QUESTION BANK

MCA

SEMESTER IV

QUESTION BANK

DESIGN AND ANALYSIS OF ALGORITHMS

MCA-202

UNIT – I

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   The best case running time of Merge Sort is:
   (a) $O(\log n)$
   (b) $O(n \log n)$
   (c) $O(n^2)$
   (d) $O(n^3)$

2   The number of swapping needed to sort the numbers 8, 22, 7, 9, 31, 19, 5, 13 in ascending order, using bubble sort is:
   (a)   11
   (b)   12
   (c)   13
   (d)   14

3   Given 2 sorted lists of size 'm' and 'n' respectively. The number of comparisons needed in the worst case by the merge sort algorithm will be:
   (a)   mn
   (b)   max(m,n)
   (c)   min(m,n)
   (d)   m+n-1

4   The running time of an algorithm T(n), where 'n' is the input size is given by:
         $T(n) = 8T(n/2) + qn$,   if $n > 1$
         p,   if $n = 1$
         where p, q are constants. The order of the algorithm is:
   (a) n^2
   (b) n^n
   (c) n^3
   (d) n

5   The way a card player arranges his cards as he picks them up one by one, is an example of:
   (a)   Bubble sort
   (b)   Selection sort
   (c)   Insertion sort
   (d)   Merge sort

6   Quick sort uses:
    (a)   Divide and conquer strategy
    (b)   Backtracking approach
    (c)   Heuristic search
    (d)   Greedy approach

7   Which algorithm of matrix multiplication runs in θ ($n^{\lg 7}$) time?
    (a)   Strassen's algorithm
    (b)   Matrix chain multiplication
    (c)   Naïve Matrix-multiplication algorithm
    (d)   None of the above

8   How many comparisons are sufficient to find?
    (a)   3 (n-2)/2
    (b) $\dfrac{3n}{2} - 2$
    (c) $3\left\lfloor \dfrac{n}{2} \right\rfloor$
    (d) $3\left\lceil \dfrac{n}{2} \right\rceil$

9   We want to check whether a given list is sorted or not. Which of the following sorting methods will be most efficient if it is already in sorted order?
    (a)   Merge sort
    (b)   Quick sort
    (c)   Insertion sort
    (d)   Bubble sort

10   We guess the form of solution in which of the following methods?
    (a)   The substitution method
    (b)   The iteration method
    (c)   The master method
    (d)   The recursive-tree method

11   What is the running time to retrieve an element from an array of size n?
(in worst case):
    (a) $O(n)$
    (b) $O(n^2)$
    (c) $O(n^3)$
    (d)   none of these

12   An algorithm lacks which of these features?
    (a)   Computes a function
    (b)   is deterministic

(c)   may take an unreasonably long time
(d)   works in discrete steps
(e)   may take forever

13   Two main measures for the efficiency of an algorithm are:
(a)   Processor and memory
(b)   Complexity and capacity
(c)   Time and space
(d)   Data and space

14   The complexity of the average case of an algorithm is:
(a)   Much more complicated to analyze than that of worst case
(b)   Much more simpler to analyze than that of worst case
(c)   Sometimes more complicated and some other times simpler than that of worst case
(d)   None of the above

15   Shell Sort was developed by
(a)   Donald L
(b)   Ruskin Bond
(c)   Bill gates
(d)   David Shell

16   Let W(n) and A (n) denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. Which of the following is always true?
(a) $A(n) = \Omega (W(n))$
(b) $A(n) = \Theta (W(n))$
(c) $A(n) = O(W(n))$
(d) $A(n) = o(W(n))$

17   The data for which you are searching is
(a)   Search argument
(b)   Sorting argument
(c)   Deletion argument
(d)   Binary argument

18   Technique for direct Search
(a)   Binary Search
(b)   Linear Search
(c)   Tree Search
(d)   Hashing

19   Time complexities of three algorithms are given. Which should execute the slowest for large values of N?
(a) $(12)O\ N$
(b) $O(N)$

(c)   O (log N)

(d)   None of these

20   The total number of comparisons in bubble sort

(a)   O(log N)

(b)   qO(n log N)

(c)   O(n)

(d)   None of these

21   Which of the sorting method is stable?

(a)   Straight insertion sort

(b)   Binary insertion sort

(c)   Shell Sort

(d)   Heap Sort

22   The information about an array that is used in a program will be stored in a

(a)   Symbol table

(b)   Activation method

(c)   System table

(d)   Dope Vector

23   The quick sort algorithm exploit_____design technique

(a)   Greedy

(b)   Dynamic programming

(c)   Divide and Conquer

(d)   Branch and Bound

24   Consider the function $f(x)= \sin(x)$ in the interval $x \in$ ($\pi/4$, 7 $\pi/4$). The number and location(s) of the local MINIMA of this function are

(a)   One, at $\pi/2$

(b)   One, at $3\pi/2$

(c)   Two, at $\pi/2$ and $3 \pi /2$

(d)   Two, at $\pi/4$ and $3\pi/2$

25   The order of an algorithm that finds whether a given Boolean function of n variables, produces a 1 is:

(a)   Constant

(b)   Linear

(c)   Exponential

(d)   Logarithmic

26   Using the standard algorithm, what is the time required to determine that number n is prime.

(a)   Constant Time

(b)   Quadratic Time

(c) Logarithmic Time
(d) Linear Time

27 Which of the following sorting method would be most suitable for sorting list which is almost sorted?
(a) Bubble Sort
(b) Merge Sort
(c) Quick Sort
(d) Heap Sort

28 The complexities of multiplying two matrices of order m*n and n *p is
(a) mnp
(b) mnq
(c) pmn
(d) nnm

29 Quick Sort is also known as
(a) Bubble Sort
(b) Merge Sort
(c) Quick Sort
(d) None of These

30 Preorder is nothing but
(a) Depth first Order
(b) Breadth first order
(c) Topological Sort
(d) Linear Order

31 Big-O notation expresses
(a) tight bounds
(b) upper bounds
(c) lower bounds
(d) best cases

32 Function g is a lower bound on function f iff for all x,
(a) $g(x) \leq f(x)$
(b) $g(x) \geq f(x)$
(c) $f = O(g)$
(d) $g = \Omega(f)$

33 A loop nested to n levels has running time
(a) $\Theta(n)$
(b) $\Theta(n^2)$
(c) $\Theta(n \lg n)$
(d) $\Theta(2^n)$

34   A useful loop invariant to help prove correctness of a sorting algorithm could be
      (a)   elements out of order are swapped
      (b)   elements are compared
      (c) $n$passes occur
      (d)   the rightmost k elements are in ascending order

35   Quadratic time is faster than
      (a) $\Theta(1)$
      (b) $\Theta(\lg n)$
      (c) $\Theta(n2)$
      (d) $\Theta(n3)$

36   Linear search is O(___)
      (a)   1
      (b)   lg n
      (c)   n
      (d) n^2;

37   The worst case running time to search for an element in a balanced binary search tree
      with $n2^n$ elements is

      (A) $\Theta(n \log n)$

      (B) $\Theta(n2^n)$

      (C) $\Theta(n)$

      (D) $\Theta(\log n)$

38   The complexity of multiplying two matrices of order m x n and n x p is
      (a)   mnp
      (b)   mnq
      (c)   mpq
      (d)   npq

39   The upper bound on the time complexity of the nondeterministic sorting algorithm is
      (a)   O(n)
      (b)   O(n log n)
      (c)   O(1)
      (d)   O(log n)

40   Let there be an array of length 'N', and the selection sort algorithm is used to sort it, how
      many times a swap function is called to complete the execution?
      (a)   N Log N times
      (b)   Log N times
      (c) N^2 times

(d)   N-1 times

41   How many number of comparisons are required in insertion sort to sort a file if the file is already sorted?
(a)   N2
(b)   N
(c)   N-1
(d)   N/2

42   The worst-case time complexity of Quick Sort is_____.
(a)   O(n2)
(b)   O(log n)
(c)   O(n)
(d)   O(n logn)

43   The worst-case time complexity of Selection Exchange Sort is_____.
(a)   O(n2)
(b)   O(log n)
(c)   O(n)
(d)   O(n logn)

44   What is an optimal Huffman code for alphabet b of the following set of frequencies a: 45, b:13, c:12, d:16, e:9, f:5
(a)   100
(b)   111
(c)   001
(d)   101

45   Which of the following method is taking overcharge for some operations in amortized analysis?
(a)   Aggregate method
(b)   Accounting method
(c)   Potential method
(d)   Both (a) and (c)

46   Which of the following method is most flexible in amortized analysis?
(a)   Aggregate method
(b)   Accounting method
(c)   Potential method
(d)   Both (a) and (c)

47   Which of the following method is taken different operations different charges in amortized analysis?
(a)   Aggregate method
(b)   Accounting method
(c)   Potential method

(d)   Both (a) and (c)

48   Which of the following method is computing total cost of an algorithm in amortized analysis?
(a)   Aggregate method
(b)   Accounting method
(c)   Potential method
(d)   Both (a) and (c)

49   Which of the following method is credit as the potential energy to pay for future operations?
(a)   Aggregate method
(b)   Accounting method
(c)   Potential method
(d)   Both (a) and (c)

50   If all c(i, j)'s and r(i, j)'s are calculated, then OBST algorithm in worst case takes one of the following time.
(a)   O(n log n)
(b) $O(n^3)$
(c) $O(n^2)$
(d)   O(log n)

51   O (N) (linear time) is better than O (1) constant time.
(a)   True
(b)   False
(c)   Both True
(d)   Both false

52   The OS of a computer may periodically collect all the free memory space to form contiguous block of free space. This is called
(a)   Concatenation
(b)   Garbage collection
(c)   Collision
(d)   Dynamic Memory Allocation

53   A mathematical-model with a collection of operations defined on that model is called
(a)   Data Structure
(b)   Abstract Data Type
(c)   Primitive Data Type
(d)   Algorithm

54   The data structure required to check whether an expression contains balanced parenthesis is
(a)   Stack
(b)   Queue
(c)   Tree

(d)   Array

55   What data structure would you mostly likely see in a non-recursive implementation of a recursive algorithm?
(a)   Stack
(b)   Linked list
(c)   Queue
(d)   Trees

56   The process of accessing data stored in a serial access memory is similar to manipulating data on a
(a)   Heap
(b)   Queue
(c)   Stack
(d)   Binary tree

57   A linear collection of data elements where the linear node is given by means of pointer is called
(a)   Linked list
(b)   Node list
(c)   Primitive list
(d)   None of these

58   Time complexities of three algorithms are given. Which should execute the slowest for large values of N?
(a)   (12) O N
(b)   O (N)
(c)   O (log N)
(d)   None of these

59   If the address of A[1][1] and A[2][1] are 1000 and 1010 respectively and each element occupies 2 bytes then the array has been stored in _____ order.
(a)   Row major
(b)   Column major
(c)   Matrix major
(d)   None of these

60   An algorithm is made up of two independent time complexities f (n) and g (n). Then the complexities of the algorithm is in the order of
(a)   f(n) x g(n)
(b)   Max (f(n),g(n))
(c)   Min (f(n),g(n))
(d)   f(n) + g(n)

61   Evaluate for the following A = TRUE, B = FALSE, C = FALSE
     i. R = NOT (A OR B) AND NOT (B OR C)
     ii. R = B AND NOT (A OR C) OR NOT (B AND C)

(a)   i is true and ii is true
(b)   i is true and ii is false
(c)   i is false and ii is true
(d)   i is false and ii is false

62   An employee came in to work and clocked in at MorningIn, clocked out at NoonOut1 for lunch, clocked back in at NoonIn, and clocked out to home at NoonOut2. Set up equation to calculate the number of hours worked for the day.
(a)   WorkingHrs = (12 - (MorningIn+NoonOut1) + (NoonOut2-NoonIn))
(b)   WorkingHrs = (12 – MorningIn + (NoonOut1-12.00) + (NoonOut2-NoonIn))
(c)   WorkingHrs = (12 – MorningIn) + (NoonOut1-12.00)-(NoonOut2-NoonIn))
(d)   WorkingHrs = (MorningIn+NoonIn) + (12.00-NoonOut2)

63   In interactivity chart the diamond indicates _____.
(a)   duplicate module
(b)   loop
(c)   decision
(d)   no special meaning

64   The difference between /, \ and MOD operator is
(a)   \ Integer Division, / Division and MOD Modulo Division
(b)   / Division, \ escape sequence, MOD remainder
(c)   / Division, \ not an operator, MOD is module
(d)   \ Division /Integer Division, MOD is Modulo Division

65   What does the algorithmic analysis count?
(a)   The number of arithmetic and the operations that are required to run the program
(b)   The number of lines required by the program
(c)   The number of seconds required by the program to execute
(d)   None of these

66   There are four algorithms A1, A2, A3, A4 to solve the given problem with the order log(n), nlog(n), log(log(n))n/log(n), Which is the best algorithm.
(a)   A1
(b)   A2
(c)   A3
(d)   A4

67   Express the formula (n-1)*(n-5) in terms of big Oh notation
(a)   O(1)
(b)   O(log n)
(c)   O(n)
(d)   O(n2)

68   How many passes are required to sort a file of size n by bubble sort method?
(a)   N2

(b) N
(c) N-1
(d) N/2

69 Which of the following sorting procedures is the slowest?
(a) Quick sort
(b) Heap sort
(c) Shell sort
(d) Bubble sort

70 The concept of order Big O is important because
(a) It can be used to decide the best algorithm that solves a given problem
(b) It determines the maximum size of a problem that can be solved in a given amount of time
(c) It is the lower bound of the growth rate of algorithm
(d) Both A and B

Ans. (1)(b), (2)(d), (3)(d), (4)(c), (5)(c), (6)(a), (7)(a), (8)(c), (9)(c), (10)(a), (11)(a), (12)(b), (13)(c), (14)(a), (15)(a), (16)(c), (17)(a), (18)(d), (19)(b), (20)(b), (21)(a), (22)(d), (23)(c), (24)(d), (25)(c), (26)(d), (27)(a), (28)(a), (29)(d), (30)(a), (31) (b), (32)(a), (33)(d), (34)(d), (35)(d), (36)(d), (37)(c), (38)(a), (39)(a), (40)(d), (41)(c), (42)(a), (43)(a), (44)(c), (45)(d), (46)(c), (47)(a), (48)(d), (49)(a), (50)(c), (51)(b), (52)(b), (53)(b), (54)(a), (55)(a), (56)(c), (57)(a), (58)(b), (59)(a), (60)(b), (61)(c), (62)(b), (63)(c), (64)(a), (65)(a), (66)(c), (67)(d), (68)(c), (69)(d), (70)(a)

(b) Fill in the Blanks:

1 Strassen's algorithm is not quite as numerically _____ as the naïve method.
2 The master method, if $f(n) = \theta\left(n^{\log_b^a}\right)$, then T(n) = _____.
3 When we have an asymptotic upper bound, we use _____.
4 A _____ is an equation or inequality that describes a function in terms of its value on smaller inputs.
5 The _____ method converts the recurrence into a tree whose nodes represent the costs incurred at various levels of the recursion.
6 The three things to be shown about a loop invariant are _____, _____ & _____.
7 The _____ running time is the longest running time for any input of size n.
8 The steps followed at each level of recursion in divide and conquer strategy are _____, _____ and _____.
9 The recurrence relation that arises in relation with worst case running time of merge sort is _____.
10 f(n) is asymptotically smaller than g(n) if _____.

14

Ans. (1) (Stable), (2) ($\theta\left(n^{\log_b^a} \lg n\right)$), (3) (O − notation), (4) (recurrence), (5) (recursion-tree method), (6) (initialization, maintenance, termination), (7) (worst-case), (8) (divide, conquer, combine), (9) ($T(n) = 2T\left(\dfrac{n}{2}\right) + \theta(n)$), (10) (f(n) = O (g(n)))

II   Short Answer Type Questions:

1   Prove using loop invariant that insertion sort is correct.
2   Discuss the basic asymptotic notations.
3   State master theorem.
4   What is randomized quick sort?
5   Briefly discuss the substitution method for solving recurrences.
6   What are the limitations of Strassen's algorithm for matrix multiplication?
7   Prove that at most $3\left\lfloor\dfrac{n}{2}\right\rfloor$ comparisons are sufficient to find simultaneous minimum and maximum.
8   Write an application of disjoint-set data structures.
9   Discuss the strategy merge sort algorithm is based on.
10   What is the difference between big-O and small-O?
11   What is Proof of correctness for an algorithm?
12   What are the basic efficiency classes?
13   What is the difference between iteration method and recursion tree method for solving recurrences?
14   Explain the DFS strategy in graph traversal?
15   Explain the BFS strategy in graph traversal?
16   Explain the technique to convert an infix expression into a postfix expression?
17   Differentiate between profiling and debugging?
18   Define time complexity. Explain how time complexity of an algorithm is computed?
19   What are the various fundamental techniques used to design an algorithm efficiently? Also write two problems for each that follows these techniques?
20   Give an algorithm to find the smallest element in a list of n numbers and analyze the efficiency.
21   Can the master method be applied to solve the recurrence?
      T(n) = 4T(n/2) + n^2 log n ? Why or why not?
22   Solve the recurrence relation by iteration:
      T(n) = T(n-1) + n^4
23   Define the "Average-case efficiency" of an algorithm?
24   How to measure the algorithm's efficiency?
25   What is the use of Asymptotic Notations?
26   Explain the Merge Sort algorithm with an example and also draw the tree structure of the recursive calls made. Analyze the efficiency of Merge sort algorithm.
27   Write a pseudo code for divide & conquer algorithm for merging two sorted arrays in to a single sorted one. Explain with example.
28   Difference between static and dynamic list?

29	What is the difference between null and void pointers?
30	What is a CONST pointer?
31	What is the difference between FIFO and LIFO?
32	What is the static List? How is it implemented?
33	Using big-O notation, state time and space complexity of quick-sort.
34	What do you mean by a randomized algorithm? Give an example.
35	Define asymptotic notation $0.\Omega$ and θ
36	What is the difference between greedy and dynamic approach.
37	Discuss the strategy merge sort algorithm is based on.

III   Long Answer Type Questions:

1   Explain merge sort algorithm in detail. Also discuss its time complexity.

2   Explain quick sort algorithm in detail. Also explain its time complexity.

3   What is data structure for disjoint sets? Explain the operation that can be performed on disjoint sets. Also discuss the linked list representation for disjoint sets.

4   Explain the Strassen's algorithm for matrix multiplication.

5   Explain recursion-tree method for solving recurrences with the help of an example.

6   Explain the red and black trees. Also explain the insertion and deletion in red and black trees.

7   Explain the AVL trees. Also explain the insertion and deletion in AVL trees.

8   A recurrence relation for Tower of Hanoi (TOH) problem is $T(n)=2T(n-1)+1$ with $T(1)=1$ and $T(2)=3$. Solve this recurrence to find the solution of TOH problem.

9   Can Master Theorem be applied to the recurrence of $T(n)=4T(n/2)+n^2 \log n$?Why and why not? Give an asymptotic upper bound of the recurrence.

10   State the Euclid's algorithm for finding GCD of two given numbers.

11   Consider the problem of adding two *n*-bit binary integers, stored in two *n*-element arrays *A* and *B*. The sum of the two integers should be stored in binary form in an $(n + 1)$ Element array *C*. State the problem formally and write pseudocode for adding the two integers.

12   Explain why the statement, "The running time of algorithm *A* is at least $O(n2)$," is meaningless.

13   We saw that the solution of $T (n) = 2T (n/2) + n$ is $O(n \lg n)$. Show that the solution of this recurrence is also $\Omega(n \lg n)$. Conclude that the solution is $\Theta(n \lg n)$.

14   Show that the solution to $T (n) = 2T (n/2+ 17) + n$ is $O(n \lg n)$.

15   Explain the procedure of Master Theorem for n terms.

16   Explain the implementation of stack using Linked List.

17   Explain Prefix, Infix and postfix expressions with example.

18   Explain the operations and the implementation of list ADT.

19   Give a procedure to convert an infix expression a+b*c+(d*e+f)*g to postfix notation
Design and implement an algorithm to search a linear ordered linked list for a given alphabetic key or name.

20   Explain why the statement, "The running time of algorithm *A* is at least $O(n2)$," is meaningless.

21   Justify the statement "Asymptotically more efficient algorithms are usually the better choice for all but small inputs" with suitable examples of notations.

22   Show that $f(n)+g(n)=O(n^2)$ where $f(n)=3n^2-n+4$ and $g(n)=n\log n+$.
23   What is meant by disjoint set? Explain the applications of disjoint set data structure.
24   Explain the control abstraction for divide and conquer with the help of binary search algorithm.
25. Explain the Strassen's algorithm for matrix multiplication.

IV   Practical Questions:

1   Illustrate the operation of merge sort on array
     A = 3, 41, 52, 26, 38, 57, 9, 49
2   Illustrate the operation of Quick sort on array:
     A = 13, 19, 9, 5, 12, 8, 7, 4, 11, 2, 6, 21
3   Solve the recurrence using recursion-tree method:
     $$T(n) = 2T\left(\frac{n}{2}\right) + cn$$
4   Illustrate the operation of heap sort on array:
     A = 13, 19, 9, 5, 12, 8, 7, 4, 11, 2, 6, 21

Solve using Master Method

5   $$T(n) = 4T\left(\frac{n}{2}\right) + n$$

6   $$T(n) = 4T\left(\frac{n}{2}\right) + n^2$$

7   $$T(n) = 4T\left(\frac{n}{2}\right) + n^3$$

8   $$T(n) = 2T\left(\frac{n}{2}\right) + n \lg n$$

9   $T(n) = 64T(n/8) - n^2\log n$

10   $T(n) = 4T(n/2) + n/\log n$

11   Is $2^{n+1} = O(2^n)$? Is $2^{2n} = O(2^n)$?

11   Show that $\frac{1}{2}n^2 - 3n = \theta(n^2)$

12   Show that $2n^2 + 3n + 1 = \theta(n^2)$

13   Let f(n) and g(n) be asymptotically nonnegative functions. Using the basic definition of Θ notation, prove that max(f(n), g(n))= Θ(f(n)+g(n))

14   Is $n^3+n=O(n^3)$?

15   Find upper and lower bounds on the polynomial $27n^2+5n+7$.

UNIT - II

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Consider the graph below and find out valid topological sorting:
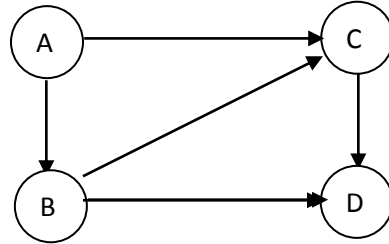
    (a)   A B C D
    (b)   B A C D
    (c)   B A D C
    (d)   A B D C

2   Which of the following is useful in traversing a given graph by BFS?
    (a)   Stack
    (b)   Set
    (c)   List
    (d)   Queue

3   The maximum degree of any vertex in a simple graph with 'n' vertices is:
    (a)   n
    (b)   n − 1
    (c)   n + 1
    (d)   2n − 1

4   The total running time of DFS is:
    (a) θ (V + E)
    (b) θ (VE)
    (c) θ (E lg V)
    (d) θ (V lg E)

5   Which of the following can be used to find strongly connected components of a graph?
    (a)   BFS
    (b)   DFS
    (c)   Prim's algo
    (d)   Kruskal'salgo

6   With which of the following algorithms time stamps are associated?
    (a)   Dijkstra'salgo
    (b)   BFS

(c) DFS

(d) Prim's

7 The complexity of linear search algorithm is
(a) O(n)
(b) O(log n)
(c) O(n2)
(d) O(n log n)

8 Which of the following abstract data type can be used to represent a many to many relation?
(a) Tree
(b) Graph
(c) Queue
(d) None of the above

9 The number of possible ordered trees with 3 nodes A, B and C are:
(a) 16
(b) 12
(c) 6
(d) 10

10 Binary search algorithm can not be applied to
(a) sorted linked list
(b) sorted binary trees
(c) sorted linear array
(d) pointer array

11 A binary tree in which every non-leaf node has non-empty left and right sub trees is called a strictly binary tree. Such a tree with 10 leaves
(a) Cannot have more than 19 nodes
(b) Has exactly 19 nodes
(c) Has exactly 17 nodes
(d) Cannot have more than 17 nodes

12 Which of the following is not the required condition for binary search algorithm?
(a) The list must be sorted
(b) There should be the direct access to the middle element in any sublist
(c) There must be mechanism to delete and/or insert elements in list
(d) None of above

13 The depth of complete binary tree with 'n' nodes is (log is to the base two)
(a) Log (n+1)-1
(b) Log (n)
(c) Log(n-1)+1
(d) Log(n)+1

14   A binary tree whose every node has either zero or two children is called
      (a)   Complete binary tree
      (b)   Binary search tree
      (c)   Extended binary tree
      (d)   None of above

15   The depth of a complete binary tree is given by
      (a) $Dn = n \log 2n$
      (b) $Dn = n \log 2n+1$
      (c) $Dn = \log 2n$
      (d) $Dn = \log 2n+1$

16   Which of the following sorting procedure is the slowest?
      (a)   Quick Sort
      (b)   Shell Sort
      (c)   Heap Sort
      (d)   Bubble Sort

17   The way a card game player arranges his cards as he picks them one by one can be
      compared to *
      (a)   Quick sort
      (b)   Merge Sort
      (c)   Insertion Sort
      (d)   Bubble Sort

18   Two isomorphic graphs must have:
      (a)   Equal number of vertices
      (b)   Same number of edges
      (c)   Same number of vertices
      (d)   All of the above

19   Which of the following sorting algorithm is on divide and conquer technique?
      (a)   Bubble Sort
      (b)   Heap Sort
      (c)   Quick Sort
      (d)   All of the above

20   Let P be a quick sort program to sort numbers in ascending order. Let t1 and t2 be the
      time taken by the program for the inputs [1 2 3 4 5] and (5 4 3 2 1) respectively. Which of
      the following holds?
      (a) $t1 = t2$
      (b) $t1 > t2$
      (c) $t1 < t2$
      (d) $t1 = t2 + 5 \log 5$.

21 Sometimes the object module produced by a compiler includes information (from the symbol table) mapping all source program names to their addresses. The most likely purpose of this information is
(a) for use as input to a debugging aid
(b) to increase the run-time efficiency of the program
(c) for the reduction of the symbol table space needed by the compiler
(d) to tell the loader where each variable belongs.

22 Which of the following sorting algorithms has average-case and worst-case running time of $O(n \log n)$?
(a) Bubble sort
(b) Insertion sort
(c) Merge sort
(d) Quick sort

23 The indirect change of the values of a variable in one module by another module is called
(a) Internal change
(b) Inter-module change
(c) Side effect
(d) Side-module update

24 Which of the following data structure is linear data structure?
(a) Tree
(b) Graph
(c) Array
(d) All of the above

25 The complexity of the average case of an algorithm is
(a) Much more complicated to analyze than that of worst case
(b) Much more simpler to analyze than that of worst case
(c) Sometimes more complicated and some other times simpler than that of worst case
(d) None or above

26 A machine needs a minimum of 100sec to sort 1000 names by quick sort. The minimum time needed to sort 100 names will be?
(a) 50.6 sec
(b) 6.7 sec
(c) 72.7 sec
(d) 12.8 sec

27 A machine needs a minimum of 200sec to sort 200 names by bubble sort. In 800 sec, it can be approximately sort?
(a) 400 names
(b) 700 names
(c) 300 names
(d) 100 names

28   The principle of locality is use of?
      (a)   Interrupts
      (b)   DMA
      (c)   Cache memory
      (d)   Polling

29   Suppose we are sorting an array of eight integers using a some quadratic sorting algorithm. After four iterations of the algorithm's main loop, the array elements are ordered as shown here
      2 4 5 7 8 1 3 6
      Which statement is correct?
      (a)   The algorithm might be either selection sort or insertion sort.
      (b)   The algorithm might be selection sort, but it is not insertion sort
      (c)   The algorithm is not selection sort, but it might be insertion sort.
      (d)   The algorithm is neither selection sort nor insertion sort.

30   Suppose that a selection sort of 100 items has completed 42 iterations of the main loop. How many items are now guaranteed to be in their final spot?
      (a)   21
      (b)   41
      (c)   42
      (d)   43

31   The problem of sorting by comparisons is
      (a)   O(n)
      (b)   O(n lg n)
      (c) $O(n^2)$
      (d) Ω(n lg n)

32   An AVL Tree is constructed by inserting the elements in the following order 5, 4, 2, 3, 7, 6 the elements which are in the leaf node are
      (a)   2, 7, 6
      (b)   5, 7
      (c)   3, 6
      (d)   5, 3, 7

33   Bubble sort is
      (a)   O(1)
      (b)   O(lg n)
      (c)   O(n)
      (d) $O(n^2)$

34   The running time for build-heap is
      (a)   O(1)
      (b)   O(lg n)

    (c)   O(n lg n)

    (d)   O(n)

35   The running time for heap-sort is
    (a)   O(1)
    (b)   O(lg n)
    (c)   O(n lg n)
    (d)   O(n)

36   A hash function f defined as f(key) = key mod 7, with linear probing used to resolve collisions. Insert the keys 37, 38, 72, 48, 98 and 11 into the table indexed from 0 to 6. What will be the location of 11?
    (a)   3
    (b)   4
    (c)   5
    (d)   6

37   The Worst case occur in linear search algorithm when
    (a)   Item is somewhere in the middle of the array
    (b)   Item is not in the array at all
    (c)   Item is the last element in the array
    (d)   Item is the last element in the array or is not there at all

38   If h is any hashing function and is used to hash n keys in to a table of size m, where n<=m, the expected number of collisions involving a particular key x is
    (a)   less than 1
    (b)   less than n
    (c)   less than m
    (d)   less than n/2

39   The sorting technique where array to be sorted is partitioned again and again in such a way that all elements less than or equal to partitioning element appear before it and those which are greater appear after it, is called
    (a)   Merge Sort
    (b)   Quick Sort
    (c)   Selection Sort
    (d)   None of these

40   If all c(i, j)'s and r(i, j)'s are calculated, then OBST algorithm in worst case takes one of the following time.
    (a)   O(n log n)
    (b)   O(n3)
    (c)   O(n2)
    (d)   O(log n)

41 For the bubble sort algorithm, what is the time complexity of the best/worst case? (assume that the computation stops as soon as no more swaps in one pass)
(a) best case: O(n) worst case: O(n*log(n))
(b) best case: O(n*log(n)) worst case: O(n*log(n))s
(c) best case: O(n*log(n)) worst case: O(n*n)
(d) best case: O(1) worst case: O(n)

42 For the quick sort algorithm, what is the time complexity of the best/worst case?
(a) best case: O(n) worst case: O(n*n)
(b) best case: O(n) worst case: O(n*log(n))
(c) best case: O(n*log(n)) worst case: O(n*log(n))
(d) best case: O(n*log(n)) worst case: O(n*n)
(e) best case: O(n*log(n)) worst case: O(n*n*n).

43 In an arbitrary tree (not a search tree) of order M. Its size is N, and its height is K. The computation time needed to find a data item on T is
(a) O(K*K)
(b) O(M*M)
(c) O(N)
(d) O(K)
(e) O(1).

44 When we organize our data as an ordered list, what is the time complexity of inserting/ deleting a data item to/from the list?
(a) O(length_of_list*length_of_list)
(b) O(length_of_list)
(c) O(log(length_of_list * length_of_list))
(d) O(1)
(e) O(log(length_of_list)*length_of_list).

45 Five statements about B-trees are below. Four of them are correct. Which one is INCORRECT?
(a) All B-trees are also search trees
(b) The word B-tree stands for balanced tree
(c) The word B-tree also stands for binary tree
(d) All leaves of a B-tree must be on the same level
(e) B-tree is not same as B+-tree.

46 For any B-tree of height H (H>1), after inserting a new key, is it possible for a key, K, which was located in a leaf-node to move up to the root in this regard which of the following is correct?
(a) Can't be defined without data
(b) Never
(c) Yes, only if H=2
(d) Yes, only when the half of the keys in the root are less than K and the other half of the keys in the root are greater than K
(e) Yes.

47 When we say the order of a tree is M, we mean
(a) Every non-leaf node must have M subtrees
(b) Every non-leaf node must have M keys

(c)   Every non-leaf node can have at most M subtrees

(d)   Every non-leaf node can have at most M keys

(e)   The Height of the tree is M.

48   T is a search tree of order M, its size is N, and its height is K. The computation time needed to INSERT/DELETE a data item on T is

(a)   O(1)

(b)   O(M)

(c)   O(Log K)

(d)   O(N)

(e)   O(K).

49   Suppose that we have a data file containing records of famous people, and we need to build a hash table to find a record from the person's birthday. The size of the hash table is 4096. The following are hash functions which convert a birthday to an integer. Which of the following function is the best?

(a)   h1(day/month/year) = day + month + year

(b)   h2(day/month/year) = day + month*31 + year

(c)   h3(day/month/year) = (day + month*31 + year*365) mod 4096

(d)   h4(day/month/year) = (day + month*31 + year*365) mod 4093

(e)   h5(day/month/year) = (day + month*31 + year*365).

50   What is collision resolution with open addressing?

(a)   When collision happens, we create a new memory location outside of the existing table, and use a chain to link to the new memory location

(b)   When collision happens, we enlarge the hash table

(c)   When collision happens, we look for an unoccupied memory location in the existing table

(d)   We use an extra table to collect all collided data

(e)   We use indexed hash table to resolve collision.

51   The depth of complete binary tree with 'n' nodes is (log is to the base two)

(a)   Log (n+1)-1

(b)   Log (n)

(c)   Log(n-1)+1

(d)   Log(n)+1

52   A binary tree whose every node has either zero or two children is called

(e)   Complete binary tree

(f)   Binary search tree

(g)   Extended binary tree

(h)   None of above

53   The depth of a complete binary tree is given by

(a)   Dn = n log2n

(b)   Dn = n log2n+1

(c)   Dn = log2n

(d)   Dn = log2n+1

54   The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
     (a)   ABFCDE
     (b)   ADBFEC
     (c)   ABDECF
     (d)   ABDCEF

55   In a binary tree, certain null entries are replaced by special pointers which point to nodes
     higher in the tree for efficiency. These special pointers are called
     (a)   Leaf
     (b)   branch
     (c)   path
     (d)   thread

56   The in order traversal of tree will yield a sorted listing of elements of tree in
     (a)   Binary trees
     (b)   Binary search trees
     (c)   Heaps
     (d)   None of above

57   In a Heap tree
     (a)   Values in a node is greater than every value in left sub tree and smaller than right
           sub tree
     (b)   Values in a node is greater than every value in children of it
     (c)   Both of above conditions applies
     (d)   None of above conditions applies

58   The number of comparisons done by sequential search is ………………
     (a)   (N/2)+1
     (b)   (N+1)/2
     (c)   (N-1)/2
     (d)   (N+2)/2

59   In general, the binary search method needs no more than ……………. comparisons.
     (a)   [log2n]-1
     (b)   [log n]+1
     (c)   [log2n]
     (d)   [log2n] +1

60   …………………. Is a directed tree in which out degree of each node is $\leq$ two.
     (a)   Unary tree
     (b)   Binary tree
     (c)   Dinary tree
     (d)   Both B and C

61   Consider the use of PAC for obtaining the solution for converting distance in Miles to
     Kilometers. The use of formula "Kilometers = 1.609* Miles" will be in

(a) given data section
(b) required result section
(c) processing required section
(d) solution alternative section

62 The PAC stands for
(a) Program Analysis Chart
(b) Problem Algorithm Code
(c) Problem Access Code
(d) Problem Analysis Chart

63 The IPO stands for
(a) Input Programming Option
(b) Input Programming Output
(c) Input Processing Output
(d) Input Operating Operation

64 The help menus or user manuals are the part of _____.
(a) Program
(b) Algorithm
(c) Internal Documentation
(d) External Documentation

65 The main measure for efficiency algorithm are-
(a) Processor and Memory
(b) Complexity and Capacity
(c) Data and Space
(d) Time and space

66 Examples of O(1) algorithms are_____.
(a) Multiplying two numbers.
(b) Assigning some value to a variable
(c) Displaying some integer on console
(d) All of the above

67 The worst-case time complexity of Quick Sort is_____.
(a) O(n2)
(b) O(log n)
(c) O(n)
(d) O(n logn)

68 The worst-case time complexity of Bubble Sort is_____.
(a) O(n2)
(b) O(log n)
(c) O(n)
(d) O(n logn)

69   The worst-case time complexity of Selection Exchange Sort is_____.
      (a)   O(n2)
      (b)   O(log n)
      (c)   O(n)
      (d)   O(n logn)

70   The worst-case time complexity of Merge Sort is_____.
      (a)   O(n2)
      (b)   O(log n)
      (c)   O(n)
      (d)   O(n logn)

Ans.   (1)(d), (2)(d), (3)(b), (4)(a), (5) (b), (6)(a), (7)(c), (8) (b), (9)(b), (10)(b), (11)(a), (12)(b),
       (13)(c), (14)(a), (15)(c), (16)(c), (17)(c), (18)(d), (19)(c), (20)(c), (21)(a), (22)(c), (23)(a),
       (24)(c), (25)(b), (26)(b), (27)(a), (28)(c), (29)(b), (30)(b), 31(c), (32)(c), (33)(d), (34)(d),
       (35)(c), (36)(c), (37)(d), (38)(a), (39)(b), (40)(b), (41)(c), (42)(d), (43)(b), (44)(c),
       (45)(c), (46)(d), (47)(b), (48)(b), (49)(b), (50)(c), (51)(a), (52)(c), (53)(d), (54)(c),
       (55)(d), (56)(b), (57)(b), (58)(b), (59)(d), (60)(b), (61)(c), (62)(d), (63)(c), (64)(d),
       (65)(d), (66)(d), (67)(a), (68)(a), (69)(a), (70)(a)

(b)   Fill in the Blanks:

1   _____ algorithm discovers all vertices at distance 'k' from source before discovering
       any vertices at distance k+1.
2   Every vertex is DFS is blackened when it is _____.
3   A _____ of a directed acyclic graph is a linear ordering of all its vertices.
4   The _____ representation of a graph G consists of an array 'A' of | V | lists one for
       each vertex is V.
5   Graph is a _____ graph if $| E | << | V |^2$
6   As a part of the maintenance work, you are entrusted with the work of rearranging the
       library books in a shelf in proper order, at the end of the day. The ideal choice would
       be…………………..sort
7   The maximum number of comparisons needed to sort 7 items using radix sort
       is…………………… (assume each item is a 4 digit decimal number)
8   ……………………sorting algorithm has the worst time complexity of nlogn.
9   ……………………sorting method sorts a given set of items that is already in order or
       reverse order with equal speed
10   The number of swapping needed to sort the numbers 8,22,7,9,31.195,13 in ascending
       order, using bubble sort is ………………….

Ans: (1)(BFS), (2)(finished), (3)(topological sorting), (4)(adjacency list), (5)(sparse),
       (6)(Insertion sort), (7)(280), (8)(Heap sort), (9)(Quick sort), (10)(14)

II   Short Answer Type Questions:

1   What is meant by sorting?
2   Mention the preliminaries of sorting.
3   What are the types of sorting?
4   What is the difference between bubble sort and selection sort?
5   Give example for insertion sort.
6   Mention the Running time for insertion sort.
7   What is meant by heap sort?
8   What do you mean by disjointsets? Which techniques are implemented for connecting graphs?
9   What is the advantage of Quick sort over Merge sort?
10   Mention the Best case n worst care of the quick sort.
11   How can we find strongly connected components in a graph?
12   Give an application of DFS.
13   What is difference between divide and conquer and dynamic programming?
14   What is the principle of radix sort?
15   Differentiate between Traversing, Searchingand Sorting.
16   Explain the insertion procedure in AVL trees.
17   Explain the Merge Sort algorithm with an example and also draw the tree structure of the recursive calls made. Analyze the efficiency of Merge sort algorithm.
18   Write a pseudo code for divide & conquer algorithm for merging two sorted arrays in to a single sorted one.Explain with example.
19   Construct a minimum spanning tree using Kruskal's algorithm with your own example.
20   Explain about Knapsack Problem with example
21   Explain Dijikstra algorithm.
22   Define Spanning tree. Discuss design steps in Prim's algorithm to construct minimum spanningtree with an example.
23   Explain Kruskal's algorithm.
24   Explain about binary search with example.
25   Write the advantages of using threaded trees.
26   Show the results of inserting 3, 1, 4, 6, 9, 2, 5, 7 into an initially binary search tree and show the results of deleting the root.
27   What are B trees?
28   What are threaded binary trees?
29   Write a function that returns the height of an AVL Tree?
30   What is the advantage of Quick sort over Merge sort?
31   What are three properties of NP-complete problem.
32   Discuss Hamiltonian cycles with example.
33   Explain the properties of binomial tree.
34   Mention the preliminaries of sorting.

III   Long Answer Type Questions:

1   Explain BFS algorithm in detail. Also explain its time complexity.
2   Explain DFS algorithm along with its time complexity in detail.
3   Write down the merge sort algorithm and give its worst case, best case and average case analysis.

4   Explain the operation and implementation of Insertion sort and counting sort.
5   Write quick sort algorithm and explain.
6   Explain in detail the simple topological sort pseudo code.
7   Compare the following:
     (a)   Radix sort
     (b)   Bucket sort
     (c)   Selection sort
8   What are red black trees? Discuss the cases for deletion of a node.
9   What are AVL trees? Explain in detail all the types of rotations possible with examples.
10   Explain the implementation of different Hashing techniques
11   Explain the insertion and deletion in red black trees.
12   Prove that the time complexity of merge sort is $O(n*log2n)$.
13   Define tractable and intractable problems with examples.
13   Write the recursive implementation of binary search algorithm. If X median value of the list of n items then how many searches were required to find X in the list using this algorithm?
14   Suppose that we had defined AVL trees to be binary search trees in which, for each node v, the heights of the left and right subtrees of v differ by at most 2 (instead of at most 1). Let ah be the minimum possible number of keys in such a tree of height h. (Define height as the length of the longest path from the root to an external node (i.e., to a leaf in the extended tree.) Then a0 = 0, a1 = 1, and a2 = 2. Give a recurrence for the value of ah when h = 3. (You don't have to solve the recurrence.)
15   Illustrate the operation of BUILD-MAX-HEAP on the array A = 5, 3, 17, 10, 84, 19, 6, 22, 9.
16   Show that there are at most $n/2h+1$nodes of height h in any n-element heap.
17   Illustrate the operation of Counting-Sort on the array A = 6, 0, 2, 0, 1, 3, 4, 6, 1, 3, 2
18   Illustrate the operation of Radix-Sort on the following list of English words: COW, DOG, SEA, RUG, ROW, MOB, BOX, TAB, BAR, EAR, TAR, DIG, BIG, TEA, NOW, FOX.
19   Illustrate the operation of BUCKET-SORT on the array A = .79, .13, .16, .64, .39, .20, .89, .53, .71, .42.
20   A full node is a node with two children. Prove that the number of full nodes plus one is equal to the number of leaves in a non empty binary tree.
21   Suppose that we replace the deletion function, which finds, return, and removes the minimum element in the priority queue, with find min, can both insert and find min be implemented in constant time?
22   Give the prefix, infix and postfix traversal algorithm.
23   Explain the operation and implementation of Binary Heap.
24   Explain how to find a maximum element and minimum element in BST?
25   Write algorithms for Union and find operations for disjoint set.
26   Write and explain the greedy method with the help of single source shortest path problem
27   Discuss the Dynamic programming solution to construct the optimal binary search tree for the given data.
     N=4, (a1,a2,a3,a4)= (do , if, int, while) P(1,4)= (3,3,1,1) and q(0,4) (2,3,1,1,1)
28   Trace quick sort algorithm for the given array of numbers, also show the tree calls and compute the average time complexity 2, 7, 8, 3, 1,9, 5, 6,3

29   Explain the operation and implementation of Insertion sort and counting sort.

IV   Practical Questions:

1   Trace the steps of insertion sort – 12,19,33,26,29,35,22. Find the total number of
        comparison made
2   Trace the quick sort algorithm for the following list of numbers: 90,77,60,99,55,88,66.
3   Show how heap sort processes the input:
        142,543,123,65,453,879,572,434,111,242,811,102.
4   Sort the sequence 3, 1, 4,7,5,9,2,6,5 using Selection sort.
5   Trace Bubble sort using following number: 25, 57, 48, 37, and 72.

6   Consider the list:
        50, 40, 20, 60, 80, 35, 90, 45
        Sort the given list using quick sort. Give sequence of steps also.

7   For the graph given below find adjacency list and adjacency matrix representation:
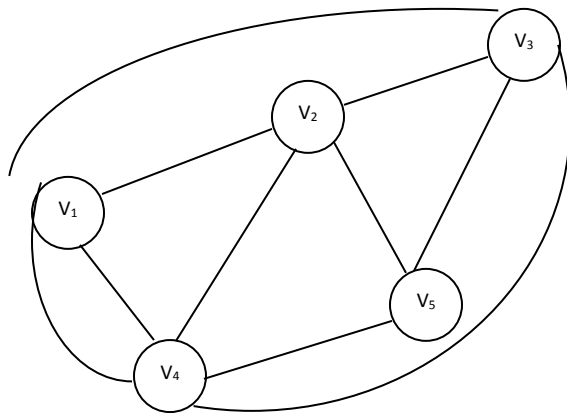
        Illustrate the operation of BFS on given graph starting from's' for Q 8

8
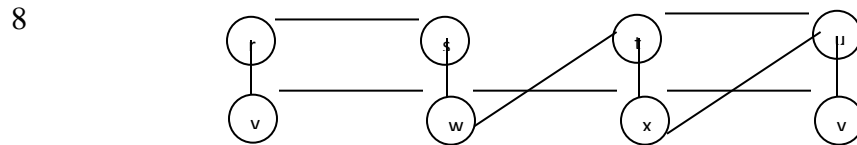
9   Illustrate the operation of DFS on given graphs starting from's':Graph given in Q.8
        above.
10   Find out the strongly connected components in the following graph:

31
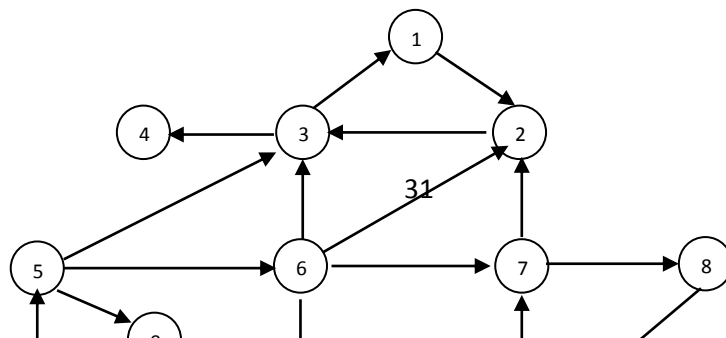
11   Prove by induction that a graph with n vertices has almost (n-1)/2 edges.

12   Sort the following array using Heap Sort:

         <5, 8, 3, 9, 2, 10, 1, 45, 32>

13   Construct a 2-3 tree for the list 9,5,8,3,2,4,7.

14   Apply Quick sort algorithm to sort the list E, X, A, M, P, L, E in alphabetical order. Draw the tree of recursive calls made.

UNIT - III

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Which of the following algorithms solves all-pair shortest path problem?
      (a)   Dijkstra's algorithm
      (b)   Floyd's algorithm
      (b)   Prim's algorithm
      (d)   Bellman-ford algorithm

2   The Bellman Ford algorithm runs in time:
      (a)   O (VE)
      (b)   O (V + E)
      (c)   O (V lg E)
      (d)   O (E lg V)

3   Which of the following algorithm does not allow a negative weight edge?
      (a)   Bellman Ford
      (d)   DAG-shortest-patch
      (c)   Dijkstra'sAlgo
      (d)   All of the above

4   Prim's algorithm works on which approach?
      (a)   Greedy Strategy
      (b)   Dynamic programming
      (b)   Divide and conquer
      (d)   None of the above

5   Dynamic programming works in:
    (a)   Top-down fashion
    (b)   Bottom-up manner
    (c)   Sandwiched approach
    (d)   All of the above

6   Development of dynamic programming can be broken into a sequence of how many steps?
    (a)   Three
    (b)   Four
    (c)   Five
    (d)   Six

7   If given 'n' distinct keys in sorted order, which of the following will be true for an optimal BST?
    (a)   For each key ki, we have a pubability pi.
    (b)   We have 'n' dummy keys.
    (c)   Every search is successful in optimal BST.
    (d)   All of the above

8   Which of the following is used to select a maximum size subset of mutually compatible activities?
    (a)   Task-scheduling problem
    (b)   Activity-selection problem
    (c)   Huffman encoding
    (d)   None of the above

9   Activity selection problem is solvable by:
    (a)   Recursive manner
    (b)   Iterative manner
    (c)   Both (a) & (b) are correct
    (d)   None of (a) & (b) is correct

10 Fractional knapsack problem is solvable by:
    (a)   Greedy strategy
    (b)   Dynamic programming
    (c)   Divide and conquer
    (d)   None of the above

11 Total running time of Huffman algo on a set of 'n' characters is:
    (a)   o (lg n)
    (b)   o (n^2)
    (c)   o (lg (lg n))
    (d)   o (n lg n))

12 For comparing DNA of two different organisms, which of the following can be used?

(a)   Matrix chain multiplication
(b)   Huffman encoding
(c)   Longest common subsequence
(d)   Activity selection

13   A schedule is said to be in early first form if :
(a)   All late tasks precede the early tasks
(b)   The early tasks precede the late tasks
(c)   The early tasks precede the late tasks and early tasks are scheduled in order of monotonically increasing deadlines.
(d)   There is no term as early-first form.

14   Which of the following does more work in solving the common sub-problems again and again?
(a)   Dynamic programming does more work than divide and conquer strategy
(b)   Divide and conquer does more work than dynamic programming
(c)   The two approaches are not comparable
(d)   Both does equal amount of work

15   What is the complexity of Bellman- Ford single- source shortest path algorithm on a complete graph of n vertices?
(a) $\theta\ (n^2)$
(b) $\theta\ (n^2 \log n)$
(c) $\theta\ (n^3)$
(d) $\theta\ (n^3 \log n)$

16   Dynamic programming divides problems into a number of
(a)   Conflicting objective functions.
(b)   Decision stages
(c)   Policies
(d)   None of the above

17   The relationship between stages of a dynamic programming problem is called a(n)
(a)   State
(b)   Random variable
(c)   Node
(d)   Graph

18   Jack is planning the Ride for Hunger route through New England. This ride will start in Providence and end in New York City. There are several possible routes as indicated below. The distances, in tens of miles, are given in the table below for each possibility.

From City	To City	Distance			From City	To City	Distance
Prov	2	5			3	5	9
Prov	3	7			4	5	8

2	3	4			4	6	6
2	4	6			5	6	3
2	5	9			5	NYC	4
3	4	6			6	NYC	8

If the cyclists are required to take the route from City 4 to City 5, how long would the shortest route from Providence to NYC be?
(a) 290 miles
(b) 320 miles
(c) 230 miles
(d) 340 miles

19 Which of the following statements is/are true for an undirected graph?
P: Number of odd degree vertices is even
Q: Sum of degrees of all vertices is even
(a) P Only
(b) Q Only
(c) Both P & Q
(d) Neither P & Q

20 What is the time complexity of Bellman-Ford single-source shortest path algorithm on a complete graph of n vertices?
(a) $\Theta(n^2 Logn)$
(b) $\Theta(n^2 Logn)$
(c) $\Theta(n^3)$
(d) $\Theta(n^3 Logn)$

21 The time complexities of some standard graph algorithms are given. Match each algorithm with its time complexity? (n and m are no. of nodes and edges respectively).
a. Bellman Ford algorithm   1. O (m log n)
b. Kruskalsalgorithm   2. O (n3)
c. Floyd Warshall algorithm   3. O(mn)
d. Topological sorting   4. O(n + m)

(a) a-3, b-1, c-2, d-4
(b) a-2, b-4, c-3, d-1
(c) a-3, b-4, c-1, d-2
(d) a-2, b-1, c-3, d-4

22 Which of the following never uses a heap?
(a) Dijkstra's algorithm
(b) Huffman code construction
(c) Longest common subsequence construction
(d) Prim's algorithm

23   The main disadvantage of compressed adjacency lists is:
      (a)   Directed graphs may not be represented
      (b)   It is difficult to change the graph
      (c)   They waste space
      (d)   Undirected graphs may not be represented

24   When a graph is dense, the best way to find the shortest path to each vertex from a
      common source vertex is:
      (a)   Dijkstra's algorithm using heap
      (b)   Dijkstra's algorithm using T-table
      (c)   Floyd-Warshall algorithm
      (d)   Warshall's algorithm

25   If the choice of the augmenting path is arbitrary (Ford-Fulkerson), an edge could be
      critical this number of times:
      (a)   E
      (b)   V
      (c)   (V-2)/2
      (d)   depends on the maximum capacity appearing in the network

26   During depth-first search on a directed graph, a cycle is indicated by which edge type?
      (a)   Back
      (b)   Cross
      (c)   Forward
      (d)   Tree

27   The fastest method for finding the diameter of a tree is to:
      (a)   Use breadth-first search.
      (b)   Use Dijkstra's algorithm.'
      (c)   Use the Floyd-Warshall algorithm.
      (d)   Use the Ford-Fulkerson algorithm.

28   Suppose a depth-first search is performed on an undirected graph. The graph is a free
      (i.e. unrooted) tree if:
      (a)   all edges are tree edges
      (b)   both C and D
      (c)   there are no restarts
      (d)   there are no back edges

29   The relationship of the net flow across a cut and the amount of flow from the source to
      the sink is:
      (a)   The amount of flow does not exceed the net flow.
      (b)   The net flow does not exceed the amount of flow.
      (c)   There is no relationship.
      (d)   They are equal.

30   Suppose that a depth-first search on a directed graph yields a path of tree edges from vertex X to vertex Y. If there is also an edge from X to Y, then its type will be:
(a)   Back
(b)   Cross
(c)   Forward
(d)   Tree

31   Which of the following basic algorithms can be used to most efficiently determine the presence of a cycle in a given graph?
(a)   Minimum cost spanning tree algorithm
(b)   Ford-Fulkerson's algorithm
(c)   breadth-first search algorithm
(d)   depth-first search algorithm

32   The approach to algorithm design that reuses part of the solution search by storing values in memory is
(a)   divide and conquer
(b)   greedy
(c)   brute force
(d)   dynamic programming

33   The Kruskal, Prim, and Dijkstra algorithms have what approach to algorithm design in common?
(a)   divide and conquer
(b)   greedy
(c)   brute force
(d)   dynamic programming

34   The single-source shortest path problem has an efficient well-known solution of the type
(a)   brute force
(b)   greedy
(c)   depth-first search
(d)   divide-and conquer

35   The breadth-first search
(a)   uses a queue
(b)   uses a stack
(c)   searches an array
(d)   searches a tree

36   The running time for heap-extract-min is
(a) $O(1)$
(b) $O(\lg n)$
(c) $O(n \lg n)$
(d) $O(n)$
(e) $O(n^2)$

37   The height of a BST is on average $O(\_\_)$

(a)   1
(b)   lg n
(c)   n
(d)   nlg n

38   String matching is a(n) _____ problem
(a)   vector;
(b)   optimization;
(c)   state-space search;
(d)   interactive computation

39   The Kruskal, Prim, and Dijkstra algorithms have what approach to algorithm design in Common?
(a)   divide and conquer
(b)   greedy
(c)   brute force
(d)   dynamic programming

40   The approach to algorithm design that reuses part of the solution search by storing values in memory is
(a)   divide and conquer
(b)   greedy
(c)   brute force
(d)   dynamic programming

41   P, Q and R are pointer variables. The statements below are intended to swap the contents of the nodes pointed to by P and Q. rewrite it so that it will work as intended.
P = Q;   R = Q;   Q = R;
(a)   R=Q; P=R; Q=R;
(b)   R=P; P=P; Q=Q;
(c)   P=P; P=Q; R=Q;
(d)   R=P; P=Q; Q=R;

42   Consider the usual algorithm for determining whether a sequence of parentheses is balanced. What is the maximum number of parentheses that will appear on the stack AT ANY ONE TIME when the algorithm analyzes: (()(())(()))
(a)   1
(b)   2
(c)   3
(d)   4

43   The Knapsack problem where the objective function is to minimize the profit is _____
(a)   Greedy
(b)   Dynamic 0 / 1
(c)   Back tracking
(d)   Branch & Bound 0/1

44. Choose the correct answer for the following statements:
    I. The theory of NP–completeness provides a method of obtaining a polynomial time for NPalgorithms.
    II. All NP-complete problem are NP-Hard.

    (a) I is FALSE and II is TRUE
    (b) I is TRUE and II is FALSE
    (c) Both are TRUE
    (d) Both are FALSE

45. For 0/1 KNAPSACK problem, the algorithm takes _____ amount of time for memory table, and _____time to determine the optimal load, for N objects and W as the capacity of KNAPSACK.
    (a) O(N+W), O(NW)
    (b) O(NW), O(N+W)
    (c) O(N), O(NW)
    (d) O(NW), O(N)

46. What is the type of the algorithm used in solving the 8 Queens problem?
    (a) Greedy
    (b) Dynamic
    (c) Branch and Bound
    (d) Backtracking.

47. Sorting is not possible by using which of the following methods?
    (a) Insertion
    (b) Selection
    (c) Deletion
    (d) Exchange

48. The Sorting method which is used for external sort is
    (a) Bubble sort
    (b) Quick sort
    (c) Merge sort
    (d) Radix sort

49. In analysis of algorithm, approximate relationship between the size of the job and the amount of work required to do is expressed by using _____
    (a) Central tendency
    (b) Differential equation
    (c) Order of execution
    (d) Order of magnitude

50 There are 5 items as follows

Items	w_i	v_i
Item1	5 pounds	30$
Item2	10 pounds	20$
Item3	20 pounds	100$
Item4	30 pounds	90$
Item5	40 pounds	160$

The knapsack can hold 60 pounds find the optimal solution
(a) 250$
(b) 260 $
(c) 270 $
(d) 290$

51 In a graph if e= [u, v], Then u and v are called
(a) endpoints of e
(b) adjacent nodes
(c) neighbors
(d) all of above

52 A connected graph T without any cycles is called
(a) a tree graph
(b) free tree
(c) a tree
(d) All of above

53 In a graph if e=(u, v) means
(a) u is adjacent to v but v is not adjacent to u
(b) e begins at u and ends at v
(c) u is processor and v is successor
(d) both b and c

54 If every node u in G is adjacent to every other node v in G, A graph is said to be
(a) isolated
(b) complete
(c) finite
(d) strongly connected

55 What is the time complexity of Floyd–Warshall algorithm to calculate all pair shortest
path in a graph with **n** vertices?
(a) O(n^2logn)
(b) Theta(n^2logn)
(c) Theta(n^4)
(d) Theta(n^3)

56   A networking company uses a compression technique to encode the message before transmitting over the network. Suppose the message contains the following characters with their frequency:

Character   Frequency
a   5
b   9
c   12
d   13
e   16
f   45

Note: Each character in input message takes 1 byte.

If the compression technique used is Huffman Coding, how many bits will be saved in the message?
(a)   224
(b)   800
(c)   576
(d)   324

57   What is the time complexity of Huffman Coding?
(a)   O(N)
(b)   O(NlogN)
(c)   O(N(logN)^2)
(d)   O(N^2)

58   Which of the following is true about Kruskal and Prim MST algorithms? Assume that Prim is implemented for adjacency list representation using Binary Heap and Kruskal is implemented using union by rank.
(a)   Worst case time complexity of both algorithms is same.
(b)   No Comparison between them.
(c)   Worst case time complexity of Kruskal is better than Prim.
(d)   Worst case time complexity of Prim is better than Kruskal

59   Suppose the letters a, b, c, d, e, f have probabilities 1/2, 1/4, 1/8, 1/16, 1/32, 1/32 respectively. Which of the following is the Huffman code for the letter a, b, c, d, e, f?
(a)   0, 10, 110, 1110, 11110, 11111
(b)   11, 10, 011, 010, 001, 000
(c)   11, 10, 01, 001, 0001, 0000
(d)   110, 100, 010, 000, 001, 111

60   If every node u in G is adjacent to every other node v in G, A graph is said to be
(a)   isolated
(b)   complete
(c)   finite
(d)   strongly connected

61   Which of the following case does not exist in complexity theory?
(a)   Best case
(b)   Worst case
(c)   Average case
(d)   Null case

62   The recurrence relation capturing the optimal execution time of the Towers of Hanoi
problem with n discs is
(a) $T(n) = 2T(n - 2) + 2$
(b) $T(n) = 2T(n - 1) + n$
(c) $T(n) = 2T(n/2) + 1$
(d) $T(n) = 2T(n - 1) + 1$

63   Which of the following sorting methods would be most suitable for sorting a list which is
almost sorted?
(a)   Bubble Sort
(b)   Insertion Sort
(c)   Selection Sort
(d)   Quick Sort

64   The running time of insertion sort is
(a) $O(n^2)$
(b) $O(n)$
(c) $O(\log n)$
(d) $O(n \log n)$

65   A sort which compares adjacent elements in a list and switches where necessary is _____.
(a)   insertion sort
(b)   heap sort
(c)   quick sort
(d)   bubble sort

66   The correct order of the efficiency of the following sorting algorithms according to their
overall running time comparison is
(a)   Insertion>selection>bubble
(b)   Insertion>bubble>selection
(c)   Selection>bubble>insertion.
(d)   bubble>selection>insertion

67   The way a card game player arranges his cards as he picks them one by one can be
compared to
(a)   Quick sort
(b)   Merge sort
(c)   Insertion sort
(d)   Bubble sort

68   Which among the following is the best when the list is already sorted?
      (a)   Insertion sort
      (b)   Bubble sort
      (c)   Merge sort
      (d)   Selection sort

69   The total number of comparisons made in quick sort for sorting a file of size n, is
      (a)   O(n log n)
      (b)   O(n2)
      (c)   n(log n)
      (d)   None of the above

70   For the improvement of efficiency of quick sort the pivot can be
      (a)   the first element
      (b)   the mean element
      (c)   the last element
      (d)   None of the above

Ans.   (1)(b), (2)(a), (3)(c), (4)(a), (5)(b), (6)(b), (7)(a), (8)(b), (9)(c), (10)(a), (11)(d), (12)(c),
       (13)(b), (14)(b), (15)(a), (16)(a), (17)(b), (18)(b), (19)(c), (20)(c), (21)(a), (22)(a),
       (23)(d), (24)(a), (25)(c), (26)(c), (27)(b), (28)(c), (29)(b), (30)(b), (31)(d), (32)(d),
       (33)(b), (34)(b), (35)(a), (36)(b), (37)(b), (38)(c), (39)(b), (40)(d) ,(41)(d), (42)(d),
       (43)(b), (44)(b), (45)(a), (46)(b), (47)(b), (48)(c), (49)(b), (50)(d), (51)(d), (52)(d),
       (53)(d), (54)(b), (55)(d), (56)(c), (57)(b), (58)(c), (59)(a), (60)(b), (61)(d), (62)(d),
       (63)(b), (64)(a), (65)(a), (66)(d), (67)(c), (68)(a), (69)(a), (70)(b)

(b)   Fill in the Blanks:

1   _____ algorithm for finding minimum spanning tree excludes cycles.
2   The running time for Prim's algo is _____.
3   _____ uses EXTRACT_MIN(Q) procedure.
4   Negative weight cycles can be detected using _____ algo.
5   Finding the shortest path to a given destination vertex 't' from vertex 's' for given
      vertices 't' and 's' is known as _____.
6   Dynamic programming is applicable where the subproblems are _____.
7   Huffman codes can be used in _____.
8   A set 'A' of tasks is _____ if there exists a schedule for these tasks such that no tasks
      are late.
9   A _____ is a job that requires exactly one unit of time to complete.
10   Huffman codes are _____ codes.
11   The minimum number of scalar multiplications needed to compute the matrix $A_{i \ldots j}$, is
      denoted by _____.
12   A _____ algorithm solves every subproblem once and then saves its answer in table.
13   A problem exhibits _____ if an optimal solution to the problem contains within it
      optimal solutions to subproblems.

14   Procedure for computing length of LCS takes _____ time.
15   _____ is an example of greedy algorithm.

Ans.   (1)(Kruskal's), (2)(O (E lg V)), (3)(Prim's/Dijkstra's), (4)(Bellman Ford), (5)(Single pair shortest path), (6)(not independent), (7)(compressing data), (8)(independent), (9)(unit time task), (10)(prefix or variable length), (11)(m [i, j]), (12)(dynamic programming), (13)(optimal substructure), (14)(O (mn)), (15)(Huffman codes/task scheduling/activity selection)

II   Short Answer Type Questions:

1   Give the elements of Dynamic programming.
2   Explain briefly the elements of Greedy Strategy.
3   What are the steps into which development of a dynamic programming algorithm can be broken?
4   Explain optimal binary search trees in brief.
5   What is task scheduling problem?
6   What is difference between divide and conquer and dynamic programming?
7   Compare and contrast between dynamic programming and greedy algorithms.
8   Write the algorithm for PRINT_OPTIMAL_PARENS(s,i,j) with matrix chain multiplication.
9   State matrix chain multiplication problem.
10   What is the key idea Huffman codes are based on?
11   Give the algorithm for Initialise_single_source.
12   Explain with example Relax algorithm.
13   What is topological sorting?
14   Analyze the time complexity of Rabin –Karp algorithm.
15   Why a variable length code is always better than fixed length code? Is Huffman code a fixed length code?
16   Draw an optimal Huffman tree for the following set of frequencies based on first 8 Fibonacci numbers
        A:1 b:1 c:2 d:3 e:5 f:8 g:13 h:21
17   Explain Optimal Binary Search Trees
18   Compute the prefix function π for the pattern ababbabbabbababbabb when the alphabet is $\Sigma = \{a, b\}$.
19   Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is 5, 10, 3, 12, 5, 50, 6.
20   Determine an LCS of 1, 0, 0, 1, 0, 1, 0, 1 and 0, 1, 0, 1, 1, 0, 1, 1, 0.
21   Describe how assembly-line scheduling has overlapping sub problems.
22   Four matrices M1, M2, M3 and M4 of dimensions pxq, qxr, rxs and sxt respectively can be multiplied is several ways with different number of total scalar multiplications. For example, when multiplied as ((M1 X M2) X (M3 X M4)), the total number of multiplications is pqr + rst + prt. Whenmultiplied as (((M1 X M2) X M3) X M4), the total number of scalar multiplications is pqr + prs + pst.If p = 10, q = 100, r = 20, s = 5 and t= 80. What are the total number of scalar multiplications required?

23   Consider the undirected graph below: Use Prim's algorithm to construct a minimum spanning tree starting with node A,
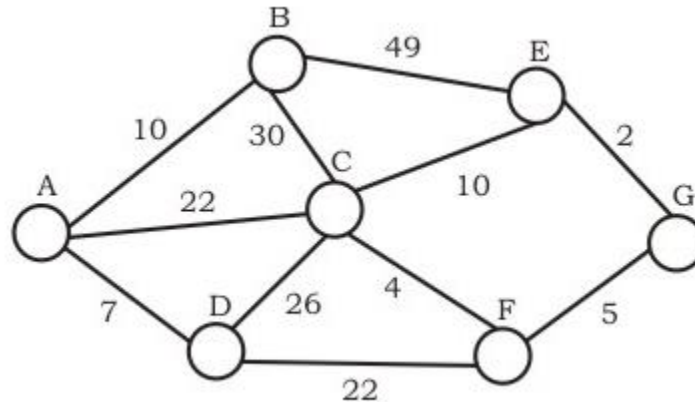
24   Apply KMP algorithm on the following data S=bacbababababacaca P=ababaca Here 'P' Substring to be search in 'S'.
25   Discuss R.Karp Algorithm of String with the help of an Example? While solving the example take value of q=5.
26   Write the Procedure for Matching String Using Naïve Algorithm.
27   What is topological sorting?
28   Difference between deterministic and non-determinsitic algorithms.
29   What is NP hard and NP complete problems.
30   Write the algorithm for counting sort.
31   Write a procedure to Huffman code.

III   Long Answer Type Questions:

1   Write and explain the matrix chain multiplication algorithm.
2   Explain LCS in detail.
3   What is activity selection problem? Explain with the help of an example.
4   What are Huffman codes? Why do we use them? Construct the Huffman codes for any set of 6 characters.
5   Give and explain the algorithm OPTIMAL_BST(p,q,n) step-by-step. Also find its time complexity.
6   Explain Dijkstra'salgo for finding out single source shortest paths.
7   Write Prim's algorithm for finding out minimum spanning tree. Explain its functionality on a sample graph and compute its time complexity.
8   Write Kruskal's algorithm. Explain its functionality on a sample graph and compute its time complexity.
9   Explain how Bellman Ford algorithm can be used to detect the presence of negative weight cycles.
10   Explain Floyd Warshall algorithm, in detail.
11   Find the longest common subsequence from the given two sequence of characters-
   (a)   P=< ABCDBCDCDD>
             Q=<BCDCD>
      (b)   P=<100101101101>

Q=<0110>

12   For a given n-vertex convex polygon proves that a very polygon has n=3 chords and divides the polygon into n-2 triangles.

13   Given the characters set S=<a,b,c,d,e,f> with the following probability of occurrence-P=<1,1,2,3,5,8>, build binary tree according to Greedy Strategy.

14   Write a pseudo code for divide & conquer algorithm for merging two sorted arrays in to a single sortedone.Explain with example.

15   Construct a minimum spanning tree using Kruskal's algorithm with your own example.

16   Working modulo $q = 11$, how many spurious hits does the Rabin-Karp matcher encounter in the text $T = 3141592653589793$ when looking for the pattern $P = 26$?

17   Construct the string-matching automation for the pattern P = aabab and illustrate its operation on the text string T = aaababaabaababaab.

18   Give a dynamic-programming solution to the 0–1 knapsack problem that runs in $O(n\ W)$ time, where n is number of items and W is the maximum weight of items that the thief can put in his knapsack.

19   What are the various fundamental techniques used to design analgorithm efficiently? Also write two problems for each that follows these techniques?

20   Give an algorithm to find the smallest element in a list of n numbers and analyze the efficiency.

21   Differentiate between Huffman code and fixed length code? Explain with example?

22   Apply matrix chain multiplication on the following matrices and show 'm' and 's' table in the results:
      A1=10X5, A2=5X30, A3=30X20, A4=20X15

23   What are the characteristic of the optimization problem, in the context of greedy algorithm? What do you mean by greedy choice property? Write the Greedy Method for SUBSET Paradigm and ORDERING paradigm? What is topological sorting? Use topological sorting algorithm to find the topological order of the vertices from the following graph? Comment on complexity of the topological sorting algorithm?

24   Define and differentiate between deterministic and Non-Deterministic algorithm. Explain the construction of Nondeterministic algorithm with an example to solve 0/1 knapsack problem?

25   Considering a 0/1 Knapsack problem, explain the application of Dynamic Programming, and Greedy algorithm to find an optimal solution. Give the two separate repetition of problem space and compare the time complexity of the algorithm under the said paradigm.

26   Explain Prim's algorithm using suitable example.

27   With the help of recursion tree, provide tight asymptotic bound on the solution of:
      T(n)= T(n/2) + T(n/4) + t(/8) + n

28   Discuss the procedure of bellman-ford algorithm.

29   State and explain the Cook's theorem. How it helps in solving NP-Problems.

30   Differentiate between NP-Complete and NP-hard problems.

IV   **Practical Questions:**

For the given graphs obtain MST by Kruskal's method:

1
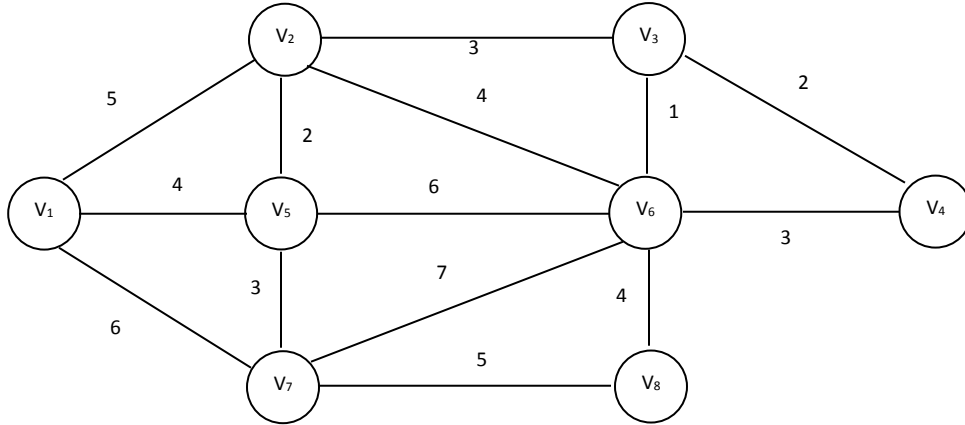
2
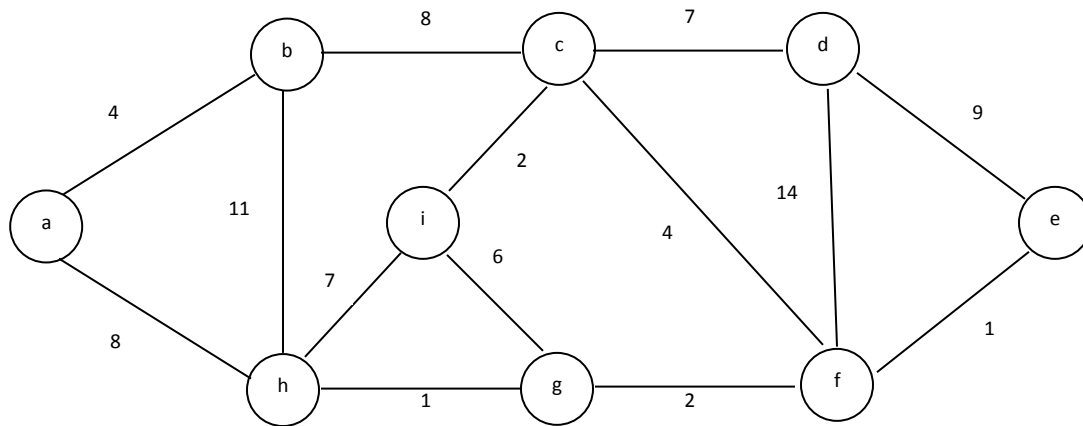
Find the MST by Prim's algorithm for the graph given below:

3
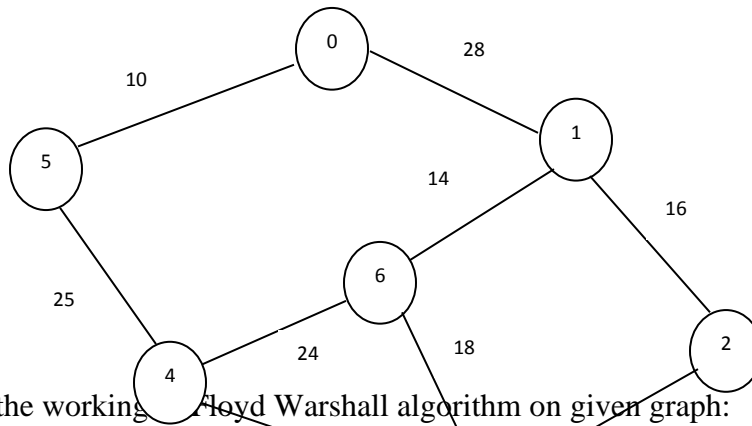
4 Show the working Floyd Warshall algorithm on given graph:
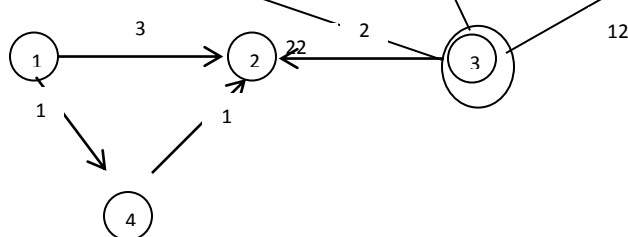
5   Trace the action of Dijkstra's algorithm on following graph:
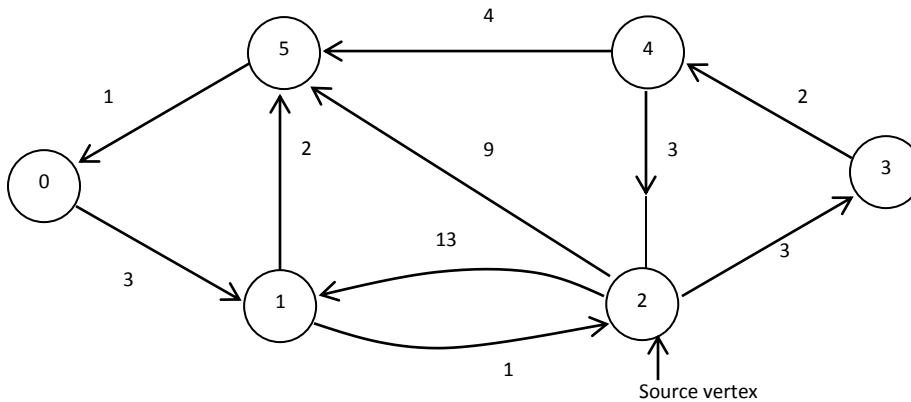
6   Show the working of Bellman Ford algorithm on the following graph:
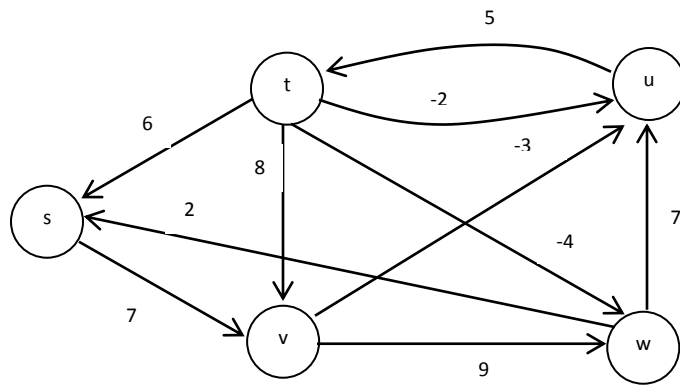
7   Find LCS of sequences $<$ A, B, C, B, D, A, B $>$ and $<$ B, D, C, A, B, A $>$.

8   Compute LCS of $<$ 1, 0, 0, 1, 0, 1, 0, 1$>$ and $<$ 0, 1, 0, 1, 1, 0, 1, 1, 0 $>$

9   Compute LCS of $<$ A, B, B, A, B, B, A, C, B $>$ and $<$ B, A, B, B, A, B, C $>$.

10   Compute Huffman codes for first 8 fibonacci numbers.

11   What is an optimal Huffman code for the following set of frequencies:
          a : 45, b : 13, c : 12, d : 16, e : 9,   f : 5

12   Find the Huffman codes for the following set of frequencies:
          M : 7   n : 11   o : 13   p : 5   q : 17   r : 23   s : 19

13   Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $<$ 5, 10, 3, 12, 5, 50, 6$>$

14   Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $<$ 30, 35, 15, 5, 10, 20, 25$>$

15   Consider the following set of's' of activities:

I	1	2	3	4	5	6	7	8	9	10	11
S_i	1	3	0	5	3	5	6	8	8	2	12
F_i	4	5	6	7	8	9	10	11	12	13	14

Find the largest set of mutually exclusive activities using activity-selection algorithm.

16

I	0	1	2	3	4	5
p_i		0.15	0.10	0.05	0.10	0.20
q_i	0.05	0.10	0.05	0.05	0.05	0.10

Compute 'e', 'w' and 'root' matrices for above data.

UNIT - IV

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   The matching time taken by KMP algorithm is:
(a) $\theta (n)$
(b) $\theta (m |\Sigma|)$
(c) $O ((n - m + a)m)$
(d) $\theta (n^2)$

2   A finite automation comprises of:
(a)   Start state
(b)   Transition function
(c)   Final state
(d)   All of the above

3   Prefix function is calculated in which of the following algorithms?
(a)   Rabin Karp
(b)   KMP
(c)   Naïve-string Matcher
(d)   None of the above

4   Which class contains problems that are solvable in polynomial time?
(a)   P
(b)   NP
(c)   NPC
(d)   A

5   Which class contains problems that are "verifiable" in polynomial time?
(a)   P
(b)   NPC
(c)   NP
(d)   A

6   Which of the following statements are TRUE?

(1)   The problem of determining whether there exists a cycle in an undirected graph is in P.

(2)   The problem of determining whether there exists a cycle in an undirected graph is in NP.

(3)   If a problem A is NP-Complete, there exists a non-deterministic polynomial time algorithm to solve A.

(a)   1,2and3
(b)   1and2only
(c)   2and3only
(d)   1 and 3 only

7   Let T (n) be the function defined by T (n) = 1 and T (n) = 2T (n/2) + √n, which of the following is TRUE?
(a)   T(n) = O(√n)
(b)   T(n) = O(log2n)
(c)   T(n) = O(n)
(d)   T(n) = O(n2)

8   In a Linear Programming Problem, suppose there are 3 basic variables and 2 non-basic variables, then the possible number of basic solutions are
(a)   6
(b)   8
(c)   10
(d)   12

9   Which one of the following is the tightest upper bound that represents the time complexity of inserting an object into a binary search tree of n nodes?
(a)   O(1)
(b)   O(logn)
(c)   O(n)
(d)   O(n log n)

10   Which one of the following is the tightest upper bound that represents the number of swaps required to sort n numbers using selection sort?
(a)   O(log n)
(b)   (B) O(n)
(c)   O(n log n)
(d)   O(n^2)

11   Consider an undirected random graph of eight vertices. The probability that there is an edge between a pair of vertices is 1/2. What is the expected number of unordered cycles of length three?
(a)   1/8
(b)   1
(c)   7
(d)   8

12   Let V1 = 2I − J + K and V2 = I + J − K, then the angle between V1 & V2 and a, vector perpendicular to both V1 & V2 shall be:
    (a)   90° and (−2I + J − 3K)
    (b)   60° and (2I + J + 3K)
    (c)   90° and (2I + J − 3K)
    (d)   90° and (−2I − J + 3K)

13   Let X be a problem that belongs to the class NP. Then which one of the following is TRUE?
    (a)   There is no polynomial time algorithm for X.
    (b)   If X can be solved deterministically in polynomial time, then P = NP.
    (c)   If X is NP-hard, then it is NP-complete.
    (d)   X may be undecidable.

14   What is the number of swaps required to sort n elements using selection sort, in the worst case?
    (a) $\theta(n)$
    (b) $\theta(n \log n)$
    (c) $\theta(n^2)$
    (d) $\theta(n^2 \log n)$

15   Which one of the following represents the time complexity of the algorithm?
    (a) $\theta(n)$
    (b) $\theta(n \log n)$
    (c) $\theta(n^2)$
    (d) $\theta(n^2 \log n)$

16   The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What is the resultant hash table?

(A)	(B)	(C)	(D)
0	0	0	0
1	1	1	1
2 2	2 12	2 12	2 12, 2
3 23	3 13	3 13	3 13, 3, 23
4	4	4 2	4
5 15	5 5	5 3	5 5, 15
6	6	6 23	6
7	7	7 5	7
8 18	8 18	8 18	8 18
9	9	9 15	9

17   The goal of the optimal matrix multiplication problem is to:
    (a)   Minimize the number of C(i,j) instances evaluated.
    (b)   Minimize the number of matrix multiplications.
    (c)   Minimize the number of scalar additions.
    (d)   Minimize the number of scalar multiplications.

18   Which of the following is not true for the activity scheduling problem?
    (a)   The activities may have various durations.

(b)   The greedy solution is a heuristic.
(c)   There may be several optimal solutions.
(d)   The goal is to maximize the number of activities.

19   Suppose that a maximum bipartitie matching with k edges is found using Edmonds-Karp. Which of the following does not hold?
(a)   All residual network capacities are zero or one.
(b)   Every augmenting path uses three edges.
(c)   The capacity of the minimum cut is k.
(d)   There will be k + 1 breadth-first searches.

20   Suppose that a depth-first search on a directed graph yields a path of tree edges from vertex X to vertex Y. If there is also an edge from X to Y, then its type will be:
(a)   Back
(b)   Cross
(c)   Froward
(d)   Tree

21   Suppose a depth-first search is performed on an undirected graph. The graph is a free (i.e. unrooted) tree if:
(a)   all edges are tree edges
(b)   both C and D
(c)   there are no restarts
(d)   there are no back edges

22   The relationship of the net flow across a cut and the amount of flow from the source to the sink is:
(a)   The amount of flow does not exceed the net flow.
(b)   The net flow does not exceed the amount of flow.
(c)   There is no relationship.
(d)   They are equal.

23   The function $n + \log n$ is in which set?
(a) $\Omega(n \log n)$
(b) $\Theta(\log n)$
(c) $\Theta(n)$
(d) $\Theta(n \log n)$

24   Suppose that a binary search is to be performed on a table with 20 elements. The maximum number of elements that could be examined (probes) is:
(a)   4
(b)   5
(c)   6
(d)   7

25 Suppose $f(x)$ is a monotonically increasing function. Which of the following approximates the summation?

(a)
$$\int_{m}^{n} f(x)dx \le \sum_{k=m}^{n} f(k) \le \int_{m}^{n} f(x)dx$$

(b)
$$\int_{m-1}^{n} f(x)dx \le \sum_{k=m}^{n} f(k) \le \int_{m}^{n+1} f(x)dx$$

(c)
$$\int_{m-1}^{n-1} f(x)dx \le \sum_{k=m}^{n} f(k) \le \int_{m+1}^{n+1} f(x)dx$$

(d)
$$\int_{m}^{n+1} f(x)dx \le \sum_{k=m}^{n} f(k) \le \int_{m-1}^{n} f(x)dx$$

26 Which of the following is true about any cut for an instance of the network flow problem?
(a)   The capacity is a lower bound on the maximum flow.
(b)   The capacity is an upper bound on the maximum flow.
(c)   The capacity is equal to the maximum flow.
(d)   The cut was found by a depth-first search on the original input network.

27 The fractional knapsack problem may be solved optimally by a greedy method by taking a fraction of no more than this number of items.
(a)   0
(b)   1
(c)   2
(d)   3

28 In which situation will a sentinel be inappropriate?
(a)   Binary search for a key in an ordered table, to simplify and speed-up code
(b)   Search for a key in an unordered table, to simplify and speed-up code
(c)   Search for a key in an unordered linked list, to simplify and speed-up code
(d)   Red-black tree, to simplify code

29 Which procedure is used as key element in a backward chaining algorithm?
(a)   Matching
(b)   Unification matching
(c)   Verification
(d)   None of the mentioned

30 What is the name of elements present in patterns?
(a)   Variables
(b)   Patterns

    (c)   Pattern variables

    (d)   Pattern element

31   A problem is said to be NP-Complete
    (a)   If it is as 'hard' as any problem in NP
    (b)   A non-polynomial time algorithm has been discovered
    (c)   A polynomial time algorithm can exist but needs a parallel computer
    (d)   There is Greedy solution to the problem

32   Which of the following problems is known to have a polynomial time solution
    (a)   Longest simple path problem for a given graph
    (b)   The 3-colorability problem in graphs
    (c)   The Eulerian cycle in a graph
    (d)   The Hamiltonian Cycle in a graph

33   Problem A is reducible to problem B if there is an algorithm that can
    (a)   transform any instance of B to an instance of A
    (b)   transform any instance of A to an instance of B
    (c)   solve A
    (d)   solve A as fast as B

34   Problems to which SAT or similar problems are reducible are called
    (a)   P
    (b)   NP
    (c)   NP-complete
    (d)   NP-hard;

35   Solving the Traveling Salesperson Problem by comparing costs of all paths is
    (a)   divide and conquer;
    (b)   exhaustive search
    (c)   the greedy approach;
    (d)   dynamic programming

36   Consider three decision problems P1, P2 and P3. It is known that P1 is decidable and P2 is undecidable. Which one of the following is TRUE?
    (a)   P3 is decidable if P1 is reducible to P3
    (b)   P3 is undecidable if P3 is reducible to P2
    (c)   P3 is undecidable if P2 is reducible to P3
    (d)   P3 is decidable if P3 is reducible to P2's complement

37   A search technique where we keep expanding nodes with least accumulated cost so far is called
    (a)   Hill Climbing
    (b)   Branch and Bound
    (c)   Best First
    (d)   Divide and Conquer

38   The worst case time complexity of the non-deterministic dynamic knapsack algorithm is
      (a)   O(n log n)
      (b)   O(log n)
      (c   O(n2)
      (d)   O(n)

39   What is the type of the algorithm used in solving the 8 Queens problem?
      (a)   Backtracking
      (b)   Dynamic Programming
      (c)   Branch and Bound
      (d)   Greedy

40   How many edges are there in a Hamiltonian cycle if the edge cost is 'c' and the cost of
      cycle is 'cn'
      (a)   c
      (b)   cn
      (c)   n
      (d)   2c

41   What is an optimal Huffman code for alphabet**a** of the following set of frequencies a: 01,
      b:01, c:02, d:03, e:05, f:8, g:13, h:21
      (a)   001010
      (b)   001111
      (c)   111100
      (d)   101010

42   What is an optimal Huffman code for alphabet **b** of the following set of frequencies a: 45,
      b:13, c:12, d:16, e:9, f:5
      (a)   100
      (b)   111
      (c)   001
      (d)   101

43   What is an optimal Huffman code for alphabet**e** of the following set of frequencies a: 29,
      b:25, c:20, d:12, e:05, f:09
      (a)   100 0
      (b)   1110
      (c)   0010
      (d)   1011

44   Which of the following method is taking overcharge for some operations in amortized
      analysis?
      (a)   Aggregate method
      (b)   Accounting method
      (c)   Potential method
      (d)   Both (A) and (C)

45   Which of the following method is most flexible in amortized analysis?
      (a)   Aggregate method
      (b)   Accounting method
      (c)   Potential method
      (d)   Both (A) and (B)

46   Which of the following method is taken different operations different charges in
      amortized analysis?
      (a)   Aggregate method
      (b)   Accounting method
      (c)   Potential method
      (d)   Both (A) and (B)

47   Which of the following method is computing total cost of an algorithm in amortized
      analysis?
      (a)   Aggregate method
      (b)   Accounting method
      (c)   Potential method
      (d)   Both (A) and (B)

48   The following is a weighted binary tree, then what is the weighted array for the TVS
      problem?
      (a)   [9, 2, 7, 0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 4]
      (b)   [9, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 4, 6]
      (c)   [9, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 6, 7, 4]
      (d)   [9, 2, 0, 0, 0, 7, 0, 0, 0, 0, 0, 0, 6, 4]
      (e)   [9, 2, 0, 0, 0, 7, 0, 0, 0, 0, 6, 4, 0, 0]

49   The upper bound on the time complexity of the nondeterministic sorting algorithm is
      (a)   O(n)
      (b)   O(n log n)
      (c)   O(1)
      (d)   O(log n)

50   The worst case time complexity of the nondeterministic dynamic knapsack algorithm is
      (a)   O(n log n)
      (b)   O(log n)
      (c) $O(n^2)$
      (d)   O(n)

51   Let G be a graph with n vertices and m edges. What is the tightest upper bound on the
      running time on Depth First Search of G? Assume that the graph is represented using
      adjacency matrix.
      (a)   O(n)
      (b)   O(m+n)
      (c) $O(n^2)$
      (d)   O(mn)

52   Let S be an NP-complete problem and Q and R be two other problems not known to be in NP. Q is polynomial time reducible to S and S is polynomial-time reducible to R. Which one of the following statements is true?
(a)   R is NP-complete
(b)   R is NP-hard
(c)   Q is NP-complete
(d)   Q is NP-hard

53   Which of the following is true about NP-Complete and NP-Hard problems.
(a)   If we want to prove that a problem X is NP-Hard, we take a known NP-Hard problem Y and reduce Y to X.

(b)   The first problem that was proved as NP-complete was the circuit satisfiability problem.
(c)   NP-complete is a subset of NP Hard
(d)   All of the above
(e)   None of the above

54   Consider two decision problems Q1, Q2 such that Q1 reduces in polynomial time to 3-SAT and 3-SAT reduces in polynomial time to Q2. Then which one of the following is consistent with the above statement?
(a)   Q1 is in NP, Q2 is NP hard
(b)   Q2 is in NP, Q1 is NP hard
(c)   Both Q1 and Q2 are in NP
(d)   Both Q1 and Q2 are in NP hard

55   Which of the following is not a backtracking algorithm?
(a)   Knight tour problem
(b)   N queen problem
(c)   Tower of hanoi
(d)   M coloring problem

56   For problems X and Y, Y is NP-complete and X reduces to Y in polynomial time. Which of the following is TRUE?
(a)   If X can be solved in polynomial time, then so can Y
(b)   X is NP-complete
(c)   X is NP-hard
(d)   X is in NP, but not necessarily NP-complete

57   Consider the following two problems on undirected graphs
α : Given G(V, E), does G have an independent set of size | V | - 4?
β : Given G(V, E), does G have an independent set of size 5?
Which one of the following is TRUE?
(a)   α is in P and β is NP-complete
(b)   α is NP-complete and β is in P
(c)   Both α and β are NP-complete

(d)   Both α and β are in P

58   Consider the decision problem 2CNFSAT defined as follows:

$\{ \Phi \mid \Phi$ is a satisfiable propositional formula in CNF with at most two literals per clause $\}$

For example, $\Phi = (x_1 \vee x_2)\wedge(x_1 \vee \overline{x_3})\wedge(x_2 \vee x_4)$ is a Boolean formula and it is in *2CNFSAT*.

The decision problem *2CNFSAT* is
(a)   NP-Complete.
(b)   Solvable in polynomial time by reduction to directed graph reachability.
(c)   Solvable in constant time since any input instance is satisfiable.
(d)   NP-hard, but not NP-complete.

59   Read the following statements carefully, and choose the correct answer
       I.   For the Backtracking algorithms stack data structure is used.
       II.   For the Branch-and-bound algorithms queue data structure is used.
       (a)   (I) is FALSE but (II) is TRUE
       (b)   (I) and (II) both are FALSE
       (c)   (I) is TRUE but (II) is FALSE
       (d)   (I) and (II) both are TRUE

60   Kadane algorithm is used to find:
       (a)   Maximum sum subsequence in an array
       (b)   Maximum sum subarray in an array
       (c)   Maximum product subsequence in an array
       (d)   Maximum product subarray in an array

61   In a Max heap the largest key is at
       (a)   the root
       (b)   a leaf
       (c)   a node
       (d)   None of the above

62.   In heap sort the input is arranged in the form of a
       (a)   heap
       (b)   tree
       (c)   queue
       (d)   None of the above

63.   Heap sort is found to be very efficient
       (a)   With regard to storage requirement
       (b)   In time consumption
       (c)   Regarding overheads involved
       (d)   None of the above

64. Suppose we need to sort a list of employee records in ascending order, using the social security number (a 9-digit number) as the key (i.e., sort the records by social security number). If we need to guarantee that the running time will be no worse than n log n, which sorting methods could we use?
    (a)   mergesort
    (b)   quicksort
    (c)   insertion sort
    (d)   Either mergesort or quicksort
    (e)   None of these sorting algorithms guarantee a worst-case performance of n log n or better

65. Consider the following function f:
    int f(int n)
    {
    int s = 0;
    while(n > 1)
    {
    n = n/2;
    s++;
    }
    return s;
    }
    What is the asymptotic complexity in terms of n? (Pick the smallest correct answer)
    (a)   O(nlog n)
    (b)   O(n)
    (c)   O(n)
    (d)   O(log n)
    (e)   O(n^2)

66. The most important reason for including a destructor in a class is:
    (a)   To print a message for debugging purposes
    (b)   To store information about an object before it goes out of scope
    (c)   To free up resources allocated by that class
    (d)   To reset the original object's pointer to NULL
    (e)   To make your TA happy

67 One of these code fragments calls the copy constructor for class A. Which one? (Assume that do Something is a void function with a parameter of the appropriate type.)
    (a)   A a;
    (b)   b;
           a = b;
           A array[20];
    (c)   A a;
           doSomething(a);
    (d)   A* a;
           doSomething(a)

(e)   A a;
        doSomething(&a);

68.   What is the asymptotic runtime for traversing all nodes in a binary search tree with n nodes and printing them in order?
       (a) $O(n \cdot \log(n))$
       (b) $O(n)$
       (c) $O(n)$
       (d) $O(\log(n))$
       (e) $O(n^2)$

69.   Consider a class List that implements an unordered list. Suppose it has as its representation a dynamically expanding (resizable) array. Which of these operations might need to delete some dynamically allocated storage to avoid a memory leak?
       I.   Default Constructor
       II.   Copy Constructor
       III.   Destructor
       IV.   Assignment operator
       (a)   I and II
       (b)   II and III
       (c)   II and IV
       (d)   III and IV
       (e)   II, III, and IV

70.   What is the postfix representation of this expression?
       (12 – a) * (b + 9) / (d * 4)
       (a)   4 b * d 9 + a 12 - * /
       (b)   / 12 a – b 9 + d 4 *
       (c)   12 – a * b + 9 / d * 4
       (d)   12 a – b 9 + * d 4 * /
       (e)   None of the above

Ans.   (1)(a), (2)(d), (3)(b), (4)(a), (5)(c), (6)(a), (7)(c), (8)(c), (9)(c), (10)(b), (11)(c), (12)(d), (13)(c), (14)(a), (15)(a), (16)(c), (17)(b), (18)(a), (19)(c), (20)(a), (21)(b), (22)(c), (23)(d), (24)(c), (25)(b), (26)(b), (27)(b), (28)(d), (29)(b), (30)(c), (31)(a), (32)(c), (33)(a), (34)(d), (35)(b), (36)(c), (37)(b), (38)(d), (39)(a), (40)(c), (41)(a), (42)(b), (43)(c), (44)(a), (45)(d), (46)(b), (47)(c), (48)(b), (49)(d), (50)(a), (51)(c), (52)(b), (53)(d), (54)(a), (55)(c), (56)(d), (57)(c), (58)(b), (59)(d), (60)(b), (61)(a), (62)(a), (63)(a), (64)(a), (65)(d), (66)(c), (67)(c), (68)(b), (69)(d), (70)(d)

(c)   Fill in the Blanks:

1   A language L_1 is _____ to a language L_2, if there exists a polynomial-time computable function

$f : \{0,1\}^* \rightarrow \{0,1\}^*$ s.t. for all $x \in \{0,1\}^*$,

$x \in L_1$ if and only if $f(x) \in L_2$

2   A language $L \subseteq \{0,1\}^*$ is _____ if

(a) $L \in NP$, and

(b) $L' \leq_p L$ for every $L' \in NP$

3   The _____ of two strings x and y, denoted xy, has length $|x| + |y|$ and consists of the characters from x followed by the characters from y.

4   A finite automation M is a _____ tuple.

5   The running time of COMPUTE_PREFIX_FUNCTION procedure is _____.

Ans.   (1)(polynomial time reducible), (2)(NP complete), (3)(concatenation), (4)(5 (five), (5)(θ (n))

II   Short Answer Type Questions:

1   What is a spurious hit?

2   What is a valid hit in Rabin Karp?

3   Define complexity class NP.

4   What is a finite automata?

5   Define complexity class NP- complete.

6   State Horner's rule. Give example also.

7   State string matching problem.

8   Define verification algorithm.

9   What is the difference between Euler tour and Hamiltonian cycle.

10   Differentiate between 2-CNF satisfiability and 3-CNF satisfiability.

11   Show that the Hamiltonian-path problem is NP-Complete.

12   Show that circuit satisfiability problem is NP-complete.

13   Prove that satisfiabilty of Boolean formula in 3-conjunctive normal form(3-CNF) is NP-Complete.

14   Define the following terms:

(a)   P Class

(b)   Polynomial time verification

(c)   Reducibility

15   Explain 0/1 knapsack problem with example.

16   Solve the following instance of the knapsack problem by the branch & bound algorithm.

17   Apply backtracking technique to solve the following instance of subset sum problem : S={1,3,4,5} and d=11 (16)

18   Explain subset sum problem & discuss the possible solution strategies using backtracking.

19   Explain Graph coloring with example.

20   Explain about Knapsack Problem using back tracking with example.

21   Explain n-Queen's Problem with the help of an example?

22   Explain the concept of Reducibility

23   Prove that Vertex Cover problem is NPC.

24   What is Branch and Bound? Explain its control abstraction

25   Discuss dynamic programming. Write procedure for matrix chain multiplication.
26   Explain travelling salesperson problem
27   Write backtracking algorithm to find chromatic number of given graph.
28   Write and explain the greedy method with the help of single source shortest path problem.

III   Long Answer Type Questions:

1   Explain Rabin Karp algorithm for string matching in detail. What is its time complexity?
2   Discuss KMP algorithm along with its complexity.
3   Prove that the clique problem is NP-complete.
4   Prove that the vertex-cover problem is NP-complete.
5   Explain Hamiltonian-cycle problem.
6   Prove that the traveling-salesman problem is NP-complete.
7   Explain string matching with finite automata.
8   Explain the subset sum problem with suitable example. Give a naïve algorithm to solve the problem.
9   What are the various techniques used while dealing with NPC problems? Are the optimal? Differentiate between decision problem and optimization problems.
10   What is the effect of backtracking on the time complexity of an algorithm? Do you think that backtracking is never required in a polynomial time algorithm?
11   What do you understand by Hash functions and explain their techniques?
12   Briefly explain NP-Hard and NP-Completeness with examples.
13   Explain about 0/1 Knapsack Problem using branch and bound with example.
14   Explain the halting problem
15   Define tractable and intractable problems with examples.
16   Give a formal definition for the problem of finding the longest simple cycle in an undirected graph. Give a related decision problem. Give the language corresponding to the decision problem.
17   Prove that the class NP of languages is closed under union, intersection, concatenation, and Kleene star. Discuss the closure of NP under complement.
18   Show that the problem of determining the satisfiability of boolean formulas in disjunctive normal form is polynomial-time solvable.
19   With reference to NP Completeness: How TSP problem is related with HCP. Explain with the help of example.
20   Prove that Clique problem is NPC.
21   State and prove cook's theorem.
22   Discuss with the help of an example Assignment problem in detail.
23   Currently what are the various techniques used while dealing with NPC problems? Are they optimal? Differentiate between decision problems and optimization problems.
24   Discuss how 8 queen's problem is solved using backtracking.
25   Discuss RSA public key cryptography algorithm
26   Draw the portion of state space tree generated by LC branch and bound for the following instances. N=4, m=15, (p1--- p4)= (10,10,,12,18) (w1---w4)=(2,4,6,9)
27   How to solve Knapsack problem with Dynamic programming? How it is different from greedy method.

28 Write an algorithm for generation of next color in M coloring problem.

IV Practical Questions:

1 Working modulo q = 11, how many spurious hits docs the Rabin Karp matcher encounter in the text T = 3141592653589793 when looking for the pattern P = 26?

2 Repeat the above question for following data:
   q = 13,   p = 31415,   T = 235902314152673992

3 Compute the prefix function π for the pattern ababbabbabbababbabb when the alphabet is Σ = {a, b}.

4 Compute the prefix function π for the pattern ababababca when the alphabet is Σ = {a, b, c}.

5 Using Rabin Karp algo find whether the pattern P = < 0010 > is in text T = < 1100011010001010 > or not.

6 Construct string matching automation for the pattern P = aabab and illustrate its operation on the text string T = aaababaabaababaab.

7 Using KMP algorithm do Q.38.

8 Compute prefix function π for the pattern aabbaabba when the alphabet is Σ = {a, b}.

QUESTION BANK

DATA WAREHOUSING AND DATA MINING

MCA 204

QUESTION BANK
DATA WAREHOUSING AND DATA MINING- MCA 204
MCA IV

UNIT - I

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Which of the following are the characteristics of strategic information?
(a)   Integrated
(b)   Accessible
(c)   Timely
(d)   All the above

2   Online transaction processing system stores
(a)   Archived Data
(b)   Summarized Data
(c)   Current Data
(d)   None of the above

3   Data granularity in a data warehouse refers to the
(a)   Integrated
(b)   Accessibility
(c)   Level of Detail
(d)   None of the above

4   Which of the following gives departmental wise view?
(a)   Data Warehouse
(b)   Data Mart
(c)   Both of the above
(d)   None of the above

5   Which of the following are the types of metadata?
(a)   Operational Metadata
(b)   Extraction and Transformation Metadata
(c)   End-user Metadata
(d)   All of the above

6   Which of the following are the characteristics of a data warehouse?
(a)   Application oriented
(b)   Time variant
(c)   Non-integrated
(d)   Volatile

7   Which of the following are the building blocks of a data warehouses?
        (a)   Data Storage
        (b)   Information Delivery
        (c)   Management and Control
        (d)   All the above

8   Which one is the data capturing system?
        (a)   Online Transaction Processing System
        (b)   Data Warehouse
        (c)   Online Analytical Processing System
        (d)   None of the above

9   Which one of the following provides the area with a set of functions to clean, huge,
        combine, convert, reduplicate and prepare source data for storage in data warehouse?
        (a)   Archived Data
        (b)   Data Staging
        (c)   Management and Control Component
        (d)   None of the above

10   Which of the following type of metadata provides navigational map of the data
        warehouse?
        (a)   End-user Metadata
        (b)   Extraction and Transformation Metadata
        (c)   Operational Metadata
        (d)   None of the above

11   The primary goal in the requirement definitions phase is to compile
        (a)   Information packages
        (b)   Hierarchies
        (c)   Lattices
        (d)   None of the above

12   Joint application development (JAD) technique consists of how many phases:
        (a)   Two
        (b)   Three
        (c)   Five
        (d)   Four

13.   Data scrubbing is which of the following?
        (a)   A process to reject data from the data warehouse and to create the necessary
                indexes
        (b)   A process to load the data in the data warehouse and to create the necessary
                indexes
        (c)   A process to upgrade the quality of data after it is moved into a data warehouse
        (d)   A process to upgrade the quality of data before it is moved into a data warehouse

14 The active data warehouse architecture includes which of the following?
 (a) At least one data mart
 (b) Data that can extracted from numerous internal and external sources
 (c) Near real-time updates
 (d) All of the above.

15 A goal of data mining includes which of the following?
 (a) To explain some observed event or condition
 (b) To confirm that data exists
 (c) To analyze data for expected relationships
 (d) To create a new data warehouse

16 An operational system is which of the following?
 (a) A system that is used to run the business in real time and is based on historical data.
 (b) A system that is used to run the business in real time and is based on current data.
 (c) A system that is used to support decision making and is based on current data.
 (d) A system that is used to support decision making and is based on historical data.

17 A data warehouse is which of the following?
 (a) Can be updated by end users.
 (b) Contains numerous naming conventions and formats.
 (c) Organized around important subject areas.
 (d) Contains only current data.

18 Which of the following features usually applies to data in a data warehouse?
 (a) Data are often deleted
 (b) Most applications consist of transactions
 (c) Data are rarely deleted
 (d) Relatively few records are processed by applications

19 The data Warehouse is_____.
 (a) Read only
 (b) Write only
 (c) Read write only.
 (d) None.

20 The important aspect of the data warehouse environment is that data found within the data warehouse is_____.
 (a) Subject-oriented.
 (b) Time-variant.
 (c) Integrated.
 (d) All of the above.

21 The time horizon in Data warehouse is usually _____.
 (a) 1-2 years.

(b) 3-4 years.
(c) 5-6 years.
(d) 5-10 years.

22 The data is stored, retrieved & updated in _____.
(a) OLAP.
(b) OLTP.
(c) SMTP.
(d) FTP.

23 What describes the data contained in the data warehouse?
(a) Relational data.
(b) Operational data.
(c) Metadata.
(d) Informational data.

24 Which of the following predicts future trends &behaviors
(a) Data warehouse.
(b) Data mining.
(c) Data marts.
(d) Metadata.

25 What is the heart of the warehouse?
(a) Data mining database servers.
(b) Data warehouse database servers.
(c) Data mart database servers.
(d) Relational data base servers.

26 What is the specialized data warehouse database?
(a) Oracle.
(b) DBZ.
(c) Informix.
(d) Redbrick.

27 Which of the following defines the structure of the data held in operational `
databases and used by operational applications?
(a) User-level metadata
(b) Data warehouse metadata
(c) Operational metadata
(d) Data mining metadata

28 What_ is held in the catalog of the warehouse database system.
(a) Application level metadata
(b) Algorithmic level metadata
(c) Departmental level metadata
(d) Core warehouse metadata

29   What maps the core warehouse metadata to business concepts, familiar and useful to end users?
        (a)   Application level metadata
        (b)   User level metadata
        (c)   End user level metadata
        (d)   Core level metadata

30   Which of the following consists of formal definitions, such as a COBOL layout or a database schema?
        (a)   Classical metadata
        (b)   Transformation metadata
        (c)   Historical metadata
        (d)   Structural metadata

31   A new type of computing environment involving strategic information is provided by
        (a)   Relational Data Bases
        (b)   Object Relational Data Bases
        (c)   Network Data bases
        (d)   Data Warehouse

32   Data Warehouse is an
        (a)   Environment
        (b)   Product
        (c)   Language
        (d)   Integrated Development Environment

33   Dimension Hierarchies are used in
        (a)   Drill down
        (b)   Drill up
        (c)   Both a and b
        (d)   None of the above

34   In data warehouse the content is updated
        (a)   Daily
        (b)   Weekly
        (c)   Monthly
        (d)   Depends upon the requirements

35   Data Mart provides a view related to
        (a)   Department
        (b)   Enterprise
        (c)   Industry
        (d)   None of the above

36   Metadata is
        (a)   Data about data

(b)   Data about tables
(c)   Data about structure
(d)   None of the above

37   Operational Systems directly populate a
(a)   Data mart
(b)   Database
(c)   Data warehouse
(d)   None of the Above

38   OLAP systems perform
(a)   Summarization
(b)   Aggregation
(c)   Analysis
(d)   All of the above

39   An .... system is market-oriented and is used for data analysis by knowledge workers, including managers, executives, and analysts.
(a)   OLAP
(b)   OLTP
(c)   Both of the above
(d)   None of the above

40   The full form of OLAP is
(a)   Online Analytical Processing
(b)   Online Advanced Processing
(c)   Online Advanced Preparation
(d)   Online Analytical Performance

41   Which of the following features usually applies to data in a data ware house?
(a)   Data are often deleted
(b)   Most applications consist of transactions
(c)   Data are rarely deleted
(d)   Relatively few records are processed by applications

42   Which of the following statements is true?
(a)   The data warehouse consists of data mart and operational data
(b)   The data warehouse is used as a source for the operational data
(c)   The operational data are used as a source for the data ware house
(d)   All of the above

43   The following is true for three tier data warehouses:
(a)   Once created the data marts will keep on being updated from the data ware house at periodic times
(b)   Once created the data marts will directly receive their new data from the operational data bases

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(c)   The data marts are different groups of tables in the data warehouse
(d)   A data mart becomes a data warehouse when it reaches a critical size

44   The following technology is not well suited for data mining
(a)   Expert system technology
(b)   Data Visualization
(c)   Technology limited to specific data types such as numeric data
(d)   Parallel architecture

45   What is true of the multidimensional model?
(a)   It typically requires less disk storage
(b)   It typically requires more disk storage
(c)   Typical business queries requiring aggregate functions take more time
(d)   Increasing the size of the dimension is difficult

46   The most common source of change data in refreshing a data warehouse is
(a)   Queryable change data
(b)   Cooperative change data
(c)   Logged change data
(d)   Snapshot changedata

47   Which of the following statements is not true about refreshing a data warehouse
(a)   It is a process of managing differences between the updating of data sources and the related
(b)   Updates to dimension table may occur at different time than the fact table
(c)   The data warehouse administrator has more control over the time lag than the valid time lag
(d)   None of the above

48   Data Warehouse is
(a)   The actual discovery phase of knowledge discovery process
(b)   The stage of selecting right data for KDD
(c)   A subject oriented, time invariant, integrated datain support of management
(d)   None of these

49   Data Dictionary is
(a)   Large collection of data
(b)   Removal of noise errors from the database
(c)   Description of attributes of the tables and various relationships
(d)   None of the above

50   Decision Support System(DSS) is
(a)   A family of relational management system marketed by IBM
(b)   Interactive data base systems and models that help in taking decisions
(c)   It consists of nodes and branches ,each node represents a decision
(d)   None of the above

51   Which of are the characteristics of strategic information?
      (a)   Integrated the following
      (b)   Accessible
      (c)   Timely
      (d)   All the above

52   Online transaction processing system stores
      (a)   Archived Data
      (b)   Summarized Data
      (c)   Current Data
      (d)   None of the above

53   Data granularity in a data warehouse refers to the
      (a)   Integrated
      (b)   Accessibility
      (c)   Level of Detail
      (d)   None of the above

54   Which of the following gives departmental wise view?
      (a)   Data Warehouse
      (b)   Data Mart
      (c)   Both of the above
      (d)   None of the above

55   Which of the following are the types of metadata?
      (a)   Operational Metadata
      (b)   Extraction and Transformation Metadata
      (c)   End-user Metadata
      (d)   All of the above

56   Which of the following are the characteristics of a data warehouse?
      (a)   Application oriented
      (b)   Time variant
      (c)   Non-integrated
      (d)   Volatile

57   Which of the following are the building blocks of a data warehouses?
      (a)   Data Storage
      (b)   Information Delivery
      (c)   Management and Control
      (d)   All the above

58   Which one is the data capturing system?
      (a)   Online Transaction Processing System
      (b)   Data Warehouse
      (c)   Online Analytical Processing System

(d)　　None of the above

59　Which one of the following provides the area with a set of functions to clean, huge, combine, convert, reduplicate and prepare source data for storage in data warehouse?
(a)　　Archived Data
(b)　　Data Staging
(c)　　Management and Control Component
(d)　　None of the above

60　Which of the following type of metadata provides navigational map of the data warehouse?
(a)　　End-user Metadata
(b)　　Extraction and Transformation Metadata
(c)　　Operational Metadata
(d)　　None of the above

61　This is an approach to selling goods and services in which a prospect explicitly agrees in advance to receive marketing information.
(a)　　Customer managed relationship
(b)　　Data mining
(c)　　Permission marketing
(d)　　One-to-one marketing
(e)　　Batch processing

62.　In an Internet context, this is the practice of tailoring Web pages to individual users' characteristics or preferences.
(a)　　Web services
(b)　　Customer-facing
(c)　　Client/server
(d)　　Customer valuation
(e)　　Personalization

63.　This is the processing of data about customers and their relationship with the enterprise in order to improve the enterprise's future sales and service and lower cost.
(a)　　Clickstream analysis
(b)　　Database marketing
(c)　　Customer relationship management
(d)　　CRM analytics
(e)　　B2C

64.　This is a broad category of applications and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions.
(a)　　Best practice
(b)　　Data mart
(c)　　Business information warehouse

(d)   Business intelligence
(e)   Business warehouse

65.   This is a systematic approach to the gathering, consolidation, and processing of consumer data (both for customers and potential customers) that is maintained in a company's databases.
(a)   Database marketing
(b)   Marketing encyclopedia
(c)   Application integration
(d)   Service oriented integration
(e)   Business technology management

66.   This is an arrangement in which a company outsources some or all of its customer relationship management functions to an application service provider (ASP).
(a)   spend management
(b)   supplier relationship management
(c)   hosted CRM
(d)   Customer Information Control System
(e)   online transaction processing

67.   This is an XML-based metalanguage developed by the Business Process Management Initiative (BPMI) as a means of modeling business processes, much as XML is, itself, a metalanguage with the ability to model enterprise data.
(a)   BizTalk
(b)   BPML
(c)   e-biz
(d)   ebXML
(e)   ECB

68.   This is a central point in an enterprise from which all customer contacts are managed.
(a)   contact center
(b)   help system
(c)   multichannel marketing
(d)   call center
(e)   help desk

69.   This is the practice of dividing a customer base into groups of individuals that are similar in specific ways relevant to marketing, such as age, gender, interests, spending habits, and so on.
(a)   customer service chat
(b)   customer managed relationship
(c)   customer life cycle
(d)   customer segmentation
(e)   change management

70. In data mining, this is a technique used to predict future behavior and anticipate the consequences of change.
    (a) predictive technology
    (b) disaster recovery
    (c) phase change
    (d) Digital Silhouettes
    (e) predictive modeling

Ans. (1)(d), (2)(c), (3)(c), (4)(b), (5)(d), (6)(b), (7)(d), (8)(a), (9)(b), (10)(a), (11)(a), (12)(c), (13)(d), (14)(d), (15)(a), (16)(b), (17)(c), (18)(c), (19)(a), (20)(d), (21)(d), (22)(b), (23)(c), (24)(b), (25)(b), (26)(d), (27)(c), (28)(b), (29)(a), (30)(a), (31)(d), (32)(a), (33)(c), (34)(d), (35)(a), (36)(a), (37)(b), (38)(d), (39)(a), (40)(a), (41)(c), (42)(c), (43)(a), (44)(c), (45)(b), (46)(d), (47)(d), (48)(c), (49)(c), (50)(c), (51)(d), (52)(c), (53)(c), (54)b), (55)(d), (56)(b), (57)(d), (58)(a), (59)(b), (60)(a), (61)(c), (62)(e), (63)(d), (64)(d), (65)(a), (66)(c), (67)(b), (68)(a), (69)(d), (70)(e)

(b)   Fill in the Blanks:

1   _____provides a new type of computing environment which provides strategic information.
2   _____data is the data about data.
3   In data warehouse the content is updated _____and stable.
4   Data marts provide _____view of data.
5   Data warehouse is the _____environment that presents a flexible and interactive source of strategic information.

Ans. (1)(Data Warehouse), (2)(Meta), (3)(Periodically), (4)(Departmental), (5)(Informational)

II   Short Answer Type Questions:

1   Describe its various characteristics of strategic information. Why there is an escalating need for strategic information?
2   What is information crisis?
3   What are the failures associated with past decision support systems.
4   What do we mean by strategic information? For a commercial bank, name five types of strategic objectives.
5   Do you agree that a typical retail store collects huge volumes of data through its operational systems? Name three types of transaction data likely to be collected by a retail store in large volumes during its daily operations.
6   Examine the opportunities that can be provided by strategic information for a medical centre. Can you list five such opportunities?
7   Why were all the past attempts by IT to provide strategic information failures? List three concrete reasons and explain.
8   Describe five differences between operational systems and informational systems.
9   Why are operational systems not suitable for providing strategic information? Give three specific reasons and explain.

10   Name six characteristics of the computing environment needed to provide strategic information.
11   Discuss the various components of a data warehouse.
12   Compare and contrast data ware-house and data mart.
13   What is the importance of managing metadata? Discuss.
14   Explain the generic warehouse architecture.
15   Explain the conceptual view of data warehouse architecture.
16   Why types of processing take place in a data warehouse? Describe.
17   A data warehouse in an environment, not a product. Discuss.
18   Data warehousing is the only viable means to resolve the information crisis and to provide strategic information. List four reasons to support this assertion and explain them.
19   Name at least six characteristics or features of a data warehouse.
20   Why is data integration required in a data warehouse, more so there than in an operational application?
21   Every data structure in the data warehouse contains the time element. Why?
22   Explain data granularity and how it is applicable to the data warehouse.
23   How are the top-down and bottom-up approaches for building a data warehouse different? Discuss the merits and disadvantages of each approach.
24   What are the various data sources for the data warehouse?
25   Why do you need a separate data staging component?
26   Under data transformation, list five different functions you can think of.
27   Name any six different methods for information delivery.
28   What are the three major types of metadata in a data warehouse? Briefly mention the purpose of each type.
29   What are the essential differences between defining requirements for operational systems and for data warehouses?
30   Explain business dimensions. Why and how business dimensions be useful for defining requirements for the data warehouse?
31   What data does an information package contain?
32   What are dimension hierarchies? Give three examples.
33   Explain business metrics or facts with five examples.
34   List the types of users who must be interviewed for collecting requirements. What information can you expect to get from them?
35   In which situations can JAD methodology be successful for collecting requirements?
36   Why are reviews of existing documents important? What can you expect to get our of such reviews?
37   Various data sources feed the data warehouse. What are the pieces of information you need to get about data sources?
38   Name any five major components of the formal requirements definition document. Describe what goes into each of these components.
39   Briefly explain multidimensional analysis.
40   Name any four key capabilities of an OLAP system.
41   State any five of Dr. Codd's guidelines for an OLAP system, giving a brief description for each.
42   What are hypercubes? How do they apply in an OLAP system?

43   What is meant by slice-and-dice? Give an example.
44   Data warehouse data is non-volatile. Explain.
45   What do you mean by web enabled data warehouse?
46.   Why were all the past attempts by IT to provide strategic information failures? List three concrete reasons and explain.
47   Why are operational systems not suitable for providing strategic information? Give three specific reasons and explain.
48   What are seven deadly sins for building a data ware house?
49   How Data warehouse categorizes the business problems.
50   Write Dimensions and dimension hierarchy for retail shop.
51   What are Expert System shells? Briefly discuss.
52   What is knowledge acquisition? Explain with example.
53   What are the hardware and software requirements to build group decision support system?
54   How is knowledge represented in knowledge base of an expert system?
55   Draw and explain the Data warehouse architecture for Insurance sector.
56   Discuss use of DSS in hospital Management. Name a few known Hospital management support systems.
57   How is DSS different from GSS?
58   BI analyzes present and past data to predict future trends. Comment
59   Expert systems are based on knowledge and not information. Discuss.
60   For an ecommerce business Explain how BI can help.

III   Long Answer Type Questions:

1   Explain the standard methods for collecting requirements?
2   Give some examples of business dimensions.
3   Write a short note on business analysis?
4   Discuss the impact of business requirements on information deliver.
5   Describe how every component of data warehouse architecture is strongly influenced by the business requirements.
6   The current trends in hardware/software technology make data warehousing feasible. Explain via some examples how exactly technology trends do help.
7   You are the IT Directors of a nationwide insurance company. Write a memo to the Executive Vice President explaining the types of opportunities that can be realized with readily available strategic information.
8   For an airlines company, how can strategic information increase the number of frequent flyers? Discuss giving specific details.
9   You are a Senior Analyst in the IT department manufacturing automobile parts. The marketing VP is complaining about the poor response by IT in providing strategic information. Draft a proposal to him explaining the reasons for the problem and why a data warehouse would be the only viable solution.
10   A data warehouse is subject-oriented.   What would be the major critical business subjects for the following companies?
        (a)   An international manufacturing company
        (b)   A local community bank

(c)   A domestic hotel chain

11   You are the data analyst on the project team building a data warehouse for an insurance company. List the possible data sources from which you will bring the data into your data warehouse. State your assumptions.

12   For an airlines company, identify three operational applications that would feed into the data warehouse. What would be the data load and refresh cycles?

13   Prepare a table showing all the potential users and information delivery methods for a data warehouse supporting a large national grocery chain.

14   You are the Vice President of Marketing for a nation-wide appliance manufacturer with three production plants. Describe any three different ways you will tend to analyse your sales. What are the business dimensions for your analysis?

15   BigBook, Inc. is a large book distributor with domestic and international distribution channels. The company orders from publishers and distributes publications to all the leading booksellers. Initially, you want to build a data warehouse to analyse shipments that are made from the company's many warehouses. Determine the metrics or facts and the business dimensions. Prepare an information package diagram.

16   You are on the data warehouse project of AuctionsPlan.com, an Internet auction company selling upscale works of art. Your responsibility is to gather requirements for sales analysis. Find out the key metrics, business dimensions, hierarchies, and categories. Draw the information package diagram.

17   Create a detailed outline for the formal requirements definition document for a data warehouse to analyze product profitability of a large department store chain.

18   Explain the steps of the data warehouse design process?

19   Discuss the areas in which data warehouses are used in present and in future?

20   Explain the three-tier architecture of a data warehouse?

21   Where are the differences in the steps involved with generating a report from a data warehouse and with generating a report from a legacy system?

22   In data warehousing terms, what kind of a user would be described as a "farmer"? What kind of user would be described as an "explorer"?

23   When cost justifying a data warehouse, which type of user should be used as the basis of the calculation?

24   As a senior analyst on the project team of a publishing company exploring the operations for a data warehouse, make a case for OLAP. Describe the merits of OLAP and how it will be essential in your environment.

25   Pick any six of Dr. Codd's initial guidelines for OLAP. Give your reasons why the selected six are important for OLAP.

26   You are asked to form a small team to evaluate the MOLAP and ROLAP models and make your recommendations. This is part of the data warehouse project for a large manufacturer of heavy chemicals. Describe the criteria your team will use to make the evaluation and selection.

27   Your company is the largest producer of chicken products, selling to supermarkets, fast-food chains, and restaurants, and also exporting to many countries. The analysts from many offices worldwide expect to use the OLAP system when implemented. Discuss how the project team must select the platform for implementing OLAP for the company. Explain your assumptions.

28   Explain the OLAP operations in detail in multidimensional data model?

29   List out the differences between OLTP and OLAP.
30   Define OLAP and explain its advantage and disadvantage over previous available technologies.
31   Discuss the various data analysis tools.
32   Write a short note on hypercubes.
33   Why should one use OLAP?
34   What is an OLAP dimension?
35   What is the difference between OLAP and data warehouse?
36   Explain the functionality of OLAP.
37   Explain the concepts and capabilities of OLAP.
38   Difference between OLAP and DSS.
39   What are the key objects within the OLAP model?
40   What does the term "Analytical Processing" indicates?
41   What are the different characteristics of data warehouse according to Inmon ?
42   Explain data granularity and how it is applicable to the data warehouse?
43   Explain different types of data used in the data warehouse.
44   Differentiate between the following
      (a)Data , Information and knowledge
      (b)Structured & Unstructured Information
41   Differentiate between structured decision, semi structured decisions and unstructured decision. Give examples of semi structured decisions and unstructured decisions.
42   Explain the architecture of an expert system? What are its application areas?
43   The current trends in hardware/software technology make data warehousing feasible. Explain via some examples how exactly technology trends do help.
44   You are the IT Directors of a nationwide insurance company. Write a memo to the Executive Vice President explaining the types of opportunities that can be realized with readily available strategic information.
45   For an airlines company, how can strategic information increase the number of frequent flyers? Discuss giving specific details.
46   You are a Senior Analyst in the IT department manufacturing automobile parts. The marketing VP is complaining about the poor response by IT in providing strategic information. Draft a proposal to him explaining the reasons for the problem and why a data warehouse would be the only viable solution.
47   To start a new hospital in a city what strategic information one must seek. Justify.
48   Explain how subjective data can be utilized in a DSS in light of the situations described in the opening vignette examples.
49   Models play a key role in DSS. Why? Explain how models exist in spreadsheet packages like Excel.
50   DSS Support all four decision-making phases: intelligence, design, choice, and implementation. True or false. Discuss giving your reasons.
51   Describe how providing support to a workgroup is different from providing support to group work. Explain why it is important to differentiate these concepts.

UNIT - II

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   E-R modeling technique is used for
        (a)   OLAP system
        (b)   OLTP system
        (c)   Data Warehouse
        (d)   None of the above

2   Which one of the following are the examples of family of STARS?
        (a)   Snapshot Table
        (b)   Transaction Table
        (c)   Core and Custom Tables
        (d)   All the above

3   Type 3 changes for slowly changing dimension relate to
        (a)   Correction of Errors
        (b)   Preservation of History
        (c)   Tentative Soft-Revisions
        (d)   None of the above

4   Which one of the following is correct about aggregate tables?
        (a)   Aggregates are recalculated summaries derived from the most granular fact table.
        (b)   Aggregate tables do not improve performance.
        (c)   Aggregate tables have more rows than the base tables.
        (d)   None of the above

5   Dimension table is
        (a)   Wide
        (b)   Deep
        (c)   Both of the above
        (d)   Neither (a) nor (b)

6   What consists of information in the enterprise that is not in classical form?
        (a)   Mushy metadata.
        (b)   Differential metadata.
        (c)   Data warehouse.
        (d)   Data mining.

7   Which of the following databases are owned by particular departments or business groups?
        (a)   Informational.
        (b)   Operational.
        (c)   Both informational and operational.
        (d)   Flat.

80

8 The star schema is composed of how many fact table.
 (a) One.
 (b) Two.
 (c) Three.
 (d) Four.

9 The time horizon in operational environment is _____.
 (a) 30-60 days.
 (b) 60-90 days.
 (c) 90-120 days.
 (d) 120-150 days.

10 The key used in operational environment may not have an element of_____.
 (a) Time.
 (b) Cost.
 (c) Frequency.
 (d) Quality.

11 Data can be updated in which environment.
 (a) Data warehouse.
 (b) Data mining.
 (c) Operational.
 (d) Informational.

12 Record cannot be updated in _____.
 (a) OLTP
 (b) Files
 (c) RDBMS
 (d) Data Warehouse

13 The source of all data warehouse data is the_____.
 (a) Operational environment
 (b) Informal environment
 (c) Formal environment
 (d) Technology environment

14 Data warehouse contains which type of _data that is never found in the operational environment.
 (a) Normalized
 (b) Informational
 (c) Summary
 (d) Denormalized

15 How much of the time required to build a data warehouse is consumed in the conversion process.
 (a) 10 percent.
 (b) 20 percent.

(c)   40 percent
(d)   80 percent.

16   Detail data in single fact table is otherwise known as_____.
    (a)   Monatomic data
    (b)   Diatomic data
    (c)   Atomic data
    (d)   Multiatomic data

17   Which test is used in an online transactional processing environment?
    (a)   MEGA
    (b)   MICRO
    (c)   MACRO
    (d)   ACID

18   Which of these is a good alternative to the star schema?
    (a)   Star schema.
    (b)   Snowflake schema.
    (c)   Fact constellation.
    (d)   Star-snowflake schema.

19   The biggest drawback of the level indicator in the classic star-schema is that it limits.
    (a)   Quantify.
    (b)   Qualify.
    (c)   Flexibility.
    (d)   Ability.

20   A data warehouse is _____.
    (a)   Updated by end users.
    (b)   Contains numerous naming conventions and formats
    (c)   Organized around important subject areas.
    (d)   Contains only current data.

21   An operational system is _____.
    (a)   Used to run the business in real time and is based on historical data.
    (b)   Used to run the business in real time and is based on current data.
    (c)   Used to support decision making and is based on current data.
    (d)   Used to support decision making and is based on historical data.

22   The generic two-level data warehouse architecture includes _____.
    (a)   At least one data mart.
    (b)   Data that can extracted from numerous internal and external sources.
    (c)   Near real-time updates.
    (d)   Far real-time updates.

23   The active data warehouse architecture includes _____
      (a)   At least one data mart.
      (b)   Data that can extracted from numerous internal and external sources.
      (c)   Near real-time updates.
      (d)   All of the above.

24   Reconciled data is _____.
      (a)   Data stored in the various operational systems throughout the organization.
      (b)   Current data intended to be the single source for all decision support systems.
      (c)   Data stored in one operational system in the organization.
      (d)   Data that has been selected and formatted for end-user support applications.

25   Transient data is _____.
      (a)   Data in which changes to existing records cause the previous version of the
             records to be eliminated.
      (b)   Data in which changes to existing records do not cause the previous version of the
             records to be eliminated.
      (c)   Data that are never altered or deleted once they have been added.
      (d)   Data that are never deleted once they have been added.

26   The extract process is _____.
      (a)   Capturing all of the data contained in various operational systems.
      (b)   Capturing a subset of the data contained in various operational systems.
      (c)   Capturing all of the data contained in various decision support systems.
      (d)   Capturing a subset of the data contained in various decision support systems.

27   Data scrubbing is _____.
      (a)   A process to reject data from the data warehouse and to create the necessary
             indexes.
      (b)   A process to load the data in the data warehouse and to create the necessary
             indexes.
      (c)   A process to upgrade the quality of data after it is moved into a data warehouse.
      (d)   A process to upgrade the quality of data before it is moved into a data warehouse

28   The load and index is _____.
      (a)   A process to reject data from the data warehouse and to create the necessary
             indexes.
      (b)   A process to load the data in the data warehouse and to create the necessary
             indexes.
      (c)   A process to upgrade the quality of data after it is moved into a data warehouse.
      (d)   A process to upgrade the quality of data before it is moved into a data warehouse.

29   Data transformation includes _____.
      (a)   A process to change data from a detailed level to a summary level.
      (b)   A process to change data from a summary level to a detailed level.
      (c)   Joining data from one source into various sources of data.

(d)   Separating data from one source into various sources of data.

30   Which of these is called a multifield transformation?
(a)   Converting data from one field into multiple fields.
(b)   Converting data from fields into field.
(c)   Converting data from double fields into multiple fields.
(d)   Converting data from one field to one field.

31   .... is a subject-oriented, integrated, time-variant, nonvolatile collection or data in support of management decisions.
(a)   Data Mining
(b)   Data Warehousing
(c)   Document Mining
(d)   Text Mining

32   The data is stored, retrieved and updated in ....
(a)   OLAP
(b)   OLTP
(c)   SMTP
(d)   FTP

33   .... is a good alternative to the star schema.
(a)   Star schema
(b)   Snowflake schema
(c)   Fact constellation
(d)   Star-snowflake schema

34   The .... exposes the information being captured, stored, and managed by operational systems.
a)   top-down view
b)   data warehouse view
c)   data source view
d)   business query view

35   The type of relationship in star schema is ....
(a)   Many to many
(b)   One to one
(c)   one to many
(d)   Many to one

36   Which of the following is not a component of a data warehouse?
(a)   Metadata
(b)   Current detail data
(c)   lightly summarized data
(d)   Component Key

37   Which of the following is not a kind of data warehouse application?
      (a)   Information Processing
      (b)   Data Processing
      (c)   Data Mining
      (d)   Transaction Processing

38   The operation of moving from finer-granularity data to a coarser granularity (by means of aggregation) is called a
      (a)   Roll up
      (b)   Drill down
      (c)   Dicing
      (d)   Pivoting

39   Data that can be modeled as dimension attributes and measure attributes are called _____ data.
      (a)   Multidimensional
      (b)   Single dimensional
      (c)   Measured
      (d)   Dimensional

40   What do data warehouses support?
      (a)   OLAP
      (b)   OLTP
      (c)   OLAP and OLTP
      (d)   Operational databases

41   A warehouse architect is trying to determine what data must be included in the warehouse. A meeting has been arranged with a business analyst to understand the data requirements, which of the following should be included in the agenda?
      (a)   Number of users
      (b)   Corporate objectives
      (c)   Database design
      (d)   Routine reporting
      (e)   Budget.

42   An OLAP tool provides for
      (a)   Multidimensional analysis
      (b)   Roll-up and drill-down
      (c)   Slicing and dicing
      (d)   Rotation
      (e)   Setting up only relations.

43   The Synonym for data mining is
      (a)   Data warehouse
      (b)   Knowledge discovery in database
      (c)   ETL

(d)   Business intelligence
(e)   OLAP.

44   Which of the following statements is true?
(a)   A fact table describes the transactions stored in a DWH
(b)   A fact table describes the granularity of data held in a DWH
(c)   The fact table of a data warehouse is the main store of descriptions of the transactions stored in a DWH
(d)   The fact table of a data warehouse is the main store of all of the recorded transactions over time
(e)   A fact table maintains the old records of the database.

45   Most common kind of queries in a data warehouse
(a)   Inside-out queries
(b)   Outside-in queries
(c)   Browse queries
(d)   Range queries
(e)   All (a), (b), (c) and (d) above.

46   Concept description is the basic form of the
(a)   Predictive data mining
(b)   Descriptive data mining
(c)   Data warehouse
(d)   Relational data base
(e)   Proactive data mining.

47   The apriori property means
(a)   If a set cannot pass a test, all of its supersets will fail the same test as well
(b)   To improve the efficiency the level-wise generation of frequent item sets
(c)   If a set can pass a test, all of its supersets will fail the same test as well
(d)   To decrease the efficiency the level-wise generation of frequent item sets
(e)   All (a), (b), (c) and (d) above.

48   Which of following form the set of data created to support a specific short lived business situation?
(a)   Personal data marts
(b)   Application models
(c)   Downstream systems
(d)   Disposable data marts
(e)   Data mining models.

49   What is/are the different types of Meta data?
I.   Administrative.
II.   Business.
III.   Operational.
(a)   Only (I) above

(b)   Both (II) and (III) above
(c)   Both (I) and (II) above
(d)   Both (I) and (III) above
(e)   All (I), (II) and (III) above.

50   Data modeling technique used for data marts is
(a)   Dimensional modeling
(b)   ER – model
(c)   Extended ER – model
(d)   Physical model
(e)   Logical model.

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(b)   A process to change data from a summary level to a detailed level.
(c)   Joining data from one source into various sources of data.
(d)   Separating data from one source into various sources of data.

61   A lookup transformation is used to look up data in
(a)   flat file
(b)   relational table (wrong)
(c)   view
(d)   synonyms

62   Which one support heterogeneous join?
(a)   source qualifier
(b)   joiner
(c)   look up

63   Which output file is not created during session running?
(a)   session log

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(b)   workflow log
(c)   error log
(d)   bad files
(e)   cache files

64   Which is both connected and unconnected?
(a)   external store procedure
(b)   store procedure
(c)   lookup
(d)   advanced external procedure transformation

65   Can we generate alpha-numeric value in sequence generator?
(a)   yes
(b)   no

66   What is meaning of tracing level?
(a)   data store in cache (wrong)
(b)   data store in database
(c)   data store in log file
(d)   data store in buffer

67   Which one contains input and output transformations?
(a)   maplet
(b)   reusable transformation
(c)   reusable mapping

68   Which dimension is collection of random transactional codes, flags and/or text attributes?
(a)   degenerated
(b)   scd
(c)   junk
(d)   confirmed

69   Which one is not a target Option for file on the Servers?
(a)   ftp
(b)   loader
(c)   mq
(d)   erp

70   Which one is not a designer tool creating transformations?
(a)   transformation developer
(b)   mapping designer
(c)   mapplet designer.
(d)   target designer

Ans.   (1)(a), (2)(d), (3)(c), (4)(a), 5(a),(6)(a), (7)(b), (8)(a), (9)(b), (10)(a), (11)(d), (12)(d), (13)(a), (14)(c), (15)(d), (16)(c), (17)(d), (18)(c), (19)(c), (20)(c), (21)(b), (22)(c),

(23)(d), (24)(b), (25)(a), (26)(b), (27)(d), (28)(b), (29)(a), (30)(a), (31)(b), (32)(a), (33)(c), (34) (c), (35)(d), (36)(d), (37) (d), (38)(a), (39) (d), (40) (d), (41)(d), (42)(c), (43)(c), (44)(d), (45)(a), (46)(b), (47)(b), (48)(d), (49)(e), (50)(a), (51)(c), (52)(b), (53)(c), (54)(d), (55)(b), (56)(a), (57)(b), (58)(d), (59)(b), (60)(a), (61)(e), (62)(b), (63)(e), (64)(a,b,c), (65)(b), (66)(c), (67)(a), (68)(c), (69)(d), (70)(d)

(c)   Fill in the Blanks:

1   Each row in a dimension table is identified by a unique value of an attribute designated as the _____key of the dimension.
2   The attributes in a dimension table are of _____format.
3   _____table contains multiple hierarchies.
4   _____dimensions are neither facts nor strictly dimension attributes.
5   Star schema helps in optimizing_____.
6   _____schema is a method of normalizing the STAR schema.
7   Type 1 changes for slowly changing dimension relate to _____.

Ans.   (1)(Primary),   (2)(Textual),   (3)(Dimension),   (4)(Degenerate),   (5)(Navigation), (6)(Snowflake), (7)(Correction of Errors)

II   Short Answer Type Questions:

1   Discuss the major design issues that need to be addressed before proceeding with the data design.
2   Why is the entity-relationship modeling technique not suitable for the data warehouses? How is dimensional modeling different?
3   What is the STAR schema? What are the component tables?
4   A dimension table is wide; the fact table is deep. Explain.
5   What are hierarchies and categories as applicable to a dimension table?
6   Differentiate between fully additive and semi-additive measures.
7   Explain the sparse nature of the data in the fact table.
8   Describe the composition of the primary keys for the dimension and fact tables.
9   Discuss data granularity in a data warehouse.
10   Name any three advantages of the STAR schema. Can you think of any disadvantages of the STAR schema?
11   Match the columns:

1.	information package	A.	enable drill-down
2.	fact table	B.	reference numbers
3.	case tools	C.	level of detail
4.	dimension hierarchies	D.	users understand easily
5.	dimension table	E.	semia-dditive
6.	degenerate dimensions	F.	STAR schema components
7.	profit margin percentage	G.	used for dimensional modeling
8.	data granularity	H.	dimension attribute
9.	STAR schema	I.	contains metrics
10.	Customer demographics	J.	wide

12 Describe slowly changing dimensions. What are the three types? Explain each type very briefly.
13 Compare and contrast Type 2 and Type 3 slowly changing dimensions.
14 Can you treat rapidly changing dimensions in the same way as Type 2 slowly changing dimensions? Discuss.
15 What are junk dimensions? Are they necessary in a data warehouse?
16 How does a snowflake schema differ from a STAR schema? List two advantages and two advantages of the snowflake schema.
17 Differentiate between slowly and rapidly changing dimensions.
18 What are aggregate fact tables? Why are they needed? Give an example.
19 Describe with examples snapshot and transaction fact tables. How are they related?
20 Give an example of a value circle. Explain how a family of STARS can support a value circle.
21 What is meant by conforming the dimensions? Why is this important in a data warehouse?
22 Which is popular in the data warehouse design, star schema model (or) snowflake schema model?
23 Under what circumstances snowflake schema is preferred over Star Schema?
24 Can we use more than one star or snow flake schema for an universe? How to do this?
25 Using multiple schemas for one universe is it good practice or not?
26 What are different methods of data loading?
27 Explain what is degenerate dimension?
28 What are datamarts? What are the disadvantages of creating a datamarts?
29 What are junk dimensions? Are they necessary in a data warehouse?
30 How does a snowflake schema differ from a STAR schema? List two advantages and two advantages of the snowflake schema.
31 Differentiate between slowly and rapidly changing dimensions.
33 What are aggregate fact tables? Why are they needed? Give an example.
34 Describe with examples snapshot and transaction fact tables. How are they related?
35 Give an example of a value circle. Explain how a family of STARS can support a value circle?
36 Differentiate between utility of OLAP and OLTP.
37 DLAP and data warehouse get there data feeded from OLTP. Discuss.
38 Redundancy removal results in data integrity. True or false. Discuss.
39 Discuss methods of handling Rapidly Changing Dimension.
40 Changes in dimensions are expected to be slow rather than rapid. Explain.

III   Long Answer Type Questions:

1 What is a fact less fact table? Design a simple STAR schema with a fact less fact table to track patients in a hospital by diagnostic procedures and time.
2 You are the data design specialist on the data warehouse project team for a manufacturing company. Design a STAR schema to track the production quantities. Production quantities are normally analyzed along the business dimensions of product, time, parts used, production facility, and production run. State your assumptions.

3   In a STAR schema to track the shipments for a distribution company, the following dimension tables are found: (1) time, (2) customer ship-to, (3) ship-from, (4) product, (5) type of deal, and (6) mode of shipment. Review these dimensions and list the possible attributes for each of the dimension tables. Also, designate a primary key for each table.

4   Assume you are in the insurance business. Find two examples of Type 2 slowly changing dimensions in that business. As an analyst on the project, write the specifications for applying the Type 2 changes to the data warehouse with regards to the two examples.

5   You are the data design specialist on the data warehouse project team for a retail company. Design a STAR schema to track the sales units and sales dollars with three dimension tables. Explain how you will decide to select and build four two way aggregates.

6   As the data designer for an international bank, consider the possible types of snapshot and transaction tables. Complete the design with one set of snapshot and transaction tables.

7   For a manufacturing company, design a family of three STARS to support the value chain.

8   What are some of the factors that influence an organization's satisfaction with its data warehouse?

9   Write a note on aggregate tables?

10   What are the different aggregate functions?

11   Explain the conceptual view of a data warehouse.

12   Suppose that a data warehouse consists of the four dimensions, date, spectator, location, Game and the two measures, count and charge, where charge is the fare that a spectator pays when watching a game on a given date. Spectators may be students, adults, or seniors, with each category having its own charge rate.
        (a)   Draw a star schema for the data ware-house.
        (b)   Bitmap indexing is useful in data warehousing. Taking this cube as an example, briefly discuss advantages and problems of using a bitmap index structure.

13   Difference between Snow flake and Star Schema. What are situations where Snow flake Schema is better than Star Schema to use and when the opposite is true?

14   What are the important issues related with star schema? Discuss.

15   Write a short note on multidimensional data model.

16   Explain the OLAP operations in multidimensional model.

17   Discuss the challenges of OLAP.

18   (a) What is information package diagram (IPD)? How it helps in dimensional analysis? Make an IPD of sales analysis system

19   You are the senior analyst in the IT department of a company manufacturing automobile parts. The marketing VP is complaining about the poor response by IT in providing strategic information. Draft a proposal to him explaining the reason for the problem and why the data ware house would be only viable option.

20   Is OLTP database design optimal for data warehouse? Discuss.

21   What are conformed dimension.

22   Explain why dimension table is wide and shallow?

23   What are hypercubes ? What is the importance of hypercubes ?

24   Discuss sparsity in fact tables?

25   What is Factless Fact table? Design a star schema with factless fact table to tract patient in a hospital by diagnostic procedure and time.

26   What are the characteristics of fact table and dimension table ?

27   A sales Organisation builds its data warehouse . It is known that not all products are sold at each outlet every day. Show how the use of analysis can speed up analysis.

28   Differentiate between fully additive, semi additive and non-additive facts with examples.

29   List the dimension and facts for hospital management system and also draw the star and snowflake schema.

30   What is data descritization and summarization with example.

31   What is market basket analysis? Explain its use.

32   Construct an ER diagram for a car insurance company that has a set of customers, each of whom owns one or more cars. Each car has associated with it zero to any number of recorded accidents.

34   Picture this scenario: An enterprise has an enterprise-wide data warehouse. The data architect has the responsibility of maintaining the data warehouse. The data warehouse is periodically updated asynchronously. The data architect keeps track of the ETL process. When was it done? Was it an incremental update to the data warehouse? Etc. What according to you is the type of metadata that the data architect is maintaining?

35   You are the data design specialist on the data warehouse project team for a manufacturing company. Design a STAR schema to track the production quantities. Production quantities are normally analyzed along the business dimensions of product, time, parts used, production facility, and production run. State your assumptions.

36   Discuss why metadata of a warehouse is more critical than the metadata of Database.

37   Discuss the business conditions in which MOLAP will be preferred over ROLAP.

38   How association rule applies in market basket analysis and discuss how ecommerce business utilize it.

39   How discretization is different from summarization. Explain.

40   Discuss how the data warehouse design of an automobile company will differ from that of a pharmaceutical company.

UNIT - III

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Data mining is
      (a)   Data driven
      (b)   User driven
      (c)   Both (a) & (b)
      (d)   Neither (a) nor (b)

2   Knowledge discovery process comprises of
      (a)   Two steps
      (b)   Four steps
      (c)   Six steps
      (d)   None of the above

3   In case of data mining the analyst has
        (a)   No prior knowledge of what the results are likely to be
        (b)   Some prior knowledge of what the results are likely to be
        (c)   All the prior knowledge of what the results are likely to be
        (d)   None of the above

4   Selection and preparation of data phase in knowledge discovery process consumes
        (a)   15% of total effort
        (b)   45% of total effort
        (c)   20% of total effort
        (d)   25% of total effort

5   Business Intelligence and data warehousing is used for _____.
        (a)   Forecasting.
        (b)   Analysis of large volumes of product sales data
        (c)   Finding Pattern
        (d)   All of the above.

6   The data administration subsystem helps you perform all of the following,
        except_____.
        (a)   backups and recovery.
        (b)   query optimization.
        (c)   security management.
        (d)   create, change, and delete information.

7   The most common source of change data in refreshing a data warehouse is _____.
        (a)   queryable change data.
        (b)   cooperative change data.
        (c)   logged change data.
        (d)   snapshot change data.

8   Which one of the following is responsible for running queries and reports against data
        warehouse tables.
        (a)   Hardware.
        (b)   Software.
        (c)   End users.
        (d)   Middle ware.

9   Query tool is meant for _____.
        (a)   data acquisition.
        (b)   information delivery.
        (c)   information exchange.
        (d)   communication.

10   Classification rules are extracted from _____.
        (a)   root node.

(b)   decision tree.
(c)   siblings.
(d)   branches.

11   Dimensionality reduction reduces the data set size by removing _____.
(a)   relevant attributes.
(b)   irrelevant attributes.
(c)   derived attributes.
(d)   composite attributes.

12   Which of these is a method of incremental conceptual clustering.
(a)   CORBA.
(b)   OLAP.
(c)   COBWEB.
(d)   STING.

13   Effect of one attribute value on a given class is independent of values of other attribute is called _____.
(a)   value independence.
(b)   class conditional independence.
(c)   conditional independence.
(d)   unconditional independence.

14   The main organizational justification for implementing a data warehouse is to provide_____
(a)   cheaper ways of handling transportation.
(b)   decision support.
(c)   storing large volume of data.
(d)   access to data.

15   Data warehouse architecture is based on _____.
(a)   DBMS.
(b)   RDBMS.
(c)   Sybase.
(d)   SQL Server.

16   Source data from the warehouse comes from _____.
(a)   ODS.
(b)   TDS.
(c)   MDDB.
(d)   ORDBMS.

17   Which of these is a data transformation process.
(a)   Comparison.
(b)   Projection.
(c)   Selection.

(d)   Filtering.

18   The technology area associated with CRM is _____.
(a)   specialization.
(b)   generalization.
(c)   personalization.
(d)   summarization.

19   Which _of the following are designed to overcome any limitations placed on the warehouse by the nature of therelational data model.
(a)   Operational database.
(b)   Relational database.
(c)   Multidimensional database.
(d)   Data repository.

20   Which of these is data about data?
(a)   Metadata.
(b)   Microdata.
(c)   Minidata.
(d)   Multidata.

21   The term that is not associated with data cleaning process is _____.
(a)   Domain consistency.
(b)   Deduplication.
(c)   Disambiguation.
(d)   Segmentation.

22   _____are some popular OLAP tools.
(a)   Metacube, Informix.
(b)   Oracle Express, Essbase.
(c)   HOLAP.
(d)   MOLAP.

23   Capability of data mining is to build _____models.
(a)   Retrospective.
(b)   Interrogative.
(c)   Predictive.
(d)   Imperative.

24   _____ is a process of determining the preference of customer's majority.
(a)   Association.
(b)   Preferencing.
(c)   Segmentation.
(d)   Classification.

25   Strategic value of data mining is _____.
        (a)   Cost-sensitive.
        (b)   Work-sensitive.
        (c)   Time-sensitive.
        (d)   Technical-sensitive.

26   _____ proposed the approach for data integration issues.
        (a)   Ralph Campbell.
        (b)   Ralph Kimball.
        (c)   John Raphlin.
        (d)   James Gosling.

27   The terms equality and roll up are associated with _____.
        (a)   OLAP.
        (b)   Visualization.
        (c)   Data mart.
        (d)   Decision tree.

28   _____ is a metadata repository.
        (a)   Prism solution directory manager
        (b)   CORBA
        (c)   STUNT
        (d)   COBWEB

29   _____ is an expensive process in building an expert system.
        (a)   Analysis
        (b)   Study
        (c)   Design
        (d)   Information collection

30   The full form of KDD is _____.
        (a)   Knowledge database
        (b)   Knowledge discovery in database
        (c)   Knowledge data house
        (d)   Knowledge data definition

31   _____ servers support multidimensional views of data through array – based
        multidimensional storage engines.
        (a)   ROLAP
        (b)   MOLAP
        (c)   Data Base
        (d)   Data Warehouse

32.   _____ is used to refer to systems and technologies that provide the business with
        the means for decision-
        (a)   Business Intelligence

(b)   Data warehouse
(c)   Data Mining
(d)   None of the above

33.   The _____ software gives the user the opportunity to look at the data from a variety of different dimensions.
(a)   Query tool
(b)   Data Mining Tool
(c)   Multidimensional Analysis software
(d)   None of the above

34   _____ methods smooth a sorted data value by consulting its "neighborhood", that is, the values around it.
(a)   Binning
(b)   Clustering
(c)   Mining
(d)   None of the above

35   _____ techniques can be used to reduce the number of values for a given continuous attribute, by dividing the range of the attribute into intervals.
(a)   Discritization
(b)   Smoothening
(c)   Binning
(d)   Mining

36   _____ can be used to help avoid errors in schema integration.
(a)   User data
(b)   Metadata
(c)   Administrator Data
(d)   All of the above

37   A frequent set is a _____ if it is a frequent set and no superset of this is a frequent set.
(a)   Minimal Frequent set
(b)   Maximum Frequent set
(c)   Border Set
(d)   None of the above

38   An_____ is an information-processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information.
(a)   Decision Tree
(b)   Artificial Neural Network
(c)   Both a and b
(d)   Neither a nor b

39 It is difficult to find strong associations among data items at low or primitive levels of abstraction due to the _____ of data in multidimensional space.
(a) Scarcity
(b) Sparcity
(c) Excess
(d) None of the above

40 The process of partitioning the ranges of quantitative attributes into intervals, is called _____.
(a) Splitting
(b) Binning
(c) Grouping
(d) None of these

41 The process of forming general concept definitions from examples of concepts to be learned.
(a) deduction
(b) abduction
(c) induction
(d) conjunction

42 Data mining is best described as the process of
(a) identifying patterns in data.
(b) deducing relationships in data.
(c) representing data.
(d) simulating trends in data.

43 Computers are best at learning
(a) facts.
(b) concepts.
(c) procedures.
(d) principles.

44 Like the probabilistic view, the _____ view allows us to associate a probability of membership with each classification.
(a) exemplar
(b) deductive
(c) classical
(d) inductive

45 Data used to build a data mining model.
(a) validation data
(b) training data
(c) test data
(d) hidden data

46. Supervised learning and unsupervised clustering both require at least one
    (a)   hidden attribute.
    (b)   output attribute.
    (c)   input attribute.
    (d)   categorical attribute.

47 Supervised learning differs from unsupervised clustering in that supervised learning requires
    (a)   at least one input attribute.
    (b)   input attributes to be categorical.
    (c)   at least one output attribute.
    (d)   ouput attriubutes to be categorical.

48 Which of the following is a valid production rule for the decision tree below?
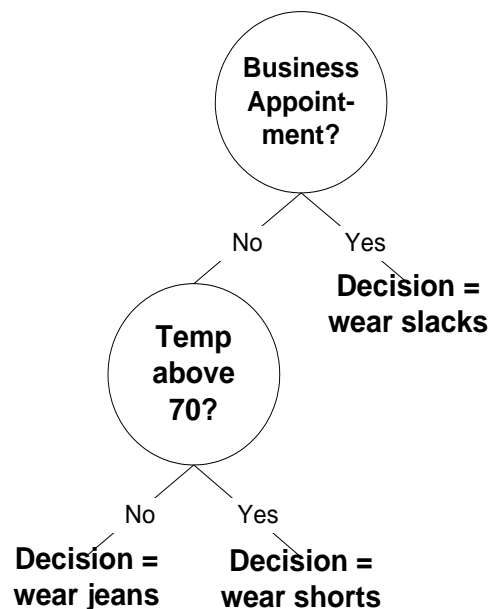
    (a)   IF Business Appointment = No & Temp above 70 = No
            THEN Decision = wear slacks
    (b)   IF Business Appointment = Yes & Temp above 70 = Yes
            THEN Decision = wear shorts
    (c)   IF Temp above 70 = No
            THEN Decision = wear shorts
    (d)   IF Business Appointment= No & Temp above 70 = No
            THEN Decision = wear jeans

49 Database query is used to uncover this type of knowledge.
    (a)   deep
    (b)   hidden

(c)   shallow

(d)   multidimensional

50   A statement to be tested.

      (a)   theory

      (b)   procedure

      (c)   principle

      (d)   hypothesis

51   Data mining applications are used accomplish which of the following tasks?

      (a)   Process transactions only

      (b)   Do RFM analysis only

      (c)   Do what-if analysis only

      (d)   Do both RFM and what-if analysis

52   The process of forming general concept definitions from examples of concepts to be learned.

      (a)   deduction

      (b)   abduction

      (c)   induction

      (d)   conjunction

53   Data mining is best described as the process of

      (a)   identifying patterns in data.

      (b)   deducing relationships in data.

      (c)   representing data.

      (d)   simulating trends in data.

54   Computers are best at learning

      (a)   facts.

      (b)   concepts.

      (c)   procedures.

      (d)   principles.

55   Like the probabilistic view, the _____ view allows us to associate a probability of membership with each classification.

      (a)   exemplar

      (b)   deductive

      (c)   classical

      (d)   inductive

56   Data used to build a data mining model.

      (a)   validation data

      (a)   training data

      (b)   test data

      (c)   hidden data

57   Supervised learning and unsupervised clustering both require at least one
       (a)   hidden attribute.
       (b)   output attribute.
       (c)   input attribute.
       (d)   categorical attribute.

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       requires
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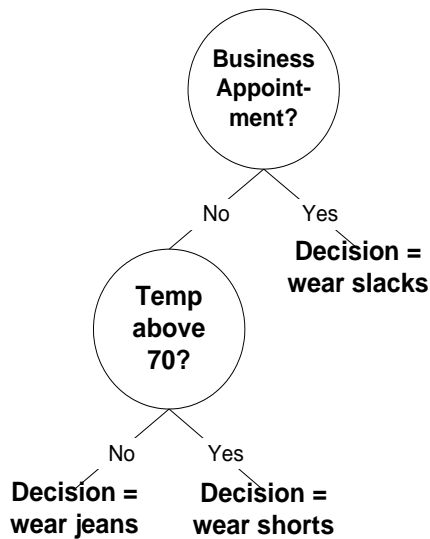
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       (c)   IF Temp above 70 = No
               THEN Decision = wear shorts
       (d)   IF Business Appointment= No & Temp above 70 = No
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59   Database query is used to uncover this type of knowledge.
       (a)   deep
       (b)   hidden
       (c)   shallow
       (d)   multidimensional

60   A statement to be tested.
      (a)   theory
      (b)   procedure
      (c)   principle
      (d)   hypothesis

61   Another name for an output attribute.
      (a)   predictive variable
      (b)   independent variable
      (c)   estimated variable
      (d)   dependent variable

62   Classification problems are distinguished from estimation problems in that
      (a)   classification problems require the output attribute to be numeric.
      (b)   classification problems require the output attribute to be categorical.
      (c)   classification problems do not allow an output attribute.
      (d)   classification problems are designed to predict future outcome.

63   Which statement is true about prediction problems?
      (a)   The output attribute must be categorical.
      (b)   The output attribute must be numeric.
      (c)   The resultant model is designed to determine future outcomes.
      (d)   The resultant model is designed to classify current behavior.

64   Which statement about outliers is true?
      (a)   Outliers should be identified and removed from a dataset.
      (b)   Outliers should be part of the training dataset but should not be present in the test data.
      (c)   Outliers should be part of the test dataset but should not be present in the training data.
      (d)   The nature of the problem determines how outliers are used.
      (e)   More than one of a,b,c or d is true.

65   Assume that we have a dataset containing information about 200 individuals. One hundred of these individuals have purchased life insurance. A supervised data mining session has discovered the following rule:

      IF age < 30 & credit card insurance = yes
      THEN life insurance = yes
      Rule Accuracy: 70%
      Rule Coverage: 63%
      How many individuals in the class *life insurance= no* have credit card insurance and are less than 30 years old?
      (a)   63
      (b)   70
      (c)   30

(d)   27

66   Which statement is true about neural network and linear regression models?
(a)   Both models require input attributes to be numeric.
(b)   Both models require numeric attributes to range between 0 and 1.
(c)   The output of both models is a categorical attribute value.
(d)   Both techniques build models whose output is determined by a linear sum of weighted input attribute values.
(e)   More than one of a,b,c or d is true.

67   Unlike traditional production rules, association rules
(a)   allow the same variable to be an input attribute in one rule and an output attribute in another rule.
(b)   allow more than one input attribute in a single rule.
(c)   require input attributes to take on numeric values.
(d)   require each rule to have exactly one categorical output attribute.

68   Which of the following is a common use of unsupervised clustering?
(a)   detect outliers
(b)   determine a best set of input attributes for supervised learning
(c)   evaluate the likely performance of a supervised learner model
(d)   determine if meaningful relationships can be found in a dataset
(e)   All of a,b,c, and d are common uses of unsupervised clustering.

69   The average positive difference between computed and desired outcome values.
(a)   root mean squared error
(b)   mean squared error
(c)   mean absolute error
(d)   mean positive error

70   Given desired class C and population P, lift is defined as
(a)   the probability of class C given population P divided by the probability of C given a sample taken from the population.
(b)   the probability of population P given a sample taken from P.
(c)   the probability of class C given a sample taken from population P.
(d)   the probability of class C given a sample taken from population P divided by the probability of C within the entire population P.

Ans.   (1)(a), (2)(c), (3)(a), (4)(b), (5)(a),(6)(d), (7)(a), (8)(c), (9)(a), (10)(b), (11)(b), (12)(c), (13)(a), (14)(c), (15)(b), (16)(a), (17)(d), (18)(c), (19)(c), (20)(a), (21)(d), (22)(a), (23)(c), (24)(b), (25)(c), (26)(b), (27)(c), (28)(a), (29)(d), (30)(b), (31)(b), (32)(a), (33)(c), (34)(a), (35)(a), (36)(b), (37)(b), (38)(b), (39)(b), (40)(b), (41)(c), (42)(a), (43)(b), (44)(a), (45)(b), (46)(c), (47)(c), (48)(d), (49)(c), (50)(a), (51)(c), (52)(c), (53)(a), (54)(b), (55)(a), (56)(b), (57)(c), (58)(c), (59)(d), (60)(c), (61)(d), (62)(b), (63)(c), (64)(d), (65)(d), (66)(a), (67)(a), (68)(e), (69)(c), (70)(d)

(b) **Fill in the Blanks:**

1   OLAP is _____driven.
2   Knowledge discovery process in data mining uncovers _____ and _____not
        readily known to exist.
3   _____is the best source of data for a data mining operation.
4   If knowledge discovery is one aspect of data mining then _____is the other.
5   Infrastructure of data warehouse is _____.

Ans.   (1)(User), (2)(Relationship Patterns), (3)(Data Warehouse), (4)(Prediction), (5)(Robust)

II   Short Answer Type Questions:

1   Give three broad reasons why you think data mining is being used in today's businesses.
2   Define data mining in two or three sentences.
3   name the major phases of a data mining operation. Out of these phases, pick two and
        describe the types of activities in these two phases.
4   How is data mining different from OLAP? Explain briefly.
5   Is the data warehouse a prerequisite for data mining? Does the data warehouse help data
        mining? If so, in what ways?
6   List out the advance database systems.
7   Describe challenges to data mining regarding performance issues.
8   Describe issues relating to the diversity of database types.
9   What do you understand by Pattern Detection? Explain in context of Data Mining.
10   Match the columns:
        1.   Knowledge discovery process   A.   reveals reasons for the discovery
        2.   OLAP   B.   neural networks
        3.   Cluster detection   C.   distance function
        4.   Decision trees   D.   feeds data for mining
        5.   Link analysis   E.   data-driven
        6.   Hidden layers   F.   fraud detection
        7.   Genetic algorithms   G.   user-driven
        8.   Data warehouse   H.   forms groups
        9.   MBR   I.   highly iterative
        10.   Banking application   J.   associations discovery
11   What relationships are needed between databases to explore on data mining?
12   Explain the major elements of data mining.
13   What is the need of data mining tool?
14   What is the motivation behind knowledge discovery?
15   Define each of the data mining functionalities using real life examples.
16   Describe why concept hierarchies are useful in Data Mining?
17   Briefly explain SVM.
18   What do you understand by Data Processing?
19   What are different stages of data mining?
20   Which classification algorithm help in prediction.
21   What is latest version of WEKA being used?
22   What are the limitations of WEKA?

23   'R' software is superior to WEKA. Discuss.
24   Explain schema integration and instance integration with an example.
25   When and how is data profiling conducted? Explain.
26   Where can we use genetic algorithms for mining the data.
27   What is the difference between clustering and nearest neighbour prediction?
28   Where can we use Neural networks in the field of data mining?
29   Describe the use and applications of DBMiner.
30   What are the factors involved while choosing data mining system?
31   Explain the types of data mining.
32   Explain in detail the various steps involved in Data Processing.
33   Discuss classification and Prediction in detail

III   Long Answer Type Questions:

1   Explain the different types of data repositories on which mining can be performed?
2   As a data mining consultant you are hired by a large commercial bank that provides many financial services. The bank already has a data warehouse that it rolled out two years ago. The management wants to find the existing customers who are most likely to respond to a marketing campaign offering new services. Outline he knowledge discovery process, list the phases, and indicate the activities in each phase.
3   What is KDD? Explain the steps involved in KDD process?
4   Explain the architecture of a typical data mining system?
5   Explain data mining primitives?
6   Describe the use and applications of DBMiner.
7   What are the factors involved while choosing data mining system?
8   Explain the types of data mining.
9   Explain in detail the various steps involved in Data Processing.
10   Discuss classification and Prediction in detail.
11   Differentiate between fully additive and semi-additive facts with examples?
12   Suppose that a data warehouse consists of the three dimensions time, doctor, and patient, and the two measures count and charge, where charge is the fee that a doctor charges a patient for a visit.
      (a) Enumerate three classes of schemas that are popularly used for modeling data warehouses.
      (b) Draw a schema diagram for the above data warehouse using one of the schema classes listed in (a).
      (c) Starting with the base cuboid [day; doctor; patient], what specific OLAP operations should be per-formed in order to list the total fee collected by each doctor in 2004?
13   Compare and contrast SVM and Neural Network.
14   What are the essential difference between MOLAP and ROLAP models? Also list some similarities?
15   Explain different OLAP operation with suitable example.
16   Explain the different steps of knowledge discovery in data process in details?
17   What is different OLAP implementation consideration?
18   OLAP is user driven. Comment.
19   Discuss the application of data mining in telecommunication industry.

20   Discuss the application of data mining in banking and finance industry.
21   As a data mining consultant you are hired by a large commercial bank that provides many financial services. The bank already has a data warehouse that it rolled out two years ago. The management wants to find the existing customers who are most likely to respond to a marketing campaign offering new services. Outline he knowledge discovery process, list the phases, and indicate the activities in each phase.
22   In your project you are responsible for analyzing the requirements and selecting a toolset for data mining. Make a list of the criteria you will use for the toolset selection. Briefly explain why each criteria is necessary.
23   You are the senior analyst in the IT department of a company manufacturing automobile parts. The marketing VP is complaining about the poor response by IT in providing strategic information. Draft a proposal to him explaining the reason for the problem and why the data ware house would be only viable option.
24   Is OLTP database design optimal for data warehouse? Discuss.
25   What are conformed dimension.
26   Explain why dimension table is wide and shallow?
27   What are hypercubes? What is the importance of hypercubes?

UNIT- IV

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Which of the following data mining technique be sued for market analysis?
        (a)   Cluster detection
        (b)   Decision Trees
        (c)   Genetic Algorithms
        (d)   All the above

2   Clustering means forming
        (a)   Rings
        (b)   Groups
        (c)   Rectors
        (d)   None of the above

3   Which of the following feeds data for data mining?
        (a)   Databases
        (b)   OLTP systems
        (c)   Data warehouses
        (d)   None of the above

4   Memory based reasoning data mining technique can be used in
        (a)   Risk assessment
        (b)   Fraud detection
        (c)   Both (a) & (b)

(d) Neither (a) nor (b)

5 Which of these is used to map a data item to a real valued prediction variable.
(a) Regression.
(b) Time series analysis.
(c) Prediction.
(d) Classification.

6 In ———— , the value of an attribute is examined as it varies over time.
(a) Regression
(b) Time series analysis
(c) Sequence discovery
(d) Prediction

7 In ———— the groups are not predefined.
(a) Association rules.
(b) Summarization.
(c) Clustering.
(d) Prediction.

8 Link Analysis is otherwise called as _____.
(a) Affinity analysis.
(b) Association rules.
(c) Both A & B.
(d) Prediction.

9 Which of these is a the input to KDD.
(a) Data
(b) Information
(c) Query
(d) Process

10 The output of KDD is _____.
(a) Data
(b) Information
(c) Query
(d) Useful information

11 The KDD process consists of _how many steps.
(a) Three.
(b) Four.
(c) Five.
(d) Six.

12 Treating incorrect or missing data is called as _____.
(a) Selection.

(b)   Preprocessing.
(c)   Transformation.
(d)   Interpretation.

13   Converting data from different sources into a common format for processing is called as _____ .
(a)   Selection
(b)   Preprocessing
(c)   Transformation
(d)   Interpretation

13.   Various visualization techniques are used in which_ step of KDD.
(a)   Selection.
(b)   Transformation.
(c)   Data mining.
(d)   Interpretation.

14   Extreme values that occur infrequently are called as _____ .
(a)   Outliers.
(b)   Rare values.
(c)   Dimensionality reduction.
(d)   All of the above.

15   Overfitting occurs when a model _____ .
(a)   Does fit in future states.
(b)   Does not fit in future states.
(c)   Does fit in current state.
(d)   Does not fit in current state.

16   The _____ of data could result in the disclosure of information that is deemed to be confidential.
(a)   Authorized use.
(b)   Unauthorized use.
(c)   Authenticated use.
(d)   Unauthenticated use.

17   _____ are effective tools to attack the scalability problem.
(a)   Sampling.
(b)   Parallelization
(c)   Both A & B.
(d)   None of the above.

18   Market-basket problem was formulated by _____ .
(a)   Agrawal et al.
(b)   Steve et al.
(c)   Toda et al.

(d)   Simon et al.

19   Data mining helps in _____.
       (a)   inventory management.
       (b)   sales promotion strategies.
       (c)   marketing strategies.
       (d)   All of the above.

20   The proportion of transaction supporting X in T is called _____.
       (a)   confidence.
       (b)   support.
       (c)   support count.
       (d)   All of the above.

21   The absolute number of transactions supporting X in T is called _____.
       (a)   confidence.
       (b)   support.
       (c)   support count.
       (d)   None of the above.

22   The value that says that transactions in D that support X also support Y is called_____.
       (a)   confidence.
       (b)   support.
       (c)   support count.
       (d)   None of the above.

23   If T consist of 500000 transactions, 20000 transaction contain bread, 30000 transaction containjam, 10000 transaction contain both bread and jam. Then the support of bread and jam is _____.
       (a)   2%
       (b)   20%
       (c)   3%
       (d)   30%

24   If T consist of 500000 transactions, 20000 transaction contain bread, 30000 transaction containjam, 10000 transaction contain both bread and jam. Then the confidence of buying bread with jam is _____.
       (a)   33.33%
       (b)   66.66%
       (c)   45%
       (d)   50%

25   The left hand side of an association rule is called _____.
       (a)   consequent.
       (b)   onset.
       (c)   antecedent.
       (d)   precedent.

26   The right hand side of an association rule is called _____.
      (a)   consequent.
      (b)   onset.
      (c)   antecedent.
      (d)   precedent.

27   Which of the following is not a desirable feature of any efficient algorithm?
      (a)   to reduce number of input operations.
      (b)   to reduce number of output operations.
      (c)   to be efficient in computing.
      (d)   to have maximal code length.

28   All set of items whose support is greater than the user-specified minimum support are
      called as_____.
      (a)   border set.
      (b)   frequent set.
      (c)   maximal frequent set.
      (d)   lattice.

29   If a set is a frequent set and no superset of this set is a frequent set, then it is called
      _____
      (a)   maximal frequent set.
      (b)   border set.
      (c)   lattice.
      (d)   infrequent sets.

31   Hierarchical clustering may be represented by a two-dimensional diagram known as____.
      (a)   Dendogram
      (b)   Hexogram
      (c)   Both a and b
      (d)   Neither a and b

32   The basic algorithm for decision tree induction is a _____ algorithm.
      (a)   Step by step
      (b)   Procedural
      (c)   Greedy
      (d)   None of the above

33   _____ technologies are the right solutions for knowledge discovery on the web.
      (a)   Data Mining
      (b)   Knowledge mining
      (c)   Web Mining
      (d)   All of above

34   Two fundamental goals of Data Mining are _____ and _____.
      (a)   Analysis and description

(b) Prediction and description
(c) Data Cleaning and organizing data
(d) Data cleaning and summarization

35 Choose the correct statements: 1. An artificial neuron is simply an electronically modeled biological neuron. 2. Artificial Neural Network composed of a large number of highly interconnected processing elements (neurons) working in unison to solve specific problems.
(a) Statement 1 & 2 are true
(b) Statement 1 & 2 are false
(c) Statement 1 is true and Statement 2 is false
(d) Statement 1 is false and statement 2 is true

36. The a priori algorithm operates in a _____ and _____.
(a) bottom – up, depth – first search method
(b) bottom – up, breadth – first search method
(c) top – down, breadth – first search method
(d) None of the above

37 Choose the correct statements 1. In the K-means clustering algorithm, the first row of the distance matrix corresponds to the distance of each object to the first centroid and the second row is the distance of each object to the second centroid. 2. In the first step of Hierarchical clustering algorithm, each cluster generated will have just one item in it.
(a) Statement 1 & 2 are true
(b) Statement 1 & 2 are false
(c) Statement 1 is true and Statement 2 is false
(d) Statement 1 is false and statement 2 is true

38 Which of the following are classification algorithms?
(a) Decision Tree
(b) Neural network
(c) Both a and b
(d) Neither a nor b

39 Knowledge discovery includes
(a) ETL
(b) Data Mining
(c) Both a and b
(d) Neither a nor b

40 CHAID (Chi Square Automatic Interaction detection) is a
(a) Classification algorithm
(b) Clustering algorithm
(c) Association Rule Mining Algorithm
(d) None of the above.

41   Another name for an output attribute.
      (a)   predictive variable
      (b)   independent variable
      (c)   estimated variable
      (d)   dependent variable

42   Classification problems are distinguished from estimation problems in that
      (a)   classification problems require the output attribute to be numeric.
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      (c)   The resultant model is designed to determine future outcomes.
      (d)   The resultant model is designed to classify current behavior.

44   Which statement about outliers is true?
      (a)   Outliers should be identified and removed from a dataset.
      (b)   Outliers should be part of the training dataset but should not be present in
             the test data.
      (c)   Outliers should be part of the test dataset but should not be present in the
             training data.
      (d)   The nature of the problem determines how outliers are used.
      (e)   More than one of a,b,c or d is true.

45   Assume that we have a dataset containing information about 200 individuals.
      One hundred of these individuals have purchased life insurance. A supervised
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             IF age < 30 & credit card insurance = yes
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             Rule Accuracy: 70%
             Rule Coverage: 63%
      How many individuals in the class *life insurance= no* have credit card insurance
      and are less than 30 years old?
      (a)   63
      (b)   70
      (c)   30
      (d)   27

46   Which statement is true about neural network and linear regression models?
      (a)   Both models require input attributes to be numeric.
      (b)   Both models require numeric attributes to range between 0 and 1.
      (c)   The output of both models is a categorical attribute value.

(d)   Both techniques build models whose output is determined by a linear sum of weighted input attribute values.

(e)   More than one of a,b,c or d is true.

47   Unlike traditional production rules, association rules
(a)   allow the same variable to be an input attribute in one rule and an output attribute in another rule.
(b)   allow more than one input attribute in a single rule.
(c)   require input attributes to take on numeric values.
(d)   require each rule to have exactly one categorical output attribute.

48   Which of the following is a common use of unsupervised clustering?
(a)   detect outliers
(b)   determine a best set of input attributes for supervised learning
(c)   evaluate the likely performance of a supervised learner model
(d)   determine if meaningful relationships can be found in a dataset
(e)   All of a,b,c, and d are common uses of unsupervised clustering.

49   The average positive difference between computed and desired outcome values.
(a)   root mean squared error
(b)   mean squared error
(c)   mean absolute error
(d)   mean positive error

50   Given desired class C and population P, lift is defined as
(a)   the probability of class *C* given population *P* divided by the probability of *C* given a sample taken from the population.
(b)   the probability of population *P* given a sample taken from *P*.
(c)   the probability of class *C* given a sample taken from population *P*.
(d)   the probability of class *C* given a sample taken from population *P* divided by the probability of *C* within the entire population *P*.

51   Another name for an output attribute.
(a)   predictive variable
(b)   independent variable
(c)   estimated variable
(d)   dependent variable

52   Classification problems are distinguished from estimation problems in that
(a)   classification problems require the output attribute to be numeric.
(b)   classification problems require the output attribute to be categorical.
(c)   classification problems do not allow an output attribute.
(d)   classification problems are designed to predict future outcome.

53   Which statement is true about prediction problems?
(a)   The output attribute must be categorical.

(b)   The output attribute must be numeric.
(c)   The resultant model is designed to determine future outcomes.
(d)   The resultant model is designed to classify current behavior.

54   Which statement about outliers is true?
(a)   Outliers should be identified and removed from a dataset.
(b)   Outliers should be part of the training dataset but should not be present in the test data.
(c)   Outliers should be part of the test dataset but should not be present in the training data.
(d)   The nature of the problem determines how outliers are used.
(e)   More than one of a,b,c or d is true.

55   Assume that we have a dataset containing information about 200 individuals. One hundred of these individuals have purchased life insurance. A supervised data mining session has discovered the following rule:
IF age < 30 & credit card insurance = yes
THEN life insurance = yes
Rule Accuracy: 70%
Rule Coverage: 63%

How many individuals in the class *life insurance= no* have credit card insurance and are less than 30 years old?
(a)   63
(b)   70
(c)   30
(d)   27

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(a)   the probability of class C given population P divided by the probability of C given a sample taken from the population.
(b)   the probability of population P given a sample taken from P.
(c)   the probability of class C given a sample taken from population P.
(d)   the probability of class C given a sample taken from population P divided by the probability of C within the entire population P.

61   _____ servers support multidimensional views of data through array – based multidimensional storage engines.
(a)   ROLAP
(b)   MOLAP
(c)   Data Base
(d)   Data Warehouse

62.   _____ is used to refer to systems and technologies that provide the business with the means for decision-
(a)   Business Intelligence
(b)   Data warehouse
(c)   Data Mining
(d)   None of the above

63   The _____ software gives the user the opportunity to look at the data from a variety of different dimensions.
(a)   Query tool
(b)   Data Mining Tool
(c)   Multidimensional Analysis software
(d)   None of the above

64   _____ methods smooth a sorted data value by consulting its "neighborhood", that is, the values around it.
(a)   Binning
(b)   Clustering
(c)   Mining
(d)   None of the above

65   _____ techniques can be used to reduce the number of values for a given
      continuous attribute, by dividing the range of the attribute into intervals.
      (a)   Discritization
      (b)   Smoothening
      (c)   Binning
      (d)   Mining

66   _____ can be used to help avoid errors in schema integration.
      (a)   User data
      (b)   Metadata
      (c)   Administrator Data
      (d)   All of the above

67   A frequent set is a _____ if it is a frequent set and no superset of this is a frequent
      set.
      (a)   Minimal Frequent set
      (b)   Maximum Frequent set
      (c)   Border Set
      (d)   None of the above

68   An_____is an information-processing paradigm that is inspired by
      the way biological nervous systems, such as the brain, process information.
      (a)   Decision Tree
      (b)   Artificial Neural Network
      (c)   Both a and b
      (d)   Neither a nor b

69   It is difficult to find strong associations among data items at low or primitive levels of
      abstraction due to the _____ of data in multidimensional space.
      (a)   Scarcity
      (b)   Sparcity
      (c)   Excess
      (d)   None of the above

70   The process of partitioning the ranges of quantitative attributes into intervals, is called
      _____.
      (a)   Splitting
      (b)   Binning
      (c)   Grouping
      (d)   None of these

Ans.   (1)(d), (2)(b), (3)(c), (4)(c), (5)(b), (6)(b), (7)(c), (8)(c), (9)(a), (10)(d), (11)(c), (12)(b),
       (13)(c), (14)(a), (15)(b), (16)(b), (17)(c), (18)(a), (19)(d), (20)(b), (21)(c), (22)(a),
       (23)(a), (24)(d), (25)(c), (26)(a), (27)(d), (28)(b), (29)(a), (30)(b), (31)(a), (32)(c),
       (33)(c), (34)(b), (35)(a), (36)(b), (37)(d), (38)(c), (39)(b), (40)(a), (41)(d), (42)(b),
       (43)(c), (44)(d), (45)(d), (46)(a), (47)(a), (48)(e), (49)(c), (50)(d), (51)(d), (52)(b),

(53)(c), (54)(d), (55)(d), (56)(a), (57)(a), (58)(e), (59)(c), (60)(d), (61)(b), (62)(a), (63)(c), (64)(a), (65)(a), (66)(b), (67)(b), (68)(b), (69)(b), (70)(b)

(b)   **Fill in the Blanks:**

1   Cluster detection, decision trees and memory based reasoning are major _____techniques.
2   Link analysis technique mines _____and discover knowledge.
3   Associations are _____between items.
4   OPTICS stands for_____.
5   STING stands for _____.

Ans.   (1)(Data Mining), (2)(Relationship), (3)(Affinities), (4)(Ordering Points to identify the Clustering Structure), (5)(Statistical Information Grid)

II   **Short Answer Type Questions:**

1   Briefly describe the cluster detection technique.
2   How does the memory-based reasoning (MBR) technique work? What are the underlying principles?
3   Name the three common application of the link analysis technique.
4   Do neural networks and genetic algorithms have anything in common? Point out a few differences.
5   What is market basket analysis? Give two examples of this application in business.
6   Give some alternative terms for data mining.
7   What is the use of a knowledge base?
8   What is Meta learning?
9   What is the major purpose of data mining techniques?
10   Define cluster analysis.
11   Define the concept of classification.
12   What are the fields in which clustering technique is used?
13   What is the difference between rules generated by association rule data mining and the one drawn from decision tree?
14   What is Meta learning?
15   What is the major purpose of data mining techniques?
16   Define cluster analysis.
17   Define the concept of classification.
18   What are the fields in which clustering technique is used?
19   Is the data warehouse a prerequisite for data mining? Does the data warehouse help data mining? If so, in what ways?
20   List out the advance database systems.
21   Describe challenges to data mining regarding performance issues.
22   Describe issues relating to the diversity of database types.
23   What do you understand by Pattern Detection? Explain in context of Data Mining.

III   Long Answer Type Questions:

1   Describe how decision trees work. Choose an example and explain how this knowledge discovery process works.
2   What are the basic principles of genetic algorithms? Give an example. Use the example to describe how this technique works.
3   In your project you are responsible for analyzing the requirements and selecting a toolset for data mining. Make a list of the criteria you will use for the toolset selection. Briefly explain why each criteria is necessary.
4   Explain data mining applications?
5   Explain data mining system products and research prototypes?
6   Discuss various data mining techniques in detail with examples.
7   Give the various classifications of data mining systems and explain them in detail.
8   Describe challenges to data mining regarding data mining methodology and user interaction issues.
9   Explain the classifications of tools for data mining?
10   What are some of the considerations that a data miner must have when interpreting data? Why are these so critical?
11   Explain clustering by using sales data as example.
12   How will you solve a classification problem using decision trees? Give example.
13   Explain classification models.
14   Discuss classification schemes.
15   What are the advantages and disadvantages of decision tree approach over other approaches of data mining?
16   How the different kinds of knowledge from the databases are mined?
17   Given the following measurements for the variable age:
      18, 22, 25,42,28,33,35,56,28 standardize the variable by the following:
      (a)   Compute the mean absolute deviation of age
      (b)   Compute the z-score for the first four measurements.
18   What is data integration and transformation? How are these performed?
19   Write a short note on (a) Memory Based Reasoning (b) Neural network
20   What is association rule mining? Describe Apriori method with example.
21   (a) Suppose that the data mining task is to cluster the following eight points, with (x,y) representing location into 3 cluster.
      A1(2,10); A2(2,5); A3(8,4); B1(5,8); B2(7,5); B3(6,4); c1(1,2); c2(4,9): The distance function is Euclidian distance. Suppose initially, we assign A1, B1, C1 as centre of each cluster respectively. Use the K-means algorithm to show
      (i)The three cluster centre after the first round execution
      (ii) The final three cluster
22   Discuss CHAID Algorithm.
23   Discuss Apriori Algorithm.
24   Data mining is the need of the hour. Discuss.
25   What are data mining tasks?
29   Explain what do understand data mining primitives
30   Differenced between Supervised learning and unsupervised learning
31   What is association rule mining? Describe Apriori method with example?

32   What are the different data mining application?

33   Explain different methods of cluster analysis?

34   If shallow knowledge is declarative, what is deep knowledge? Be as specific as you can.

35   Black boarding offers certain characteristics. Explain each characteristic. What makes up the basic model.

36   if u were asked to apply the Delphi method involving 4 experts, what procedure would you follow? What limitations would you expect in this knowledge capture technique?

37   Write an essay in which you describe the role of knowledge developer and his or her relationship with the key persons in the knowledge capture process.

38   Discuss how portals can offer a solution to the centralized versus decentralized information dilemma. What forma of knowledge can be collected centrally, and what should be left decentralized? Why?

39   Discuss how synergy between different strategic business units can be harnessed and utilized by knowledge portals.

40   Explain why knowledge maps are required

QUESTION BANK

ADVANCED COMPUTER NETWORKS

MCA-206

QUESTION BANK
ADVANCED COMPUTER NETWORKS MCA – 206
MCA IV

UNIT - I

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   A set of rules that govern data communications between the sender and the receiver is called _____.
(a)   Rule
(b)   Protocol
(c)   Low
(d)   Option

2   The number of cycles completed by a signal in one signal cycle is its_____.
(a)   Amplitude
(b)   Frequency
(c)   Period
(d)   Phase

3   The unit to measure frequency is _____.
(a)   Hertz
(b)   Volts
(c)   Ampere
(d)   Seconds

4   The position of a signal relative to time zero is _____.
(a)   Amplitude
(b)   Frequency
(c)   Period
(d)   Phase

5   _____ signals are on-off in nature.
(a)   Analog
(b)   Digital
(c)   Mixed
(d)   None of the above

6   In the ____ method, after the station finds the line idle it sends or refrains from sending based on the outcome of a random number generator. If the line is busy, it tries again.
(a)   Non-persistent
(b)   P-persistent
(c)   1-persistent

(d) None of the above

7 In CSMA, vulnerable period is equal to
   (a) 1 frame transmission time
   (b) 1 way propagation time
   (c) 2 frame transmission times
   (d) Round trip propagation time

8 A _____ is a device connected to two networks
   (a) Gateway
   (b) Link
   (c) Server
   (d) Bridge

9 The hamming distance between 100 and 001 is
   (a) 0
   (b) 1
   (c) 2
   (d) 3

10 Which model is used by internet applications
   (a) Login
   (b) Distributed server
   (c) Digital server
   (d) Client/server

11 Which is not an example of network layer
   (a) X.25 level 2-ISO
   (b) Source routing
   (c) IP-ARPANET
   (d) X.25 Packet Level Protocol-ISO
   (e) None of these

12 Mobile computers and PDAs are examples of
   (a) Radio broadcasting
   (b) Wireless network
   (c) Geosynchronous
   (d) LAN

13 ATM is fundamentally a __ technology
   (a) Circuit switching
   (b) Packet switching
   (c) Narrow band
   (d) None

14   Which is a variation of FDM?
      (a)   TDM
      (b)   PCM
      (c)   WDM
      (d)   None of these

15   Encryption is a security method but it doesn't keep digital pests and hackers out. For this
      we need
      (a)   Router
      (b)   Bridges
      (c)   Hub
      (d)   Firewall

16   HTTP stands for
      (a)   Hyper Text Transfer Protocol
      (b)   Hyper Text Transmission Protocol
      (c)   Hyper Text Tie Protocol
      (d)   None of these

17   IEEE 802.22 standard for
      (a)   Wireless LAN (WiFi)
      (b)   Broadband wireless
      (c)   Personal Area Network
      (d)   Wireless Regional Area Network

18   Network components are connected to the same computer in the _____ topology.
      (a)   Star
      (b)   Ring
      (c)   Bus
      (d)   Mesh

19   Computer Network is
      (a)   Collection of hardware components and computers
      (b)   Interconnected by communication channels
      (c)   Sharing of resources and information
      (d)   All of the Above

20   What is a Firewall in Computer Network?
      (a)   The physical boundary of Network
      (b)   An operating System of Computer Network
      (c)   A system designed to prevent unauthorized access
      (d)   A web browsing Software

21   Which of the following layer of OSI model also called end-to-end layer?
      (a)   Presentation layer
      (b)   Network layer

(c)   Session layer
(d)   Transport layer

22   How many bits are there in the Ethernet address?
(a)   64 bits
(b)   48 bits
(c)   32 bits
(d)   16 bits

23   Which layers of the OSI model are host-to-host layers?
(a)   Transport, Session, Persentation, Application
(b)   Network, Transport, Session, Presentation
(c)   Datalink, Network, Transport, Session
(d)   Physical, Datalink, Network, Transport

24   What is the meaning of Bandwidth in Network?
(a)   Transmission capacity of a communication channels
(b)   Connected Computers in the Network
(c)   Class of IP used in Network
(d)   None of Above

25   IPV4 Address is
(a)   8 bit
(b)   16 bit
(c)   32 bit
(d)   64 bit

26   Which of the following is a product of LLC sublayer?
(a)   802.3 frame
(b)   802.5 frame
(c)   PDU(Protocol Data Unit)
(d)   Preamble

27   T switch is used to
(a)   Control how messages are passed between computers
(b)   Echo every character that is received.
(c)   Transmit characters one at a time.
(d)   Rearrange the connection between computing equipment.

28   To locate the hardware address of a local device, we would use
(a)   ARP
(b)   RARP
(c)   ICMP
(d)   PING

29   Hackers often use data thrown in bin to get information. This is
(a)   Scavenging

      (b)   Data hiding
      (c)   Piggybacking
      (d)   Both a and b

30   Which of the following is not a network device
      (a)   Router
      (b)   Switch
      (c)   Modem
      (d)   Bridge

31   Which is not a responsibility of network layer
      (a)   Medium access control
      (b)   Internetworking
      (c)   Congestion Control
      (d)   Routing

32   A port number is a
      (a)   transport service access point
      (b)   physical address
      (c)   network service access point
      (d)   none of the above

33   Two sublayers of data link layer of IEEE 802.3 are
      (a)   HIPPI FP and MAC
      (b)   LLC and MAC
      (c)   ACM and TxM
      (d)   IFM and LLC

34   Which is not a correct statement about a token bus and a token ring
      (a)   A bus is more reliable than a ring because a station to cable connection is passive in a bus.
      (b)   A bus can cover longer distance than a ring because each station acts like a repeater.
      (c)   It is easier to implement a ring using optical fibre due to point to point connection as opposed to multi drop connection in a bus.
      (d)   None of the above

35   What is not true about addresses
      (a)   An IP address is a 32 bit address.
      (b)   A physical address is usually denoted in colon hexadecimal notation.
      (c)   An IPv6 address can be both classful as well as classless.
      (d)   A port number is a sixteen bit identifier for a process.

36   Autonegotiation is a new feature starting which generation of Ethernet to allow incompatible devices to connect to each other
      (a)   Gigabit Ethernet

(b)   Standard Ethernet
(c)   Fast Ethernet
(d)   Ten gigabit Ethernet

37   Which is not an implementation of standard Ethernet
(a)   10Base2
(b)   10BaseF
(c)   10GBaseL
(d)   10BaseT

38   Classifications of LANs based on switching technology are
(a)   FDDI and its variations, and high speed token ring
(b)   Fast Ethernet and Gigabit Ethernet
(c)   ATM, Fibre channel and the Ether switches
(d)   None of the above

39   WiFi uses
(a)   Token passing
(b)   CSMA/CA
(c)   CSMA/CD
(d)   Reservation Frame

40   Station management standard is part of
(a)   DQDB
(b)   FDDI
(c)   Standard Ethernet
(d)   WiMax

41   B and P bits in HIPPI header denote:
(a)   Arrival of D2_Area in next burst, and presence of D1_Area
(b)   Presence of D2_Area, and arrival of D1_Area in next burst
(c)   Both a and b
(d)   None of the above

42   Uploading and downloading maximum data rates in 56K modem are respectively:
(a)   56kbps and 56 kbps
(b)   56kbps and 33.6kbps
(c)   33.6kbps and 56kbps
(d)   None of the above

43   IEEE802.11b offers
(a)   2.4 GHz and OFDM
(b)   2.4 GHz and DSSS with CCK
(c)   5 GHz with OFDM
(d)   2.4 GHz with both OFDM and DSSS with CCK

44   MAC protocol used by WiFi mobile stations
      (a)   CSMA/CD
      (b)   Polling
      (c)   Token Passing
      (d)   CSMA/CA

45   Access method of WiMax is
      (a)   CSMA/CD
      (b)   Polling
      (c)   Grant Request Mechanism
      (d)   None

46   Control field used by token ring LANs to manage priority
      (a)   Reservation field
      (b)   Priority Field
      (c)   Both a and b
      (d)   None of the above

47   Signalling technique used by FDDI UTP uses
      (a)   NRZ-I
      (b)   MLT-3
      (c)   RZ
      (d)   None

48   Access method used in FDDI is
      (a)   Token passing
      (b)   Polling
      (c)   Timed token rotation
      (d)   None

49   AMT time register used by FDDI is equal to
      (a)   Target Token Rotation time
      (b)   Synchronous Allocation
      (c)   2 x Synchronous Allocation
      (d)   2 x Target Token Rotation time

50   SMT protocol in FDDI is responsible for
      (a)   connection management
      (b)   ring monitoring
      (c)   both a and b
      (d)   none

51   WiMAX stands for
      (a)   wireless maximum communication
      (b)   worldwide interoperability for microwave access

(c)   worldwide international standard for microwave access
(d)   none of the mentioned

52   WiMAX provides
    (a)   simplex communication
    (b)   half duplex communication
    (c)   full duplex communication
    (d)   none of the mentioned

53   WiMAX uses the
    (a)   orthogonal frequency division multiplexing
    (b)   time division multiplexing
    (c)   space division multiplexing
    (d)   all of the mentioned

54   Which one of the following modulation scheme is supported by WiMAX?
    (a)   binary phase shift keying modulation
    (b)   quadrature phase shift keying modulation
    (c)   quadrature amplitude modulation
    (d)   all of the mentioned

55   WiMAX MAC layer provides an interface between
    (a)   higher transport layers and physical layer
    (b)   application layer and network layer
    (c)   data link layer and network layer
    (d)   none of the mentioned

56   For encryption, WiMAX supports
    (a)   advanced encryption standard
    (b)   triple data encryption standard
    (c)   both (a) and (b)
    (d)   none of the mentioned

57   WiMAX is mostly used for
    (a)   local area network
    (b)   metropolitan area network
    (c)   personal area network
    (d)   none of the mentioned

58   Which short range wireless standard is used for wireless PAN?
    (a)   802.16
    (b)   802.15
    (c)   802.3
    (d)   802.13

59   Does WiFi support roaming?
      (a)   Yes
      (b)   No
      (c)   Can't Say
      (d)   Sometimes

60   The Optimum Channel Bandwidth Requirement for WiMAX is _____
      (a)   1.75 MHz
      (b)   5 MHz
      (c)   20 MHz
      (d)   10 MHz

61   What is the access point (AP) in wireless LAN?
      (a)   device that allows wireless devices to connect to a wired network
      (b)   wireless devices itself
      (c)   both (a) and (b)
      (d)   none of the mentioned

62   In wireless ad-hoc network
      (a)   access point is not required
      (b)   access point is must
      (c)   nodes are not required
      (d)   none of the mentioned

63   Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?
      (a)   CDMA
      (b)   CSMA/CA
      (c)   ALOHA
      (d)   None of the mentioned

64   In wireless distribution system
      (a)   multiple access point are inter-connected with each other
      (b)   there is no access point
      (c)   only one access point exists
      (d)   none of the mentioned

65   A wireless network interface controller can work in
      (a)   infrastructure mode
      (b)   ad-hoc mode
      (c)   both (a) and (b)
      (d)   none of the mentioned

66   In wireless network an extended service set is a set of
      (a)   connected basic service sets
      (b)   all stations
      (c)   all access points

      (d)   none of the mentioned

67   Mostly _____ is used in wireless LAN.
      (a)   time division multiplexing
      (b)   orthogonal frequency division multiplexing
      (c)   space division multiplexing
      (d)   none of the mentioned

68   Which one of the following event is not possible in wireless LAN.
      (a)   collision detection
      (b)   acknowledgement of data frames
      (c)   multi-mode data transmission
      (d)   none of the mentioned

69   What is Wired Equivalent Privacy (WEP) ?
      (a)   security algorithm for ethernet
      (b)   security algorithm for wireless networks
      (c)   security algorithm for usb communication
      (d)   none of the mentioned

70   What is WPA?
      (a)   wi-fi protected access
      (b)   wired protected access
      (c)   wired process access
      (d)   wi-fi process access

Ans. (1)(b), (2)(c), (3)(a), (4)(a), (5)(b), (6)(b), (7)(b), (8)(a), (9)(c), (10)(d), (11)(a), (12)(b), (13)(b), (14)(c), (15)(d), (16)(a), (17)(d), (18)(a), (19)(d), (20)(c), (21)(d), (22)(b), (23)(a), (24)(a), (25)(c), (26)(c), (27)(d), (28)(d), (29)(a), (30)(c), (31)(a), (32)(a), (33)(b), (34)(b), (35)(c), (36)(c), (37)(c), (38)(c), (39)(b), (40)(b), (41)(a), (42)(c), (43)(b), (44)(d), (45)(c), (46)(c), (47)(b), (48)(c), (49)(d), (50)(c), (51)(b), (52)(c), (53)(a), (54)(d), (55)(a), (56)(c), (57)(b), (58)(b), (59)(a), (60)(d), (61)(a), (62)(a), (63)(b), (64)(a), (65)(c), (66)(a), (67)(b), (68)(a), (69)(b), (70)(a)

II   Short Answer Type Questions:

1   What are protocols and standards?
2   Discuss three important bodies that help standardize data communications.
3   What is the meaning of signal propagations?
4   Explain the term bandwidth. Why is it useful?
5   Discuss the terms amplitude, period, frequency and phase in brief.
6   Explain Fourier's theory using analog signals.
7   What is data transmission rate and how is it calculated?
8   What is the need for binary language?
9   Explain the EBCDIC code.
10   How is MAC layer different from Physical layer in WIMAX?

11   Give the architecture of IEEE 802.16 Architecture
12   Find the suitability of the following generators in relation to burst errors of different lengths.
      (a) $x^6 + 1$
      (b) $x^{18} + x^7 + x + 1$
      (c) $x^{32} + x^{23} + x^7 + 1$
13   100 stations on a pure ALOHA network share a $1 - Mbps$ channel. If frames are 1000 bits long, find the throughput if each station is sending 10 frames per second.
14   Find the chips for a network with
      (a)   Two stations
      (b)   Four stations
15   The period of a signal is 100 ms. What is its frequency in kilohertz?
16   Explain with an example how three bits are required to represent up to eight different symbols.
17   Explain Pulse Code Modulation (PCM) in detail.
18   What is hidden and exposed station problem?
19   Explain NAV.
20   Compare Wi-Fi and WIMAX.
21   Differentiate between Symmetric and asymmetric subscriber line.
22   List the various types of Timers and Time Registers used in FIDDI.
23   Explain the advantages and disadvantages of Fiber Distributed Data Interface?
24   What is 802.11 family?
25   Differentiate between ESS and BSS.
26   List advantages and disadvantages of a token ring.
27   List HIPPI signal lines.
28   What are HIPPI connection management policies?
29   With an example, show the communication at the application layer simple private network.
30   Change the multicast IP address 232.43.14.7 to an Ethernet multicast physical address.
31   Differentiate between OFDM and FDM.
32   What is DSSS?
33   Draw an example of DQDB architecture and explain usage of its counters.
34   Why did TCP/IP model become more popular than OSI?
35   What are three layers of X.25?
36   Compare message, packet and circuit switching.
37   What is logical addressing?
38   Why do we need protocols?
39   Describe evolution of Ethernet.

III   Long Answer Type Questions:

1   Explain in detail Modulation Techniques.
2   What does the Nyquist Theorem say about the transmission rate of digitized signals, which are originally in the analog form?
3   How is Delta Modulation different from PCM?
4   Explain the differences between FDM and TDM?

5   Briefly explain the technique called synchronous TDM. Contrast it with statistical TDM.
6   Discuss the concept of parity checks, CRC and worming code in detail.
7   Explain stop and wait method. How does the sliding window technique work?
8   Describe the three kinds of risks involved in data communications over a network.
9   Give in detail the working of ISDN services. Give its architecture.
10   Distinguish between Pure and slotted Aloha. Explain TDMA, CDMA, CSMA/CD and CSMA/CA.
11   Differentiate between repeaters, hubs, bridges, routers and switches. Clearly state their position in OSI layer.
12   What are various LAN technologies? Give their standards.
13   How does FDDI work and explain the role of TTR Protocol.
14   Explain DQDB in detail.
15   Define Token Ring LAN. Explain in detail the working of Token Ring LAN.
16   Explain various DSL Technologies.
17   What do you understand by Cable Modem?
18   Give the architecture of HIPPI Protocol. What are its limitations? Give their solution.
19   Identify and describe the problem areas for wireless MAC protocols.
20   Explain IEEE 802.6 Protocol. Comment on its fairness.
21   What is the access method used in WiFi? Explain the process using a flow chart.
22   Why is FDDI better than token ring? Give its limitations.
23   Explain the architecture of WiMax.
24   Differentiate between WiMax and WiFi.
25   Give physical layer specification of FDDI.
26   Explain the following: FDDI, DQDB
27   Explain TCP/IP suite of protocols.
28   Discuss six goals of IEEE 802.3z design. Explain its two common implementations with its corresponding encoding and decoding mechanism.
29   Discuss in detail four IEEE 802.11 addressing mechanism.
30   Write steps of auto-configuration in IPv6 addressing.
31   What is AAL5? Why is it called SEAL?
32   Differentiate between OSPF and RIP.
33   Discuss the reasons why layered structured is used in OSI RM.
34   What are the fast access technologies? Explain various types of fast access technologies.
35   Write notes on the FDDI and ADSL.
36   How is distributed queue maintained in DQDB?
37   What is the difference between traditional modem and cable modem?

UNIT - II

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Layer 2 from bottom in TCP/IP is the _____.
     (a)   Physical layer
     (b)   Application layer

(c)   Transport layer
        (d)   Internet layer

2   IP address_____ the physical address.
        (a)   is the same as
        (b)   has no relation with
        (c)   means
        (d)   none

3   IP makes a _____ of datagram delivery.
        (a)   worst effort
        (b)   guaranteed delivery
        (c)   best effort
        (d)   all of the above

4   The _____ for all computers on the same physical network is the same.
        (a)   host id
        (b)   physical address
        (c)   IP address
        (d)   n/w-id

5   Which protocol works at the internet layer and provides a connection service between the
        hosts?
        (a)   IP
        (b)   ARP
        (c)   TCP
        (d)   UDP

6   If a host broadcasts a frame that includes a source and destination hardware address, and
        its purpose is to assign IP addresses to itself, which protocol at the network layer does the
        host use?
        (a)   RARP
        (b)   ARPA
        (c)   ICMP
        (d)   TCP
        (e)   IPX

7   How many bytes is an Ethernet address
        (a)   3
        (b)   4
        (c)   5
        (d)   6

8   If a router interface is congested, which protocol in the IP suite is used to tell neighbour
        routers?
        (a)   RARP

(b)   ARP
(c)   ICMP
(d)   IP
(e)   TCP

9   If digital data rate of 9600 bps is encoded using 8 level phase shift keying, the modulation rate is:
(a)   1200
(b)   3200
(c)   4800
(d)   9600

10   HDLC is
(a)   Bit oriented
(b)   Code transparent
(c)   Code dependent
(d)   Byte oriented

11   Which layer functions as a liaison between user support and network support layers
(a)   Network layer
(b)   Physical layer
(c)   Transport layer
(d)   Session layer

12   Which of the following is not a standard RS-232C signal?
(a)   RTS
(b)   CTS
(c)   DSR
(d)   VDR

13   MAN refers to
(a)   Mini area network
(b)   Metropolitan area network
(c)   Mini area network
(d)   Medium area network

14   Which is a type of fragmentation?
(a)   Transparent
(b)   Non transparent
(c)   a and b both
(d)   None

15   Adaptive or dynamic directory used in packet routing changes?
(a)   Within each user session
(b)   with each user session
(c)   at system generation times only

(d)   both a and b

16   For a website, one has to buy space from
    (a)   Network administrator
    (b)   Telephone exchange
    (c)   ISP
    (d)   Internet society

17   Encryption scheme in 802.11 was:
    (a)   Wireless security
    (b)   Wired equivalent privacy
    (c)   WiFi protected Access
    (d)   WiFi protected Access 2

18   IEEE 802.5 is
    (a)   Token bus
    (b)   Fast Ethernet
    (c)   Token ring
    (d)   Wireless LAN

19   PDU of application layer
    (a)   Segment
    (b)   Datagram
    (c)   Message
    (d)   Frame

20   Which topology requires a central controller or hub?
    (a)   Mesh
    (b)   Star
    (c)   Bus
    (d)   Ring

21   Which of the following decides the role of a device on a network?
    (a)   Line connection
    (b)   Link connection
    (c)   Line discipline
    (d)   Link decision

22   If the period of a signal is 1000 ms, then what is its frequency in kilohertz ?
    (a) 10^{-3} KHz
    (b) 10^{-2} KHz
    (c) 10^{-1} KHz
    (d)   1 KHz

23   _____ uses two carriers one in phase and the other quadrature?
(a)   ASK
(b)   PSK
(c)   FSK
(d)   QAM

24   Carrier is
(a)   One or more conductors that serve as a common connection for a related group of devices
(b)   A continuous frequency capable of being modulated or impressed with a second signal
(c)   The condition when two or more sections attempt to use the same channel at the same time
(d)   A collection of interconnected functional units that provides a data communications service among stations attached to the network

25   A bridge can
(a)   Filter a frame
(b)   Forward a frame
(c)   Extend a LAN
(d)   All of the above

26   A comparison of frequency division and time division multiplexing system shows that
(a)   FDM requires a lower bandwidth, but TDM has greater noise immunity.
(b)   FDM has greater noise immunity and requires lower bandwidth than TDM.
(c)   FDM requires channel synchronization, while TDM has greater noise immunity.
(d)   FDM requires more multiplex while TDM requires band pass filter.

27   Which of the following access control methods is probabilistic?
(a)   Polling
(b)   Contention
(c)   Token passing
(d)   Sliding window

28   PURE ALOHA
(a)   Does not require global time synchronization
(b)   Does require global time synchronization
(c)   Both a and b
(d)   None of these

29   Which of following divides the high speeds signals into frequency bands?
(a)   T-switch
(b)   Time division multiplexer
(c)   Frequency division multiplexer
(d)   Modem

30   Which of the following type of ICMP messages need to be encapsulated into an IP
      datagram
      (a)   Time executed
      (b)   Multicasting
      (c)   Echo reply
      (d)   All of the above

31   The address space of IPV6 is
      (a) 3.2×10^4
      (b) 3.4×10^{38}
      (c) 5.6×10^{36}
      (d) 10^{32}

32   Loopback address is
      (a)   ::/128
      (b)   ::1/128
      (c)   FC00::/7
      (d)   None of the above

33   Neighbor discovery doesn't involve
      (a)   Autoconfiguration
      (b)   Router solicitation and advertisement
      (c)   Neighbor advertisement and redirection
      (d)   Packet too big message

34   ATM is
      (a)   Automatic transmission mode
      (b)   Asynchronous Transfer Mode
      (c)   Asynchronous Time Mode
      (d)   None of the above

35   NNI in ATM connects
      (a)   a host to a host
      (b)   a host to a switch
      (c)   two ATM switches
      (d)   None of the above

36   NNI header doesn't include
      (a)   GFC
      (b)   Payload Type
      (c)   VCI
      (d)   CLP

37   ATM reference model includes
      (a)   ATM Layer
      (b)   AAL Layer

(c)   Management plane
(d)   Control Plane
(e)   All of the above

38   VBR QoS is supported by
     (a)   AAL 5
     (b)   AAL 2
     (c)   AAL 1
     (d)   AAL ¾

39   SEAL is
     (a)   AAL 5
     (b)   AAL 2
     (c)   AAL 1
     (d)   AAL 3/4

40   What is a transition technique from IPv4 to IPv6
     (a)   Tunneling
     (b)   Dual Stack
     (c)   Translation technique
     (d)   All of the above

41   In IPv6 addresses, the addresses start with eight 0s are called
     (a)   unicast addresses
     (b)   multicast addresses
     (c)   anycast addresses
     (d)   reserved addresses

42   Which of the following is not a feature of Anycast addressing in IPv6?
     (a)   Same IPv6 address assigned to multiple nodes
     (b)   Routing protocol makes the "nearest" determination
     (c)   Supports many future potential applications
     (d)   Provides an any-to-many communication model

43   An IPv6 address has
     (a)   32 bits
     (b)   128 bits
     (c)   64 bits
     (d)   none

44   The header length of an IPv6 datagram is _____.
     (a)   10bytes
     (b)   25bytes
     (c)   30bytes
     (d)   40bytes

45   IPv6 doesnot use _____ type of address
        (a)   Broadcast
        (b)   Multicast
        (c)   Anycast
        (d)   None of the mentioned

46   The ____ field determines the lifetime of IPv6 datagram
        (a)   Hop limit
        (b)   TTL
        (c)   Next header
        (d)   None of the mentioned

47   Dual-stack approach refers to
        (a)   Implementing Ipv4 with 2 stacks
        (b)   Implementing Ipv6 with 2 stacks
        (c)   Node has both IPv4 and IPv6 support
        (d)   None of the mentioned

48   In the IPv6 header,the traffic class field is similar to which field in the IPv4 header?
        (a)   Fragmentation field
        (b)   Fast-switching
        (c)   ToS field
        (d)   Option field

49   These are the features present in IPv4 but not in IPv6.
        (a)   Fragmentation
        (b)   Header checksum
        (c)   Options
        (d)   All of the mentioned

50   Suppose two IPv6 nodes want to interoperate using IPv6 datagrams but are connected to
        each other by intervening IPv4 routers. The best solution here is
        (a)   use dual-stack approach
        (b)   Tunneling
        (c)   No solution
        (d)   Replace the system

51   In Reverse Path Forwarding (RPF), router receives a packet and extracts the
        (a)   Protocol Address
        (b)   Source Address
        (c)   IP Address
        (d)   Standard Address

52   A network can receive a multicast packet from a particular source only through a
        (a)   designated parent resolve
        (b)   designated protocol router
        (c)   designated parent rotator

(d)   designated parent router

53   To convert broadcasting to multicasting, protocol uses
(a)   Three Procedures
(b)   Two Procedures
(c)   One Procedure
(d)   Multi Procedures

54   In multicast communication, relationship is
(a)   one to one
(b)   one to many
(c)   many to one
(d)   one to all

55   In multiple unicasting, packets are created with a relative delay in
(a)   large packet
(b)   large networks
(c)   large switches
(d)   large system

56   ATM can be used for
(a)   local area network
(b)   wide area network
(c)   both (a) and (b)
(d)   none of the mentioned

57   An ATM cell has the payload field of
(a)   32 bytes
(b)   48 bytes
(c)   64 bytes
(d)   128 bytes

58   Frame relay has error detection at the
(a)   physical layer
(b)   data link layer
(c)   network layer
(d)   transport layer

59   Virtual circuit identifier in frame relay is called
(a)   data link connection identifier
(b)   frame relay identifier
(c)   cell relay identifier
(d)   none of the mentioned

60   Frame relay has only
        (a)   physical layer
        (b)   data link layer
        (c)   both (a) and (b)
        (d)   none of the mentioned

61   The main reason for transition from IPv4 to IPv6 is
        (a)   Huge number of systems on the internet
        (b)   Very low number of system on the internet
        (c)   Providing standard address
        (d)   None of the mentioned

62   Which of the following is not a transition strategies?
        (a)   Dual stack
        (b)   Tunnelling
        (c)   Conversion
        (d)   Header translation

63   To determine which version to use when sending a packet to a destination, the source
        host queries which of the following?
        (a)   Dual stack
        (b)   Domain Name Server
        (c)   Header information
        (d)   All of the mentioned

64   The strategy used when two computers using IPv6 want to communicate with each other
        and the packet must pass through a region that uses IPv4 is
        (a)   Dual stack
        (b)   Header translation
        (c)   Conversion
        (d)   Tunnelling

65   The correct format of packet in tunnel that uses IPv4 region is
                1. IPv6 header
                2. Payload
                3. IPv4 header
        (a)   3-1-2
        (b)   3-2-1
        (c)   1-2-3
        (d)   1-3-2

66   _____ is necessary when the sender wants to use IPv6, but the receiver does not
        understand IPv6.
        (a)   Dual stack
        (b)   Header translation
        (c)   Conversion

(d)   Tunnelling

67   Header translation uses _____ to translate an IPv6 address to an IPv4 address.
        (a)   IP address
        (b)   Physical address
        (c)   Mapped address
        (d)   Any of the mentioned

68   Which of the following is not the step in Header translation procedure?
        (a)   The IPv6 mapped address is changed to an IPv4 address by extracting the rightmost 32bits
        (b)   The value of the IPv6 priority field is discarded
        (c)   The type of service field in IPv4 is set to zero
        (d)   The IPv6 flow label is considered

69   The _____ field determines the lifetime of IPv6 datagram
        (a)   Hop limit
        (b)   TTL
        (c)   Next header
        (d)   None of the mentioned

70   Dual-stack approach refers to
        (a)   Implementing Ipv4 with 2 stacks
        (b)   Implementing Ipv6 with 2 stacks
        (c)   Node has both IPv4 and IPv6 support
        (d)   None of the mentioned

Ans.   (1)(d), (2)(b), (3)(c), (4)(d),(5)(a), (6)(a), 7(d), (8)(c), (9)(c), (10)(a), (11)(c), (12)(d), (13)(b), (14)(c), (15)(a), (16)(c), (17)(b), (18)(c), (19)(c), (20)(b), (21)(c), (22)(a), (23)(d), (24)(b), (25)(d), (26)(c), (27)(d), (28)(a), (29)(c), (30)(d), (31)(b), (32)(b), (33)(d), (34)(b), (35)(c), (36)(a), (37)(e), (38)(b), (39)(a), (40)(d), (41)(d), (42)(d), (43)(b), (44)(d), (45)(a), (46)(a), (47)(c), (48)(c), (49)(d), (50)(b), (51)(b), (52)(d), (53)(b), (54)(b), (55)(a), (56)(c), (57)(b), (58)(b), (59)(a), (60)(c), (61)(a), (62)(c), (63)(b), (64)(d), (65)(a), (66)(b), (67)(c), (68)(d), (69)(a), (70)(c)

(b)   Fill in the Blanks:

1   When a datagram cannot be delivered to a destination, a router sends a message _____.
2   The MTU of _____ is the highest.
3   A zero in the "more fragments" flag indicates that _____.
4   The time to live field in a IP datagram is related to the _____ message.
5   The header portion of an IP datagram is _____.
6   The maximum number of class B network is _____.

Ans.   (1)(destination unreachable), (2)(token ring), (3)(this is an IP datagram), (4)(ICMP), (5)(fragmented if required), (6)(16384)

II   Short Answer Type Questions:

1   Describe the three parts of an IP address.
2   Why is IP called connectionless?
3   What is the purpose of the time to live field of the IP datagram header?
4   What is Maximum Transmission Unit?
5   Why is IP called a best-effort delivery protocol?
6   What is a router? How does it work?
7   How does a gateway work?
8   Explain internet hierarchy in brief?
9   Why is Inter-networking important?
10   What is a Virtual Network?
11   What is the type of each of the following addresses?
     (a)   FFO2 :: O
     (b)   FECO:: Z4A2
     (c)   FE8O:: 12
     (d)   FE79:: 14
12   What is the address space in each of the following systems?
     (a)   A system with 16-bit addresses.
     (b)   A system with 64-bit addresses.
     (c)   A system with 128 bit addresses.
13   Show in hexadecimal colon notation
(a)   The link level address in which the node identifier is O:: 124/48.
(b)   The site local address in which the node identifier is O:: 124/48.
14   Find the netid and hosted of the following addresses
     (a)   117.34.3.8
     (b)   132.57.8.6
     (c)   207.3.54.12
15   An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets.
     (a)   Find the subnet mask.
     (b)   Find the no. of addresses in each subnet.
     (c)   Find the 1st and last addresses in subnet 1.
     (d)   Find the 1st and last addresses in subnet 1024.
16   What is auto configuration?
17   How do you define Quality Of Service in IPv6.
18   Explain Security mechanism in IPv6.
19   How is Application programming interface introduced for IPV6.6 bone.
20   Explain the following term with respect to ATM technologies:-
     Virtual Path, Virtual Connection, UNI, SVCand Octet
21   What is Route Optimization in MIPv6?
22   Give the DNS configuration commands for IPv6.
23   What are the differences between Hierarchical v/s Flat routing?

24   What is stateful address configuration?
25   What is CIDR?
26   What do you understand by an anicast address?
27   What are the special addresses in IPv6 address space?
28   Give the address format of a global unicast address.
29   If a port number is 16 bits, what is the minimum header size at the network layer of the TCP/IP protocol suite?
30   What is two-level addressing?
31   Which fields of IP header change from router to router?
32   The AS number in an organization is 24101. Find the range of multicast addresses that the organization can use in the GLOP block.
33   What is MTU?
34   Is the size of ARP packet fixed? Explain.
35   How is an ATM virtual connection identified?
36   Why RIP uses UDP instead of TCP?
37   What is hop by hop option in IPv6?
38   Differentiate between IPv4 addresses and IPv6 addresses? What is CIDR?
39   What is ESP?
40   Compare ATM and Frame Relay.
41   What is ABR?
42   List IPv6.6 Bone transition techniques.
43   How is IPv4 options different from IPv6 extension headers?
44   What is adaptive routing?

III   Long Answer Type Questions:

1   Explain the internal architecture of an ISP in detail.
2   Explain the Internet Topology in detail.
3   How can a user access Internet over the cable television? What are the requirements for this?
4   Explain the typical dial-up connection between a home user and an ISP.
5   Explain Address Resolution Protocol in detail. Illustrate.
6   Explain RARP. Why is it required? Illustrate.
7   Give a brief description of two groups of multicasting routing protocols. Illustrate using diagrams.
8   Explain in detail the Intra-domain routing protocols.
9   Explain in detail ICMP. Draw its message format.
10   Draw IPv4 header and explain in detail.
11   Explain RIP protocol in detail.
12   Draw and differentiate between IPv4 and IPv6.
13   Draw and Explain UNI & NNI cell formats of the cells transmitted in ATM network and differentiate among them.
14   Describe the packet format of IPv6. Discuss the various extension headers.
15   Explain ATM Reference Model.
16   Draw and explain the architecture and working of Cell Based Network.

17 Explain why each specific set of traffic description and QoS parameters were selected for each of ATM service categories?
18 How is the Mapping of an Ethernet MAC Address into Interface ID done in global unicast addresses?
19 What is the purpose of the scope field in a multicast IPv6 address? Explain its most prevalent values.
20 What are the differences between ICMPv4 and ICMPv6?
21 Explain redirection function in internet protocol.
22 Write down the steps of address autoconfiguration in IPv6.
23 Explain header of IPv6. Compare IPv4 and IPv6.
24 What is Discrete Multitone Technique?
25 Discuss ATM architecture.
26 Explain six extension header types of IPv6 datagram.
27 Describe the architecture of ATM and its various layers.
28 Explain all routing techniques.
29 Explain all Neighbor-Discovery Messages and all Group Membership Messages
30 Explain the format of global unicast addresses in IPv6.
31 What is neighbor discovery process?
32 What are the different categories of addresses in IPv6? Discuss the extension headers in IPv6.
33 Draw the header format for IPv6.
34 Discuss the various fields of routing tables in details.
35 Discuss ATM reference model.

UNIT - III

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Transport layer protocols are useful for ensuring _____ delivery.
      (a)   H-2-H
      (b)   H-2-R
      (c)   N/W-2-N/W
      (d)   End-2-End
2   _____is a reliable delivery mechanism.
      (a)   IP
      (b)   TCP
      (c)   UDP
      (d)   ARP

3   Transport layer is _____ the data link layer.
      (a)   Above
      (b)   Below
      (c)   Depended on
      (d)   None of the above

4   When a packet is lost in transit, it should be handled by _____.
        (a)   Sequence control
        (b)   Loss control
        (c)   Error control
        (d)   Duplication control

5   In ....the change or lack of change in the level of the voltage determine the value of the bit
        (a)   NRZ-I
        (b)   NRZ-L
        (c)   Both (a) and (b)
        (d)   None of above

6   Decryption and encryption of data are the responsibility of which of the following layer?
        (a)   Physical layer
        (b)   Data Link layer
        (c)   Presentation layer
        (d)   Session layer

7   A network that requires human intervention to route signals is called a
        (a)   bus network
        (b)   Ring network
        (c)   Star network
        (d)   T switched network

8   Intranets and extranets can use their network fire walls and other security features to establish secure Internet links within an enterprise or with its trading partners. Select the best fit for answer:
        (a)   Network Server
        (b)   Virtual Private Network
        (c)   Network operating system
        (d)   OSI

9   Protocol used to monitor and control network devices operates at
        (a)   Application layer
        (b)   Transport layer
        (c)   Network layer
        (d)   Data Link layer

10   In case of Bus/Tree topology signal balancing issue is overcome by
        (a)   Modulation
        (b)   Polling
        (c)   Segmentation

(d)   Strong transmitter

11   The secondary device in a multipoint configuration sends data in response to which of the following event?
(a)   ACK
(b)   ENQ
(c)   Poll
(d)   Sel

12   Quadrature Amplitude Modulation is combination of
(a)   ASK and FSK
(b)   ASK and PSK
(c)   PSK and FSK
(d)   None of above

13   Consider a source computer (S) transmitting a file of size 106 bits to a destination computer (D) over a network of two routers (R1 and R2) and three links (L1, L2, and L3). L1 connects S to R1; L2 connects R1 to R2; and L3 connects R2 to D. Let each link be of length 100 km. Assume signals travel over each link at a speed of 108 meters per second. Assume that the link bandwidth on each link is 1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits. Find the total sum of transmission and propagation delays in transmitting the file from S to D?
(a)   1005 ms
(b)   1010 ms
(c)   3000 ms
(d)   3003 ms

14   For the transmission of the signal, Bluetooth wireless technology uses
(a)   time division multiplexing
(b)   frequency division multiplexing
(c)   time division duplex
(d)   frequency division duplex

15   Another name of IEEE 802.11 is a _____
(a)   Wi-Max
(b)   Fast Ethernet
(c)   Wi-Fi
(d)   802.11 g

16   Which of following is also called forward error correction?
(a)   Simplex
(b)   Retransmission
(c)   Detection error coding
(d)   Error correction coding

17   Which is reserved address for private networks?
      (a)   150.0.0.0 to 150.255.255.255
      (b)   128.0.0.0 to 191.255.255.255
      (c)   192.168.0.0 to 192.168.255.255
      (d)   202.40.55.0 to 202.40.55.255

18   A telephone conference call is an example of which type of communications
      (a)   Same time / same place
      (b)   Same time / different place
      (c)   Different time / different place
      (d)   Different time / same place

19   In communication satellite multiple repeaters are known as
      (a)   Detector
      (b)   Modulator
      (c)   Stations
      (d)   Trasnponders

20   In the session layer ,during data transfer , the data stream responsible for the control
      purpose is
      (a)   Regular data
      (b)   Typed data
      (c)   Capability data
      (d)   Expedited data

21   Assume that source S and destination D are connected through two intermediate routers
      labeled R. Determine how many times each packet has to visit the network layer and the
      data link layer during a transmission from S to D.
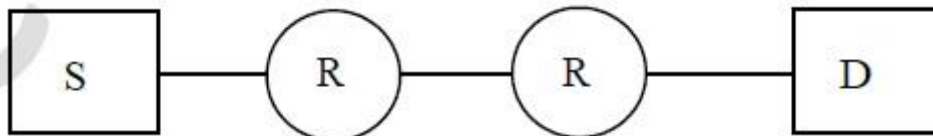
      (a)   Network layer – 4 times and Data link layer-4 times
      (b)   Network layer – 4 times and Data link layer-3 times
      (c)   Network layer – 4 times and Data link layer-6 times
      (d)   Network layer – 2 times and Data link layer-6 times

22   The amount of uncertainty in a system of symbol is called
      (a)   Bandwidth
      (b)   Entropy
      (c)   Loss
      (d)   Quantum

23   A network that contains multiple hubs is most likely configured in which topology?
      (a)   Mesh
      (b)   tree

(c)　　Bus
(d)　　Star

24　　Which of the following ISO level is more closely related to the physical communications facilities?
(a)　　Application
(b)　　Session
(c)　　Network
(d)　　Data link

25　　Which of the following has the smallest default maximum physical receive packet size?
(a)　　ARCnet
(b)　　Ethernet
(c)　　Token ring[4Mbps]
(d)　　Token ring[16Mbps]

26　　Which of the following can be used for clustering of data?
(a)　　Single layer perception
(b)　　Multilayer perception
(c)　　Self organizing map
(d)　　Radial basis function

27　　Mobile IP provides two basic functions
(a)　　Route discovery and registration
(b)　　Agent discovery and registration
(c)　　IP binding and registration
(d)　　None of the above

28　　To prevent silly window syndrome created by a sender that is sending data at a very slow rate_____can be used.
(a)　　Clark s solution
(b)　　Nagle s algorithm
(c)　　Both a and b
(d)　　Delayed acknowledgement

29　　In which topology if there are n devices in a network each device has n-1 ports for cables?
(a)　　Mesh
(b)　　Star
(c)　　Bus
(d)　　Ring

30　　In which circuit switching, delivery of data is delayed because data must be stored and retrieved from RAM?
(a)　　Space division
(b)　　Time division

(c)   Virtual
(d)   Packet

31   The addresses used by mobile IP for a mobile host are
(a)   MAC and IP address
(b)   Home address and foreign address
(c)   Care of address and home address
(d)   Physical address and foreign address

32   A colocated address is
(a)   the care-of address when the mobile host and the foreign agent are different
(b)   the care-of address when the mobile host and the foreign agent are the same
(c)   the home address of the mobile host
(d)   None of the above

33   A remote host communicates with a mobile host using the steps
(a)   Phase I-Agent Discovery, Phase II-Registration, Phase III-Data Transfer
(b)   Phase I- Registration, Phase II- Agent Discovery, Phase III-Data Transfer
(c)   Phase I-Agent Discovery, Phase II- Data Transfer, Phase III- Registration
(d)   None of the above

34   Inefficiency in mobile IP s called
(a)   Two node instability
(b)   Triangle Routing
(c)   Double crossing
(d)   Both b and c

35   Which is an interdomain routing protocol
(a)   OSPF
(b)   BGP
(c)   RIP
(d)   None of the above

36   Solution to two node instability problem is
(a)   Defining infinity
(b)   Split Horizon
(c)   Poison Reverse
(d)   All of the above

37   What is not an RIP timer
(a)   Garbage Collection Timer
(b)   Expiration Timer
(c)   Retransmission Timer
(d)   Periodic Timer

38   Which is not an OSPF link
(a)   Stub
(b)   Transient
(c)   Virtual
(d)   Multipoint

39   Which is not a type of autonomous system of BGP
(a)   Stub AS
(b)   Transit AS
(c)   Virtual AS
(d)   Multihomed AS

40   Which is a BGP message
(a)   Notification
(b)   Keep Alive
(c)   Open
(d)   All of the above

41   Match the following IEEE No to their corresponding Name for IEEE 802 standards for LANs.

i) 802.3	a) WiFi
ii) 802.11	b) WiMa
iii) 802.15.1	c) Ethernet
iv) 802.16	d) Bluetooth

(a)   i-b, ii-c, iii-d, iv-a
(b)   i-c, ii-d, iii-a, iv-b
(c)   i-c, ii-a, iii-d, iv-b
(d)   i-b, ii-d, iii-c, iv-a

42   The examples of Interior Gateway Protocols (IGP) are.
              i) Open Short Path First (OSPF)
              ii) Routing Information Protocol (RIP)
              iii) Border Gateway Protocol (BGP)
(a)   i only
(b)   i, and ii only
(c)   i and iii only
(d)   All i, ii and iii

43   A ………….. is a set of information that is exchanged between a client and web browser and a web server during an HTTP transaction.
(a)   infoset
(b)   clientinfo
(c)   cookie
(d)   transkie

44   The ……………… layer is responsible for resolving access to the shared media or
        resources.
        (a)   Physical
        (b)   Mac sub layer
        (c)   Network
        (d)   Transport

45   A/An .... routing scheme is designed to enable switches to react to changing
        traffic patterns on the network.
        (a)   static routing
        (b)   fixed alternate routing
        (c)   adaptive routing
        (d)   dynamic routing

46   In .... routing, the routing table hold the address of just the next hop instead of
        complete route information.
        (a)   next-hop
        (b)   host-specific
        (c)   network-specific
        (d)   default

47   .... was originally developed to provide a loop-free method of exchanging routing
        information between autonomous systems.
        (a) OSPF
        (b)   EIGRP
        (c)   BGP
        (d)   RIP

48   In .... routing, the destination address is a network address in the routing tables.
        (a)   next-hop
        (b)   host-specific
        (c)   network-specific
        (d)   default

49   Logical partitioning of the network, authentication and faster convergence rate are the
        advantages of ....
        (a)   OSPF
        (b)   EIGRP
        (c)   BGP
        (d)   RIP

50   The .... flag indicates the availability of a router.
        (a)   up
        (b)   host specific
        (c)   gateway
        (d)   added by redirection

51   The .... protocol allows the administrator to assign a cost, called the metric, to each route.
        (a)   OSPF
        (b)   IP
        (c)   BGP
        (d)   BBGP

52   If there is only one routing sequence for each source destination pair, the scheme is known as
        (a)   static routing
        (b)   fixed alternative routing
        (c)   standard routing
        (d)   dynamic routing

53   The Open Shortest Path First protocol is an intra domain routing protocol based on .... routing.
        (a)   distance vector
        (b)   link state
        (c)   path vector
        (d)   non distance vector

54   An/A ....routing scheme is designed to enable switches to react to changing traffic patterns on the network.
        (a)   static routing
        (b)   fixed alternative routing
        (c)   dynamic routing
        (d)   non routing

55   The Routing Information Protocol (RIP) is an intra domain routing based on ....routing.
        (a)   distance vector
        (b)   link state
        (c)   path vector
        (d)   distance code

56   An area is ....
        (a)   part of an AS
        (b)   composed of at least two AS
        (c)   another term for an AS
        (d)   composed more than two AS

57   In .... routing the least cost route between any two nodes is the minimum distance.
        (a)   path vector
        (b)   distance vector
        (c)   bridging
        (d)   switching

58   For centralized routing the decision is made by some designated node called ......
        (a) Designated center
        (b)   control center
        (c)   network center
        (d)   network control center

59   For purposes of routing, the Internet is divided into ....
        (a)   wide area networks
        (b)   autonomous networks
        (c)   local area networks
        (d)   autonomous systems

60   In .... a route is selected for each destination pair of nodes in the network.
        (a)   flooding
        (b)   variable routing
        (c)   fixed routing
        (d)   random routing

61   In Address Resolution Protocol (ARP), a packet is encapsulated directly into a
        (a)   Data link Integer
        (b)   Network Frame
        (c)   Network Station
        (d)   Data link Frame

62   Address space of IPv4 is
        (a)   4294967296
        (b)   4294965796
        (c)   4266496296
        (d)   6294967296

63   For multicasting between two noncontiguous multicast routers, we make a multicast
        (a)   Port
        (b)   Frame network
        (c)   Switch
        (d)   Backbone

64   An Ethernet multicast physical address is in range of
        (a)   :01 :00:5E:00:OO:OO to 01:00:5E:7F:FF:FF
        (b)   :00:5E:00:OO:OO to 01:00:5E:7F:FF:FF
        (c)   :00:5E:00:OO:OO to 01:00:5E:7F:FF:FF
        (d)   :00:5E:00:OO:OO to 01:00:5E:7F:FF:FF

65   Subnetting is actually
        (a)   Microwave networks
        (b)   Sub division of networks
        (c)   Absolute network
        (d)   linear network

66   Open Shortest Path First (OSPF) is also called as
        (a)   Link state protocol
        (b)   Error-correction protocol
        (c)   Routing information protocol
        (d)   All of the mentioned

67   The computation of the shortest path in OSPF is usually done by
        (a)   Bellman-ford algorithm
        (b)   Routing information protocol
        (c)   Dijkstra's algorithm
        (d)   Distance vector routing

68   Which of the following is false with respect to the features of OSPF
        (a)   Support for fixed-length sunbathing by including the subnet mask in the routing message
        (b)   More flexible link cost than can range from 1 to 65535
        (c)   Use of designated router
        (d)   Distribution of traffic over multiple paths that have equal cost to the destination

69   In OSPF, which protocol is used to discover neighbour routers automatically?
        (a)   Link state protocol
        (b)   Error-correction protocol
        (c)   Routing information protocol
        (d)   Hello protocol

70   Which of the following is not a type of OSPF packet?
        (a)   Hello
        (b)   Link-state request
        (c)   Link-state response
        (d)   Link-state ACK

Ans.   (1)(a), (2)(b), (3)(a), (4)(a),(5)(a), (6)(c), 7(d), (8)(b), (9)(a), (10)(c), (11)(c), (12)(b), (13)(a), (14)(c), (15)(c), (16)(a), (17)(c), (18)(b), (19)(d), (20)(c), (21)(c), (22)(b), (23)(b), (24)(d), (25)(b), (26)(c), (27)(b), (28)(b), (29)(a), (30)(b), (31)(c), (32)(b), (33)(a), (34)(d), (35)(b), (36)(d), (37)(c), (38)(d), (39)(c), (40)(d), (41)(c), (42)(b), (43)(c), (44)(b), (45)(c), (46)(a), (47)(c), (48)(c), (49)(a), (50)(d), (51)(a), (52)(b), (53)(b), (54)(c), (55)(a), (56)(a), (57)(b), (58)(d), (59)(d), (60)(c), (61)(d), (62)(a), (63)(d), (64)(a), (65)(b), (66)(a), (67)(c), (68)(a), (69)(d), (70)(c)

(b)   Fill in the Blanks:

1   The client does _____.
2   TCP uses the mechanism of _____.
3   When a single packet reaches the destination twice, it should be handled by _____.
4   TCP is concurrent because _____.

5   Combination of _____ and _____makes a socket.

6   Well-known parts are generally required _____.

Ans.   (1)(active upon), (2)(virtual connections), (3)(error control), (4)(it processes multiple request at the same time), (5)(IP address, port number), (6)(on the client and the server)

II   Short Answer Type Questions:

1   Discuss the idea of a port.
2   Which protocol is called Iterative protocol?
3   What is the difference between a port and a socket? Why are sockets important?
4   Explain why TCP is concurrent.
5   Discuss the idea of passive open and active open.
6   What factors make TCP reliable?
7   What is the purpose of sequence number inside a TCP packet header?
8   Explain the six-bit flag field of a TCP packet.
9   Why is urgent pointer used in TCP?
10   Give the total header length of a TCP packet.
11   TCP is sending data at 2 Mbytes. If the sequence no. starts with 7000, how long does it take before sequence number goes back to zero?
12   Calculate the efficiency of this transmission at the UDP level where data to be sent are 15 bytes.
13   In a connection, the value of cwnd is 2500 and its value of rwnd is 4500. The host has sent 2000 bytes which have not been acknowledged. How many more bytes can be sent?
14   In SCTP, the value of cumulative TSN in a SACK is 23. The value of the previous cumulative TSN in the SACK was 29. What is the problem?
15   In TCP, if the value of HLEN is 1000, how many bytes of options are included in the segment?
16   Explain double crossing and triangle routing.
17   How the source-based and group-based trees reduce the complexity of construction n shortest path trees for n groups.
18   What is Route Optimization in MIPv6?
19   What do you understand by MBONE?
20   Gives the Configuration Modes in OSPFv3.
21   Explain three phases of mobile IP communication.
22   What is care-of-address? How is it different from co-located care-of-address?
23   Differentiate between a home agent and a foreign agent.
24   Explain the steps of Remote host and mobile host communication.
25   What is the meaning of the code field in agent advertisement message?
26   Explain the data transfer phase in mobile IP.
27   What is the source based tree approach in routing?
28   Explain MOSPF.
29   What is the inefficiency in mobile IP?
30   Explain the security issues in routing.
31   Give an example of a group shared tree approach based multicast routing.
32   What is a foreign agent and what is its role in mobile IP?
33   How ARP and RARP are different from each other? Explain.

34   What are the sizes of MAC address space, IPv4 and IPv6 address spaces? Give examples.
35   What is DVMRP?
36   What is triangle routing?
37   Why do we need mobile IP?

III   Long Answer Type Questions:

1   Discuss in detail the difference between TCP and UDP.
2   How is TCP connection established? Explain in detail.
3   Explain UDP in detail. Give the list for all well-known ports reserved for UDP and TCP.
4   Give the working of SCTP.
5   How is congestion control implemented in Transmission Control Protocol?
6   How is process to process communication established in TCP? Explain the use of sending and receiving buffers.
7   How is SYN flooding attack implemented? What steps can be used to counter it.
8   What is the difference between half-close and full-close TCP termination?
9   Explain retransmission in relation to TCP connection.
10   How is flow control implemented in TCP. Explain in detail.
11   Draw UDP header. What are the possible scenarios when UDP is preferred over TCP?
12   What are the various timers involved in TCP protocol?
13   IP does not provide guaranteed delivery where as TCP providers guaranteed delivery. How TCP achieves this when implemented over IP?
14   How Mobile IP adds mobility to the network layer- IP. Explain using well-labelled diagram.
15   What are the new security threats that have been introduced in Mobile IPv6? Give their solutions.
16   Explain Unicast and Multicast Addressing used in IPv6. Also, describe the format of IPv6 Multicast Address in detail.
17   Explain Multicast Distance Vector and its strategies in Detail.
18   Explain the inefficiency in mobile IP communication.
19   How is link state routing different from distance vector routing?
20   How is hierarchical routing done?
21   What are the different methods of broadcast routing?
22   Categorize various OSPF link types.
23   Explain the important fields of a router link LSA format.
24   Explain OSPF protocol.
25   Explain ICMP.
26   What is multicast distance vector routing? Describe four decision making strategies involved in DVMRP.
27   Describe the three phases involved in the communication between mobile host and remote host.
28   Explain the protocol independent multicast (PIM) routing protocols and their two modes.
29   Explain the working of MBONE.
30   What is count to infinity problem? How is it overcome?
31   Define IP Multicast Address with the help of example.
32   Explain Distance Vector Multicast routing Protocol with the help of example.

33   Explain the mobility operation.
34   Show the position of IGMP in TCP/IP Model. Explain IGMP Version 2.
35   Describe issues associated with mobile IP.

UNIT - IV

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   In cryptography, what is cipher?
       (a)   Algorithm for performing encryption and decryption
       (b)   Encrypted message
       (c)   Both (a) and (b)
       (d)   None of the mentioned

2   In asymmetric key cryptography, the private key is kept by
       (a)   Sender
       (b)   Receiver
       (c)   Sender and receiver
       (d)   All the connected devices to the network

3   Which one of the following algorithm is not used in asymmetric-key cryptography?
       (a)   RSA algorithm
       (b)   Diffie-hellman algorithm
       (c)   Electronic code book algorithm
       (d)   None of the mentioned

4   In cryptography, the order of the letters in a message is rearranged by
       (a)   Transpositional ciphers
       (b)   Substitution ciphers
       (c)   Both (a) and (b)
       (d)   None of the mentioned

5   What is data encryption standard (DES)?
       (a)   Block cipher
       (b)   Stream cipher
       (c)   Bit cipher
       (d)   None of the mentioned

6   Cryptanalysis is used
       (a)   To find some insecurity in a cryptographic scheme
       (b)   To increase the speed
       (c)   To encrypt the data
       (d)   None of the mentioned

7   Which one of the following is a cryptographic protocol used to secure HTTP connection?
      (a)   Stream control transmission protocol (SCTP)
      (b)   Transport layer security (TSL)
      (c)   Explicit congestion notification (ECN)
      (d)   Resource reservation protocol

8   Voice privacy in GSM cellular telephone protocol is provided by
      (a)   A5/2 cipher
      (b)   b5/4 cipher
      (c)   b5/6 cipher
      (d)   b5/8 cipher

9   ElGamal encryption system is
      (a)   Symmetric key encryption algorithm
      (b)   Asymmetric key encryption algorithm
      (c)   Not an encryption algorithm
      (d)   None of the mentioned

10   Cryptographic hash function takes an arbitrary block of data and returns
      (a)   Fixed size bit string
      (b)   Variable size bit string
      (c)   Both (a) and (b)
      (d)   None of the mentioned

11   Which of the following is not a service primitive?
      (a)   Connect
      (b)   Listen
      (c)   Send
      (d)   Sound

12   _____ is a satellite based tracking system that enables the determination of person's position.
      (a)   Bluetooth
      (b)   WAP
      (c)   Short Message Service
      (d)   Global Positioning System

13   Broadband uses
      (a)   Manchester encoding
      (b)   FSK encoding
      (c)   ASK encoding
      (d)   PSK encoding

14   MTU is specified by
      (a)   IP Datagram size
      (b)   Hardware technology

(c)   TCP Segment size
(d)   None of the above

15   A smart modem can dial, hangup and answer incoming calls automatically. Can you tell who provides the appropriate instructions to the modem for this purpose?
(a)   Communication software
(b)   Error detection protocols
(c)   Link access procedure (LAP)
(d)   Telecommunications

16   Start and stop bits are used in serial communication for
(a)   Error detection
(b)   Error correction
(c)   Synchronization
(d)   Slowing down the communication

17   In a client/server networking environment the processing
(a)   Takes place only on the client side
(b)   Of request by the client is handled by the server
(c)   Takes place only on the server side
(d)   None of these

18   Which layer of OSI reference model uses the ICMP (Internet Control Message Protocol)
(a)   Transport layer
(b)   Data link layer
(c)   Network layer
(d)   Application layer

19   How many carrier frequencies are used in BFSK?
(a)   2
(b)   1
(c)   0
(d)   None of above

20   Which of the following file transfer protocols use TCP and establishes two virtual circuits between the local and remote server ?
(a)   FTP
(b)   TFTP
(c)   TELNET
(d)   NFS

21   Which of the following protocol is used for transferring electronic mail messages from one machine to another?
(a)   FTP
(b)   SNMP
(c)   SMTP
(d)   RPC

22   Which is reserved address for private networks?
      (a)   128.0.0.0 to 191.255.255.255
      (b)   172.16.0.0 to 172.31.255.255
      (c)   150.0.0.0 to 150.255.255.255
      (d)   202.40.55.0 to 202.40.55.255

23   If a protocol specifies that data should be sent at 100 Mbps what is this issue?
      (a)   Syntax
      (b)   Semantics
      (c)   Timing
      (d)   None of these

24   Contention is
      (a)   A collection of interconnected functional units that provides a data communications service among stations attached to the network
      (b)   The condition when two or more stations attempt to use the same channel at the same time
      (c)   A continuous frequency capable of being modulated or impressed with a second signal
      (d)   One or more conductors that serve as a common connection for a related group of devices

25   Which of the following TCP/IP protocol is used for the file transfer with minimal capability and minimal overhead?
      (a)   RARP
      (b)   FTP
      (c)   TFTP
      (d)   TELNET

26   Packets of the same session may be routed through different paths
      (a)   TCP ,but not UDP
      (b)   TCP and UDP
      (c)   UDP ,but not TCP
      (d)   Neither TCP nor UDP

27   In order that a code is 't' error correcting, the minimum Hamming distance should be
      (a)   t
      (b)   2t-1
      (c)   2t
      (d)   2t+1

28   Collision domain can be compared to which distance data travels between two stations?
      (a)   Minimum
      (b)   Maximum
      (c)   Virtual
      (d)   Both a and b

29   Match the following with link quality measurement and handoff initiation :
      (a) Networked-Controlled Handoff (NCHO) (i) MS connect to BS
      (b) Mobile-Assisted Handoff (MAHO)   (ii) Process via channel the target BS
      (c) Forward Handoff   (iii) First Generation Analog Cellular
                                                        System
      (d) Hard Handoff   (iv) Second Generation Digital Cellular System
      (a)   (iii) (iv) (ii) (i)
      (b)   (ii) (iii) (i) (iv)
      (c)   (ii) (i)   (iv) (iii)
      (d)   (iv) (iii) (i) (ii)

30   In which way does the Combined Encryption combine symmetric and asymmetric
      encryption?
      (a)   First, the message is encrypted with symmetric encryption and afterwards it is
             encrypted asymmetrically together with the key.
      (b)   The secret key is symmetrically transmitted, the message itself asymmetrically.
      (c)   First, the message is encrypted with asymmetric encryption and afterwards it is
             encrypted symmetrically together with the key.
      (d)   The secret key is asymmetrically transmitted, the message itself symmetrically

31   Connection establishment in TCP is
      (a)   One way handshake
      (b)   Asymmetric
      (c)   Two way handshake
      (d)   Three way handshake

32   Congestion in a network occurs when
      (a)   Load offered to the network is lower than capacity of the network
      (b)   Delay in the network occurs
      (c)   Load offered to the network is higher than capacity of the network
      (d)   Goodput is maximum

33   Port number of HTTP is
      (a)   21
      (b)   13
      (c)   80
      (d)   25

34   SYN flag in TCP header is used for
      (a)   Indicating that the urgent pointer field is valid.
      (b)   Indicating that the acknowledgment field is valid.
      (c)   Pushing the data.
      (d)   Informing that the connection must be reset.
      (e)   Synchronizing sequence numbers during connection, used to establish
             connections.

35   FIN flag in TCP header is used for
        (a)   Pushing the data.
        (b)   Informing that the connection must be reset.
        (c)   Synchronizing sequence numbers during connection, used to establish connections.
        (d)   Terminating the connection.

36   RST flag in TCP header is used for
        (a)   Indicating that the urgent pointer field is valid.
        (b)   Pushing the data.
        (c)   Informing that the connection must be reset.
        (d)   Terminating the connection.

37   TCP entity is in CLOSE_WAIT state when
        (a)   A connection request is received.
        (b)   The server is waiting for the application to close.
        (c)   Both sides have tried to close simultaneously
        (d)   Waiting for retransmitted segments to die

38   PAWS is implemented by TCP by extending sequence number bits by including
        (a)   Window Size Field
        (b)   Timestamp field
        (c)   Urgent Pointer Field
        (d)   None of the above

39   What is a TCP timer
        (a)   Expiration timer
        (b)   Update Timer
        (c)   Keepalive timer
        (d)   None of the above

40   TCP entity is in TIME_WAIT state when
        (a)   A connection request is received.
        (b)   The server is waiting for the application to close.
        (c)   Both sides have tried to close simultaneously
        (d)   Waiting for retransmitted segments to die

41   Public key encryption is useful for
        (a)   short messages
        (b)   long messages
        (c)   both a and b
        (d)   none

42   The keys in asymmetric key encryption are generated by
        (a)   the sender
        (b)   the receiver

(c)   the channel

(d)   none of the above

43   Message integrity is achieved by

(a)   digital signature

(b)   message digest

(c)   both a and b

(d)   caeser cipher

44   Transport mode in IPSec protects

(a)   entire packet

(b)   payload of the packet

(c)   header of the packet

(d)   none of the above

45   ESP provides

(a)   message authentication

(b)   integrity

(c)   privacy

(d)   all of the above

46   Kerberos is

(a)   datalink layer protocol

(b)   network authentication protocol

(c)   both a and b

(d)   none of the above

47   Two army problem is associated with

(a)   IP packet delivery

(b)   TCP asymmetric connection release

(c)   TCP symmetric connection release

(d)   physical layer specification

48   Sequence number of a TCP segment is

(a)   the number of the first data byte contained in that segment

(b)   the number of first bit in that segment

(c)   randomly determined

(d)   none of the above

49   Maximum window size of sender in Go Back N protocol with modulo n sequence numbers is

(a)   n-1

(b)   n

(c)   n/2

(d)   none of the above

50   Maximum window size of the sender in Selective Repeat protocol with modulo n sequence numbers is
(a)   n
(b)   n/2
(c)   n-1
(d)   none of the above

51   A digital signature needs a
(a)   private-key system
(b)   shared-key system
(c)   public-key system
(d)   All of them

52   One way to preserve integrity of a document is through use of a
(a)   Thumb Impression
(b)   Finger Print
(c)   Biometric
(d)   X-Rays

53   A session symmetric key between two parties is used
(a)   only once
(b)   twice
(c)   multiple times
(d)   depends on situation

54   Encryption and decryption provide secrecy, or confidentiality, but not
(a)   Authentication
(b)   Integrity
(c)   Keys
(d)   Frames

55   In asymmetric key cryptography, the private key is kept by
(a)   sender
(b)   receiver
(c)   sender and receiver
(d)   all the connected devices to the network

56   Which one of the following algorithm is not used in asymmetric-key cryptography? RSA algorithm
(a)   diffie-hellman algorithm
(b)   electronic code book algorithm
(c)   none of the mentioned

57   In cryptography, the order of the letters in a message is rearranged by
(a)   transpositional ciphers
(b)   substitution ciphers

(c)   both (a) and (b)
(d)   none of the mentioned

58   What is data encryption standard (DES)?
(a)   block cipher
(b)   stream cipher
(c)   bit cipher
(d)   none of the mentioned

59   The MD5 is a message digest algorithm developed by _____.
(a)   Ron Rivest.
(b)   WhiteField Diffie.
(c)   Martin Hellman.
(d)   Diffie-Hellman.

60   The original message digest algorithm is called as _____.
(a)   MAC.
(b)   SHA.
(c)   MD.
(d)   DSA.

61   The receiver of the data controls the amount of data that are to be sent by the sender is referred as
(a)   Flow control
(b)   Error control
(c)   Congestion control
(d)   Error detection

62   Size of TCP segment header ranges between
(a)   16 and 32 bytes
(b)   16 and 32 bits
(c)   20 and 60 bytes
(d)   20 and 60 bits

63   Connection establishment in TCP is done by which mechanism?
(a)   Flow control
(b)   Three-Way Handshaking
(c)   Forwarding
(d)   Synchronisation

64   The server program tells its TCP that it is ready to accept a connection. This process is called
(a)   Active open
(b)   Active close
(c)   Passive close
(d)   Passive open

65   The process of A client that wishes to connect to an open server tells its TCP that it needs to be connected to that particular server is
        (a)   Active open
        (b)   Active close
        (c)   Passive close
        (d)   Passive open

66   In Three-Way Handshaking process, the situation where both the TCP's issue an active open is
        (a)   Mutual open
        (b)   Mutual Close
        (c)   Simultaneous open
        (d)   Simultaneous close

67   The situation when a malicious attacker sends a large number of SYNC segments to a server, pretending that each of them is coming from a different client by faking the source IP address in the datagrams
        (a)   SYNC flooding attack
        (b)   Active attack
        (c)   Passive attack
        (d)   Denial-of-service attack

68   SYNC flooding attack belongs to a type of security attack known as
        (a)   SYNC flooding attack
        (b)   Active attack
        (c)   Passive attack
        (d)   Denial-of-service attack

69   Size of source and destination port address of TCP header respectively are
        (a)   16-bits and 32-bits
        (b)   16-bits and 16-bits
        (c)   32-bits and 16-bits
        (d)   32-bits and 32-bits

70   Connection establishment in TCP is done by which mechanism?
        (a)   Flow control
        (b)   Three-Way Handshaking
        (c)   Forwarding
        (d)   Synchronisation

Ans   (1)(a), (2)(b), (3)(c), (4)(a), (5)(a), (6)(a), (7)(b), (8)(a), (9)(b), (10)(a), (11)(d), (12)(d), (13)(d), (14)(b), (15)(a), (16)(c), (17)(b), (18)(c), (19)(a), (20)(a), (21)(c), (22)(b), (23)(c), (24)(b), (25)(c), (26)(b), (27)(d), (28)(b), (29)(a), (30)(d), (31)(d), (32)(c), (33)(c), (34)(e), (35)(d), (36)(c), (37)(b), (38)(b), (39)(c), (40)(d), (41)(a), (42)(b), (43)(c), (44)(b), (45)(d), (46)(b), (47)(c), (48)(a), (49)(a), (50)(b), (51)(c), (52)(b), (53)(a), (54)(b), (55)(b), (56)(c), (57)(a), (58)(a), (59)(a), (60)(c), (61)(a), (62)(c), (63)(b), (64)(d), (65)(a), (66)(c), (67)(a), (68)(d), (69)(b), (70)(b)

(b)   Fill in the Blanks:

1   A _____ is a subtree of the domain name space.
2   If a label is not terminated by a null string, it is called a _____.
3   What a server is responsible for or has authority over is called a _____.
4   Reduction of search time for DNS is handled through _____.
5   SNMP uses the services of UDP on two well-known ports _____ and
        _____.
6   The main difference between SNMPv^3 and SNMPv^2 is the _____.
7   HTTP supports _____servers.
8   A_____ connection is established between 2 end points by the network
        provides.
9   In public-key cryptography, there are 2 keys, _____ and _____.
10   _____ is often used for long messages.

Ans.   (1)(domain), (2)(partially qualified domain name), (3)(zone), (4)(caching), (5)(161, 162),
        (6)(enhanced security), (7)(proxy), (8)(permanent virtual circuit), (9)(public key, private
        key), (10)(symmetric key cryptography)

II   Short Answer Type Questions:

1   Explain the concept of SNMP in brief.
2   What are the functions of SMI?
3   Give the encoding format for SMI.
4   How does Get Next Request work in SNMP?
5   How does lexicographic ordering work in SNMP?
6   Give a brief explanation of MIME.
7   What are the two type of user-agents of electronic mail?
8   How is FTP different from HTTP?
9   Write short note on Primary and secondary servers in DNS.
10   What is a root server?
11   Given the two prime numbers p=19, q=23. Try to find N, e and d.
12   What are the values of R_1, R_2 in Diffie-Hellmon protocol if G=7, N=23, x=3 and
        y=5?
13   Using substitution with key=4, encrypt the following message "This Is A GOOD
        EXAMPLE".
14   Encode the following message in base 64:
        01010111   00001111   11110000   10101111   01110001
15   Encode the following message in quoted-printable
        01010111   00001111   11110000   10101111   0111000
16   What are options in TCP Extensions?
17   Define term Piggybacking.
18   What is Authentication Header? How does it provide security?
19   "S/MIME is not restricted to email" Justify, Write the functions provided by S/MIME.
20   Given 10bit key k=1010000010. By using SDES key encryption method determine
        K1,K2 where p10=3 5 2 7 4 10 1 9 8 6, P8=6 3 7 4 8 5 10 9.

21   "In practice proper TCP implementations have demonstrated remarkable robustness in adapting to a wide range of network characteristics." Justify.
22   If the maximum effective bandwidth at which TCP is able to transmit over a particular path is B bytes per second then give the constraint that must be satisfied for error-free operation.
23   Define message integrity. What are the various threats to message integrity?
24   What are monoalphabetic ciphers? How are they different from polyaphabetic ciphers?
25   Explain block ciphers with an example.
26   What is an advantage of using asymmetric cipher over symmetric cipher?
27   What is a message digest?
28   What is the purpose of Record protocol in SSL layer?
29   What is the role of SACK in TCP?
30   What is ISAKMP?
31   Draw a block diagram showing the digital signature process.
32   Why RIP uses UDP instead of TCP?
33   What is encrypted security payload in IPv6?
34   What is T/TCP?
35   What do you mean by certifying authority?
36   What is the difference between symmetric and asymmetric cryptography?
37   What is DES?
38   Define Feistel ciphers.

III   Long Answer Type Questions:

1   In the internet, the domain name space is divided into three different sections. Explain three sections in detail.
2   Explain name-address resolution in DNS.
3   Give the DNS-messages format in detail.
4   What are the two different types of records in DNS.
5   Explain compression in detail.
6   Give a detailed description of DDNS.
7   Explain in Detail Network Virtual Terminal.
8   Explain RMON in detail. Illustrate your answer.
9   Give the difference between symmetric key cryptography and asymmetric key cryptography. How is key management?
10   Digital signatures are increasingly being used in E-commerce. What according to you is the reason behind this popularity? How is digital signature technology related to cryptography? Explain in detail.
11   Briefly describe RMON and SNMP and differentiate between them.
12   What are the various protocols used by SNMP? Discuss their roles in detail.
13   What are various timers in TCP Extensions?
14   Apply MAC on the cryptographic checksum method to authenticate build confidentiality of the message where the authentication is tied to message M=8376, K1=4892, K2=5362071.
15   Explain the digital signature process. What is a signed digest?
16   What are the various entity authentication verification categories? Explain challenge-response authentication.

17   What is KDC? What are its functions?
18   Specify the steps of Diffie-Hellman Key Agreement.
19   What is inverse multiplexing? Explain TCP connection management.
20   Write short notes on <u>any two</u> of the following:
    (a)   Digital certificate
    (b)   ESP
    (c)   TCP Extensions for high speed networks
    (d)   Secure HTTP

21   Discuss the concept of send window and receive window for data transfer in TCP.
22   Compare and contrast http and https.
23   How message authentication code (MAC) is generated?
24   Explain the various protocols of security at different layers of the TCP/IP model.
25   Describe any key distribution algorithm, with example.
26   Write short note on Digital Certificates.
27   Describe Address Aggregation.
28   What is Secure HTTP? How is it different from https?
29   Define extensions of TCP.
30   What is the difference between AH and ESP?

QUESTION BANK

OBJECT ORIENTED ANALYSIS AND DESIGN

MCA-208

QUESTION BANK
OBJECT ORIENTED ANALYSIS AND DESIGN - MCA 208
MCA IV

UNIT - I

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Which one is not the phase of software lifecycle?
   (a)   Requirement analysis
   (b)   System Testing
   (c)   Prototyping
   (d)   Operation and Maintenance

2   Which one is not the type of feasibility?
   (a)   Economic
   (b)   Political
   (c)   Technical
   (d)   Component

3   If requirements are easily understandable and defined, which model is best suited?
   (a)   Waterfall
   (b)   Prototyping
   (c)   Spiral
   (d)   None of the above

4   The fact that the same operation may apply to two or more classes is called what?
   (a)   Inheritance
   (b)   Polymorphism
   (c)   Encapsulation
   (d)   Multiple classification

5   When no prior system exists and development starts from scratch it is known as
   (a)   Greenfield engineering
   (b)   Re-engineering
   (c)   Interface engineering
   (d)   Reverse engineering

6   Which is the component of a use case model?
   (a)   Actor
   (b)   Customer
   (c)   Developer
   (d)   Stakeholder

7   The object-oriented development life cycle is which of the following?
        (a)   Analysis, design, and implementation steps in the given order and using multiple iterations.
        (b)   Analysis, design, and implementation steps in the given order and going through the steps no more than one time.
        (c)   Analysis, design, and implementation steps in any order and using multiple iterations.
        (d)   Analysis, design, and implementation steps in any order and going through the steps no more than one time.

8   Multiplicity is the same as what concept for an ERD?
        (a)   Relationship
        (b)   Attribute
        (c)   Entity
        (d)   Cardinality

9   An abstract class is which of the following?
        (a)   A class that has direct instances, but whose descendants may have direct instances.
        (b)   A class that has no direct instances, but whose descendants may have direct instances.
        (c)   A class that has direct instances, but whose descendants may not have direct instances.
        (d)   A class that has no direct instances, but whose descendants may not have direct instances

10   A UML diagram includes which of the following?
        (a)   Class name
        (b)   List of attributes
        (c)   List of operations
        (d)   All of the above

11   What is the Magic "Glue" for Interworking Advanced Technology?
        (a)   Hardware,
        (b)   Software,
        (c)   Operation system.
        (d)   All above

12   The Object interface categories are:
        (a)   Object service and common facilities.
        (b)   Domain interfaces and application interfaces.
        (c)   All above.
        (d)   None of above.

13   Object orientation helps to solve
        (a)   Upgrading/Changing software is difficult.

(b)   Maintaining software is difficult.
(c)   Too many lines of code.
(d)   All above.

14   CORBA provides the mechanism to operate on objects independent of
   (a)   Location
   (b)   Supporting technology
   (c)   Implementation details
   (d)   All above

15   Which of the following concepts is not a part of CORBA?
   (a)   Polymorphism
   (b)   Lifecycle
   (c)   Inheritance
   (d)   Reuse

16   Which of the following is not a level of the SEI CMM?
   (a)   Initial
   (b)   Optimizing
   (c)   Managed
   (d)   Defined
   (e)   Final

17   The unifying focus for all the products that the ASCC (AT&T Software Construction
   Center) produces is:
   (a)   Software reuse
   (b)   Process
   (c)   Data
   (d)   Quality
   (e)   Lower cost

18   Which of the following does DATA provide for the Silver Bullet process?
   (a)   evaluation of the process
   (b)   project management
   (c)   a basis for improvement
   (d)   benchmark measurements against other organizations
   (e)   All of the above

19   Which feature is part of the object-oriented paradigm?
   (a)   Encapsulation
   (b)   Inheritance
   (c)   Polymorphism
   (d)   Abstraction
   (e)   All of the above

20   Which item is not part of the embedded software approach?
   (a)   Proprietary Interfaces

(b) Closed architecture
(c) Little opportunity to add value
(d) Decreasing costs
(e) None of the above

21 Which item is not part of the open software approach?
(a) Machine independent software
(b) Standard APIs
(c) Open architecture
(d) Lots of opportunity to add value
(e) Lower costs
(f) None of the above

22 Which of the following is not included when using the term "Software"?
(a) the code
(b) test plans
(c) user manuals
(d) design specifications
(e) All of the above

23 To deploy OOM well, you should spend approximately ____of your time in the requirements and design stages. (Session 3)
(a) 10%
(b) 30%
(c) 50%
(d) 70%
(e) 90%

24 What would be the advantages to the Open Software Approach over the Embedded Software Approach?
(a) Software is machine dependent
(b) Uses standard interface (not proprietary)
(c) Plug and play capability
(d) Lower integration, verification, and support costs
(e) All of above

25 Which is not a Communications Software trend:
(a) software reuse
(b) rapid prototyping
(c) object oriented techniques
(d) workstation in a non-distributed computing environment

26 Please identify different perspectives during OOAD.
(a) Conceptual
(b) Domain
(c) Design

(d)   Specification
(e)   Implementation
(f)   Deployment

27   At Conceptual level, a Class can consist attributes of:
(a)   Primitive data type
(b)   Value object data type e.g. Date, Money
(c)   Complex data type e.g. Customer, Account, Inventory
(d)   All of the above

28   Which of the following statements are true?
(a)   Within a specification model, generalization means that the interface of the subtype must include all elements from the interface of the supertype.
(b)   Generalization at the implementation perspective is associated with inheritance in programming languages.
(c)   Subclassing is the preferred way to implement subtyping over delegation due to high cohesion
(d)   The principle of substitutability means that if I write code assuming that I have a Customer, then I can freely use any subtype of Customer such Corporate Customer or Individual Customer and everything should work fine.

29   Which of the following statements is false?
(a)   Classification refers to the relationship between an object and its type.
(b)   In multiple classification, an object may be described by several types that are not necessarily connected by inheritance.
(c)   Multiple classification is similar to multiple inheritance.
(d)   Dynamic classification allows objects to change type within the subtyping structure. e.g. Person <-- (Job <<dynamic>>) Manager, Engineer, Salesman.
(e)   Static classification does not allow objects to change type. e.g. Person <-- (Sex {complete}) Female, Male.

30   Which of the following statements are true?
(a)   One of the strengths of objected-oriented development is that you can vary the interfaces of classes independently of the implementation.
(b)   Inheritance is a common technique to reuse interfaces and attributes of super classes.
(c)   Interfaces are often declared through abstract classes that may provide some implementation but the majority of implementation is at the subclass level. However, client programs will never see the implementation, only the interface.
(d)   A pure interface does not contain attributes. It only consists of operations declarations with no implementation bodies
(e)   All of the above.

31   Which of the following is false about System Sequence Diagrams?
(a)   SSD is a picture that shows for a particular scenario of a use case the events that external actors generate their order and inter-system events

(b)   SSDs are part of the Use-Case Model.

(c)   SSDs can also be used to illustrate collaborations between systems

(d)   System events and their associated system operations can be expressed in terms of the physical input medium or interface widget level.

(e)   An SSD should be done for the main success scenario of the use case and frequent or complex alternative scenario.

(f)   It is sometimes desirable to show at least fragments of the use case text for the scenario to enhance the two views.

32   For showing scenarios, which one of the following OOAD artifacts is the MOST useful?
(a)   Interaction Diagrams
(b)   Activity Diagrams
(c)   Use Cases
(d)   State Diagrams
(e)   Class Diagrams

33   For showing detailed design of procedures, which one of the following OOAD artifacts is the MOST useful?
(a)   Interaction Diagrams
(b)   Activity Diagrams
(c)   Use Cases
(d)   State Diagrams
(e)   Class Diagrams

34   For understanding control mechanisms, such as user interfaces and device controllers, which one of the following OOAD artifacts is the most useful?
(a)   Interaction Diagrams
(b)   Activity Diagrams
(c)   Use Cases
(d)   State Diagrams
(e)   Class Diagrams

35   For understanding control mechanisms, such as user interfaces and device controllers, which one of the following OOAD artifacts is the most useful?
(a)   Interaction Diagrams
(b)   Activity Diagrams
(c)   Use Cases
(d)   State Diagrams
(e)   Class Diagrams

36   For business modeling of a human organization or the workflow of a system, which one of the following OOAD artifacts is the most useful?
(a)   Interaction Diagrams
(b)   Activity Diagrams
(c)   Use Cases
(d)   State Diagrams

(e)   Class Diagrams

37   Activity diagrams cannot be used in the following situation:
(a)   Analyzing a use case
(b)   Understanding workflow
(c)   Describing a complicated sequential algorithm
(d)   Dealing with multithreaded applications
(e)   Procedural flow of control
(f)   Representing complex conditional logic

38   Which OOAD artifact is the MOST useful in situations where asynchronous events occur?
(a)   state diagrams
(b)   activity diagrams
(c)   collaboration diagram
(d)   object diagram

39   Which one of the following highlights the roles each object plays in an interaction model?
(a)   Sequence Diagrams
(b)   Collaboration Diagrams
(c)   Deployment Diagrams
(d)   Package Diagrams

40   Which one of the following is false? Interaction models help us to do the following :
(a)   Develop and evaluate various mechanisms for each scenario
(b)   Find new objects and classes
(c)   Develop the interface for each class
(d)   Model computations and workflows

41   Computer systems are designed by
(a)   simplifying requirements of system
(b)   breaking of the system into smaller self-contained co-operating subsystems
(c)   breaking up the systems into independent parts
(d)   modular design

42   Functions and procedures are
(a)   not useful in designing computer systems
(b)   old fashioned and they are not useful
(c)   useful in designing computer systems
(d)   have side effects which require special care if they are used as subsystems

43   In which of the following mechanisms, types of all variables and expressions are fixed at compilation time.
(a)   Strong Typing
(b)   Weak Typing

(c)   Static Binding/ early binding

(d)   Dynamic Binding/ late binding

44   The method of design encompassing the process of object oriented decomposition and a notation for depicting both logical and physical and as well as static and dynamic models of the system under design is known as:

(a)   Object- Oriented Programming

(b)   Object- Oriented Design

(c)   Object- Oriented Analysis

(d)   None of the mentioned

45   In which of the following mechanisms, types of all variables and expressions are not known until runtime.

(a)   Strong Typing

(b)   Weak Typing

(c)   Static Binding/ early binding

(d)   Dynamic Binding/ late binding

46   The process of compartmentalizing the elements of an abstraction that constitute its structure and behavior is called as

(a)   Hierarchy

(b)   Encapsulation

(c)   Modularity

(d)   Entity Abstraction

47   Single inheritance, Multiple inheritance, and Aggregation comes under _____

(a)   Modularity

(b)   Typing

(c)   Hierarchy

(d)   None of the mentioned

48   Which of the following statements about Persistence is correct?

(a)   It is the enforcement of the class of an object, such that objects of different types may not be interchanged, or at the most they may be interchanged only in very restricted ways.

(b)   It is the property of an object through which its existence transcends time and/or space.

(c)   It is the property that distinguishes an active object from one that is not active.

(d)   All of the mentioned

49   What is that concept in type theory in which a single name may denote objects of many different classes that are related by some common super class referred to _____

(a)   Monomorphism

(b)   Type Checking

(c)   Polymorphism

(d)   Generalization

50   What is the programming style of the object oriented conceptual model?
        (a)   Invariant relationships
        (b)   Algorithms
        (c)   Classes and objects
        (d)   Goals, often expressed in a predicate calculus.

51   The method of design encompassing the process of object oriented decomposition and a
        notation for depicting both logical and physical and as well as static and dynamic models
        of the system under design is known as:
        (a)   Object- Oriented Programming
        (b)   Object- Oriented Design
        (c)   Object- Oriented Analysis
        (d)   None of the mentioned

52   What is the programming style of the object oriented conceptual model?
        (a)   Invariant relationships
        (b)   Algorithms
        (c)   Classes and objects
        (d)   Goals, often expressed in a predicate calculus

53   The essential characteristics of an object that distinguish it from all other kinds of objects
        and thus provide crisply defined conceptual boundaries, relative to the perspective of the
        viewer is called:
        (a)   Encapsulation
        (b)   Modularity
        (c)   Hierarchy
        (d)   Abstraction

54   Abstraction is classified into _____ types
        (a)   4
        (b)   3
        (c)   2
        (d)   1

55   The process of compartmentalizing the elements of an abstraction that constitute its
        structure and behavior is called as
        (a)   Hierarchy
        (b)   Encapsulation
        (c)   Modularity
        (d)   Entity Abstraction

56   Single inheritance, Multiple inheritance, and Aggregation comes under _____
        (a)   Modularity
        (b)   Typing
        (c)   Hierarchy
        (d)   None of the mentioned

57   In which of the following mechanisms, types of all variables and expressions are fixed at compilation time.
      (a)   Strong Typing
      (b)   Weak Typing
      (c)   Static Binding/ early binding
      (d)   Dynamic Binding/ late binding

58   In which of the following mechanisms, types of all variables and expressions are not known until runtime
      a)   Strong Typing
      b)   Weak Typing
      c)   Static Binding/ early binding
      d)   Dynamic Binding/ late binding

59   Which of the following statements about Persistence is correct?
      (a)   It is the enforcement of the class of an object, such that objects of different types may not be interchanged, or at the most they may be interchanged only in very restricted ways.
      (b)   It is the property of an object through which its existence transcends time and/or space.
      (c)   It is the property that distinguishes an active object from one that is not active.
      (d)   All of the mentioned

60   What is that concept in type theory in which a single name may denote objects of many different classes that are related by some common super class referred to _____
      (a)   Homomorphism
      (b)   Type Checking
      (c)   Polymorphism
      (d)   Generalization

61   Product is
      (a)   Deliverables
      (b)   User expectations
      (c)   Organisation's effort in development
      (d)   None of the above

62   To produce a good quality product, process should be
      (a)   Complex
      (b)   Efficient
      (c)   Rigorous
      (d)   None of the above

63   Concepts of software engineering are applicable to
      (a)   Fortran language only
      (b)   Pascal language only
      (c)   'C' language only

(d)   All of above

64   Management of software development is dependent on
(a)   People
(b)   Product
(c)   Process
(d)   All

65   During software development which factor is most crucial?
(a)   People
(b)   Product
(c)   Process
(d)   Project

66   Software engineering approach is used to achieve:
(a)   Better performance of hardware
(b)   Error free software
(c)   Reusable software
(d)   Quality software product

67   Spiral model was developed by
(a)   Bev Littlewood
(b)   Berry Boehm
(c)   Roger Pressman
(d)   Victor Basili

68   If requirements are frequently changing, which model is to be selected?
(a)   Waterfall
(b)   Prototyping
(c)   RAD
(d)   Iterative Enhancement

69   If limited user participation is available, which model is to be selected
(a)   Waterfall
(b)   Spiral
(c)   Iterative enhancement
(d)   Any

70   Which is not a non-functional requirement?
(a)   Efficiency
(b)   Reliability
(c)   Product features
(d)   Stability

Ans.   (1)(c), (2)(d), (3)(a), (4)(b), (5)(a), (6)(a) , (7)(a) , (8)(d) , (9)(b) , (10)(d), (11)(b),
(12)(c), (13)(d), (14)(d), (15)(b), (16)(e), (17)(b), (18)(e), (19)(e), (20)(d), (21)(f), (22)(e),

(23)(d), (24)(e), (25)(d), (26)(c), (27)(a), (28)(b), (29)(a), (30)(a), (31)(d), (32)(c), (33)(a), (34)(d), (35)(d), (36)(b), (37)(f), (38)(a), (39)(b), (40)(d), (41)(b), (42)(d), (43)(c), (44)(b), (45)(d), (46)(b), (47)(c), (48)(b), (49)(c), (50)(c), (51)(b), (52)(c), (53)(d), (54)(a), (55)(b), (56)(c), (57)(c), (58)(d), (59)(b), (60)(c), (61)(a), (62)(b), (63)(d), (64)(d), (65)(a), (66)(d), (67)(b), (68)(b), (69)(d), (70)(c)

(b)   Fill in the Blanks:

1   The focus of prototyping is on _____ requirements.
2   Large amount of documentation is done in _____ model.
3   _____ is also known as gathering of requirements.
4   _____requirements go beyond the customer's expectations and prove to be very satisfying when present.
5   _____ is an approach to software development that organizes both the problem and its solution as a collection of discrete objects.
6   The conditions in which you expect the system to be in after the case is executed are called _____
7   _____ are the flow of events that occur during a use case instance.
8   An object is an _____ of the class.
9   _____ is a technique for hiding the internal implementation details of an object.
10   _____ expresses a part-of relationship and is a stronger form of an association relationship.
11   _____ is a class about a class
12   _____, _____, _____, _____, _____and _____ are the 5 levels of process maturity in OOD
13   _____ and _____ are two process used by Grady Booch in his OO software development.

Ans.   (1)(poorly understood), (2)(waterfall), (3)(Requirement Elicitation), (4)(Exciting), (5)(Object orientation), (6)(Post-conditions), (7)(Scenarios), (8)(instance), (9)(Encapsulation), (10) (Aggregation), (11)(meta-class), (12)(Initial, Repeatable, Defined, Managed and Optimized), (13)(Macro and Micro)

II   Short Answer Type Questions:

1   What are the various types of requirement elicitation? Explain
2   What do you understand by requirement elicitation? Illustrate.
3   What do you understand by software development lifecycle?
4   What is software engineering? What are its various layers?
5   What is prototyping? Explain different types of prototype
6   Write down the limitations of waterfall model.
7   Distinguish between QFD and FAST.
8   Give the differences between precondition and post condition.
9   Discuss the benefits of use cases.
10   Give the structure of OOM.

11   What is a use case? How it is beneficial in requirement phase? Is there any other way to capture requirements?
12   Does RAD promote incremental, staged delivery?
13   When prototyping model is appropriate?
14   Briefly explain the difference between the following pairs of terms with suitable examples
       (a)   Class/Object
       (b)   Encapsulation/Data hiding
       (c)   Superclass/Subclass
15   What are the various OO methodologies existing?
16   List the phases of Rumbaugh OMT model.
17   Define Objects
18   Give a brief note on object behavior
19   Define Class Hierarchy
20   Write the 80-20 rule
21   What are the diagrams used in Booch methodology?
22   State difference between OODBMS and traditional database. Describe object relational systems?
23   Differentiate between OOA/OOD models.
24   What is Guard Condition.
25   Explain Physical aggregation and catalogue aggregation.
26   Difference between Generalization Vs Instantiation
27   What is HOOD**?**
28   Explain Full scale test?
29   What is Overload test?
30   What is Extends, Uses cases in diagram?
31   Explain the Grouping Relationship in Use cases?
32   What is Uses of Synchronisation?
33   If a module has logical cohesion, what kind of coupling is this module likely to have with others?
34   What is the difference between a flowchart and structure chart?
35   What problems are likely to arise if a module has low cohesion?

III   Long Answer Type Questions:

1   Discuss the various elements of effective software engineering in detail.
2   What are the factors involved in the emergence of software engineering?
3   Explain the various characteristics of software engineering.
4   Compare and contrast the various software lifecycle models.
5   Discuss the object oriented process model along with its advantages.
6   What do you mean by object oriented approach? Explain its various features with examples.
7   Explain the spiral model in detail.
8   What is OOM? Discuss its various stages.
9   Describe the RAD model. Discuss each phase in detail.
10   Discuss the characteristics for the selection of a life cycle model.

11   Describe the use case model along with an example.
12   What are the major types of requirements elicitation? Discuss.
13   Explain the use case template with an example.
14   Compare object oriented process model and other software life cycle models.
15   What are the major requirement elicitation activities? Explain.
16   Describe the generic phases of software development process transformations.
17   What are the limitations of traditional software engineering?
18   How does V-shaped model meet the reality?
19   Discuss waterfall model, advantages, suitability and its problems.
20   In what way do the object oriented approach claim to improve the system development process?
21   Define the principle terminologies used in object oriented approach.
22   Demonstrate object oriented concepts for banking system.
23   What are the benefits and drawbacks of using OO in software development?
24   Describe the Booch Macro and Micro development processes.
25   Describe in detail the Jacobson Use Case Methodology.
26   What are the benefits of Coad and Yourdon OOA/OOD model?
27   What are the three dimensions of models available in Shlaer and Mellor OOA?
28   Compare various OO methodologies.
29   Why do we go for Object oriented system development?
30   Describe in detail about Object Oriented database management systems?
31   How does object oriented approach claim to improve the system development?
32   What basic features a programming language needs to support in order to be called an object oriented language.
33   What is Rational Unified Process? Explain Rational Unified Process model with appropriate diagram.
34   Explain why Object Oriented programs are said to be more maintainable & Reusable as compared to Function oriented programs?
35   What is CRC (Class Responsibilities Collaboration) card? How classes are represented in CRC card?
36   What is Rumbaugh's Methodology? Explain Static, Dynamic, and Functional model in detail.
37   What is State Chart Diagram? Draw the state chart diagram for Phone Call System.
38   Explain Activity Diagram? Draw activity diagram for telephonic conversation between caller and callee?
39   Explain OMT methodologies? State difference between static, dynamic and functional methodologies?
40   What is risk? Discuss various risk management activities.
41   Explain Putnam Resource Allocation model. What are the limitations of this model?
42   Compare and contrast Function Oriented design and Object Oriented design.
43   What is coupling? Discuss its various types with examples.
44   Define cohesion and its types with examples.

IV   Practical Questions:

1   For each of the following collections of objects, describe how they could be distinguished:-

      (i)   All telephones in the world for making telephone call.
      (ii)   All persons in the world for the purpose of criminal investigation.
      (iii)   All persons in the world for sending mail.
      (iv)   All customers with safe deposit boxes in a given bank.
      (v)   All electronic mail addresses throughout the world.
      (vi)   All employees of the company to restrict access for security reasons.

2   Draw use case diagram for online point of Sale Inventory System. (Show the Extend and include operations)

3   Draw a class diagram and an object diagram for a car rental application. The car rental agency has multiple offices/branches. The customer visits the agency for enquiry and takes a test ride, then selects the car by signing the term and conditions form. The customer can also book the car through telephone, email and sms. The agency checks the availability of the car and gives status to the customer. The customer can avail the driver facility if required, by paying additional charges. The billing is done online/offline based on the type of vehicle and distance travelled.

4   Draw the use case diagram & use case template (for any one case) for the above said problem in Q.3.

UNIT - II

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Which of the following is the layer of Object Oriented Software Engineering?
      (a)   Tools
      (b)   Process
      (c)   Architecture
      (d)   All of the above

2   Which model aims to capture the functional requirement?
      (a)   Requirements model
      (b)   Analysis model
      (c)   Design model
      (d)   Implementation model

3   Which process is used for developing and maintaining the components?
      (a)   Analysis
      (b)   Component
      (c)   Testing
      (d)   Construction

4   Which is not the dimension of analysis model?
      (a)   Information
      (b)   Implementation
      (c)   Behavior

(d)   Presentation

5   Which type of object models information in the system that is to be held for a longer time?
(a)   Control object
(b)   Interface object
(c)   Entity object
(d)   None of the above

6   Which one of the following is not the part of requirements model?
(a)   A use case model
(b)   Interface descriptions
(c)   A problem domain model
(d)   Analysis model

7   Which of the following object interface categories is domain independent?
(a)   Object services
(b)   Common facilities
(c)   Domain interfaces
(d)   Application interfaces

8   Which of the following statements are TRUE about Use Cases?
(a)   Use case diagrams are the primary tool to document requirements
(b)   Use cases provide the basis of communication between sponsors and developers in planning phase
(c)   Use cases description provides a good source to identify domain concepts
(d)   A fully-dressed use case should include both "whats" and "hows" so that they are ready for "realization"
(e)   A use case is an interaction between a user and a system.

9   During elaboration, you need to understand the risks to your project. Risks can be classified as:
(a)   Security risks e.g. virus, intrusion
(b)   Requirements risks
(c)   Financial risks
(d)   Technology risks
(e)   Skills risks

10   Referring to the attached diagram, the arrow indicates:
(a)   Refers to
(b)   Association
(c)   Dependency
(d)   Navigability

11   Which statements are true for a use case?
(a)   A use case captures some user-visible and non-visible functions

(b) A use case may have many scenarios
(c) A use case can be traced to a discrete goal
(d) UML use case diagrams are designed to replace textual description since a picture is better than a thousand words
(e) A use case must be initiated by an actor
(f) Good source for identifying use cases is external events

12 Which statements are true for an Actor?
(a) An actor is a role a user plays with respect to the system
(b) Generalization is not applicable to actors
(c) An actor does not need to be human. A subsystem or external system can be modeled as an actor
(d) All of above

13 Which are valid relationships in Use Case Diagrams?
(a) Use
(b) Generalization
(c) Subtyping
(d) Include
(e) Extend
(f) Extract

14 Which statements are true for use case relationships?
(a) An Include relationship means that a Use Case includes the behavior described in another Use Case
(b) an Extend relationship implies that a Use Case may extend the behavior described in another Use Case
(c) Generalization between Use Cases means that the child is a more specific form of the parent. The child inherits all Features and Associations of the parent, and may add new Features and Associations
(d) All of the above

15 Identify which of the following are value objects:
(a) Customer, Inventory, Sale
(b) BirthDate, PrimeRate, Money
(c) Account, Transaction, InstitutionNumber
(d) All of the above

16 Which of the following statements is true about an Association Class?
(a) It can contain attributes and operations.
(b) There can be more than one instance between participating objects.
(c) It is designed to support the Historic Mapping pattern.
(d) None of these

17   Which of the following statement is true?
        (a)   Development case is a document defining the case tools adopted by a project
        (b)   Development case is a document outlining the choice of UP artifacts for a project
        (c)   To support for reuse, it is recommended for an organization to adopt a development case for all applications
        (d)   None of these

18   What is the preferred size of use cases that capture the same functional requirements for a given project?
        (a)   20 use cases
        (b)   100 use cases
        (c)   500 use cases
        (d)   It depends

19   Which of the following statements are false about use case realization?
        (a)   A use-case realization describes how a particular use case is realized within the design model in terms of collaborating objects.
        (b)   Use-case realization is part of requirements gathering activity.
        (c)   Interaction diagrams and patterns apply while doing use-case realizations
        (d)   During construction use-case realizations are created for remaining design problems.

20   Which of the following statements are true about use-case driven development?
        (a)   Requirements are primarily captured in use cases.
        (b)   Use cases are the essential part of iterative planning by choosing some use case scenarios.
        (c)   Use cases are key input to project sizing
        (d)   User manuals are normally organized based on use cases
        (e)   Business use cases should not be developed within the project scope
        (f)   All of the above

21   Which of the following are true when mapping designs to code?
        (a)   Classes need to be implemented and ideally fully unit tested from most-coupled to least-coupled.
        (b)   Use case model: list of actor-goal-use case, use case context diagram and all in high level format.
        (c)   Unit testing code should be written before the code to be tested and the developer writes unit testing code for all production code. The basic rhythm is to write a little test code, then write a little production code, make it pass the test, then write some more test code and so forth.
        (d)   Unit testing should be at package level rather than at class level. One or a few test classes are created to test the entire functions of the package.

22   If requirements are frequently changing, which model is to be selected?
        (a)   Waterfall
        (b)   Prototyping

(c)   RAD

(d)   Iterative Enhancement

23   If limited user participation is available, which model is to be selected

(a)   Waterfall

(b)   Spiral

(c)   Iterative enhancement

(d)   Any

24   Which is not a non-functional requirement?

(a)   Efficiency

(b)   Reliability

(c)   Product features

(d)   Stability

25   Which of the following is true of the V-model?

(a)   It states that modules are tested against user requirements.

(b)   It only models the testing phase.

(c)   It specifies the test techniques to be used.

(d)   It includes the verification of designs.

26   Legacy systems are

(a)   Old systems

(b)   New systems

(c)   Undeveloped systems

(d)   None of the above

27   What can static analysis not find?

(a)   The use of a variable before it has been defined

(b)   Unreachable ("dead") code

(c)   Memory leaks

(d)   Array bound violations

28   Which is not a strategy for design?

(a)   Bottom up design

(b)   Top down design

(c)   Embedded design

(d)   Hybrid design

29   Product is

(a)   Deliverables

(b)   User expectations

(c)   Organization's effort in development

(d)   None of the above

30   To produce a good quality product, process should be
       (a)   Complex
       (b)   Efficient
       (c)   Rigorous
       (d)   None of the above

31   Which one of the following is true?
       (a)   In the Dynamic Model, every trigger must map to an operation in the interface of
               a class.
       (b)   Every arrow incident on an object in an Interaction Model represents an operation
               that must be in the interface of a class.
       (c)   Both "a" and "b" are true.
       (d)   Both "a" and "b" are false.

32   Which of the following is true about finding operations from the Static Model?
       (a)   Way(s) to create/delete an instance of a class
       (b)   Method to set/access the value of each attribute
       (c)   Method to check the value of any derived attribute
       (d)   Method to create each relationship
       (e)   All of the above
       (f)   "a", "b" and "c" only
       (g)   "a" and "b" only

33   Which of the following is true about finding operations from the Static Model?
       (a)   Method to determine if a relationship exists
       (b)   Method to access the value of each association
       (c)   Method to set an association
       (d)   Method to access all instances of a class with which a contains relationship exists.
       (e)   All of the above
       (f)   "a" and "b" only
       (g)   None of the above

34   Which of the following is false?
       (a)   A Dependency between Packages indicates (a Class(es) in) one Package in some
               way relies on (a Class(es) in) the other Package
       (b)   Dependencies limit reusability
       (c)   A Class (Package) cannot be reused without reusing the Class (Package) on which
               it depends
       (d)   Cyclic dependencies of packages allows reusability

35   Which of the following sources can be used to find operations for an interface?
       (a)   Domain experts
       (b)   Extended operations
       (c)   Testability operations
       (d)   All of the above
       (e)   "b" and "c" only

(f)   None of the above

36   Subtyping can be implemented by :
(a)   Subclassing
(b)   Delegation
(c)   Both "a" and "b"
(d)   "a" only
(e)   "b" only
(f)   None of the above

37.   For showing how several objects collaborate in single use case, which one of the following OOAD artifacts is the MOST useful?
(a)   Interaction Diagrams
(b)   Activity Diagrams
(c)   Package Diagrams
(d)   State Diagrams
(e)   Class Diagrams

38   When you want to look at the behavior of a single object across many use cases, which one of the following OOAD artifacts is the most useful?
(a)   Activity Diagrams
(b)   Package Diagrams
(c)   State Diagrams
(d)   Class Diagrams
(e)   Sequence Diagrams

39   When you want to look at the behavior across many use cases or many threads, which one of the following OOAD artifacts is the mostuseful?
(a)   Activity Diagrams
(b)   Package Diagrams
(c)   State Diagrams
(d)   Class Diagrams
(e)   Sequence Diagrams

40   Which of the following are valuable for concurrent processes?
(a)   Object Diagrams
(b)   Package Diagrams
(c)   State Diagrams
(d)   Class Diagrams

41   In object-oriented design
(a)   operations and methods are identical
(b)   methods specify algorithms whereas operations only state what is to be done
(c)   methods do not change values of attributes
(d)   methods and constructor are same

42   By abstraction in object-oriented modeling we mean picking
      (a)   only attributes appropriate to model an object
      (b)   only operations
      (c)   both operation and attributes with operations appropriate to model an object
      (d)   the appropriate abstract data type

43   Given a word statement of problem potential operations appropriate for objects are
      identified by selecting
      (a)   verb phrases in the statement
      (b)   noun phrases in the statement
      (c)   adjectives in the statement
      (d)   adverbs in the statement

44   Which of the following UML diagrams has a static view?
      (a)   Collaboration
      (b)   Use case
      (c)   State chart
      (d)   Activity

45   A data model contains
      (a)   data object
      (b)   attributes
      (c)   relationships
      (d)   All of the mentioned

46   _____ defines the properties of a data object and take on one of the three different
      characteristics.
      (a)   Data object
      (b)   attributes
      (c)   relationships
      (d)   data object and attributes

47   The _____ of a relationship is 0 if there is no explicit need for the relationship to
      occur or the relationship is optional.
      (a)   Modality
      (b)   cardinality
      (c)   entity
      (d)   structured analysis

48   Which of the following are not the primary objectives in the analysis model?
      (a)   Describing the customer complaints
      (b)   establishing a basis for the creation of a software design
      (c)   defining a set of requirements that can be validated once the software is built
      (d)   None of the mentioned

49   Which of the following is a structural model that demonstrates the other systems in the
      environment of the system being developed?
      (a)   system context model
      (b)   interaction model
      (c)   environmental model
      (d)   both system context and interaction

50   Which of the following come under system control?
      (a)   Reconfigure
      (b)   Shutdown
      (c)   Power save
      (d)   All of the mentioned

51   What does a simple name in UML Class and objects consists of
      (a)   Letters
      (b)   Digits
      (c)   Punctuation Characters
      (d)   All of the mentioned

52   What Does a Composite name consists of in a UML Class and object diagram?
      (a)   Delimiter
      (b)   Simple names
      (c)   Digits
      (d)   All of the mentioned

53   A Class consists of which of these abstractions?
      (a)   Set of the objects
      (b)   Operations
      (c)   Attributes
      (d)   All of the mentioned
      (e)   b, c

54   A class is divided into which of these compartments?
      (a)   Name Compartment
      (b)   Attribute Compartment
      (c)   Operation Compartment
      (d)   All of the mentioned

55   An attribute is a data item held by which of the following?
      (a)   Class
      (b)   Object
      (c)   All of the mentioned
      (d)   None of the mentioned

56   What should be mentioned as attributes for conceptual modelling?
      (a)   Initial Values

(b)   Names
(c)   All of the mentioned
(d)   None of the mentioned

57   An operation can be described as?
(a)   Object behavior
(b)   Class behavior
(c)   Functions
(d)   a,b
(e)   None of the mentioned

58   Which of these are part of class operation specification format?
(a)   name
(b)   parameter list
(c)   return-type list
(d)   All of the mentioned

59   What among these is true ?
(a)   Associations may also correspond to relation between instances of three or more classes
(b)   Association lines may be unlabeled or they may show association name
(c)   All of the mentioned
(d)   None of the mentioned

60   What is multiplicity for an association?
(a)   The multiplicity at the target class end of an association is the number of instances that can be associated with a single instance of source class
(b)   The multiplicity at the target class end of an association is the number of instances that can be associated with a number instance of source class
(c)   All of the mentioned
(d)   None of the mentioned

61   Which one is not a category of software metrics?
(a)   Product metrics
(b)   Process metrics
(c)   Project metrics
(d)   People metrics

62   Which is not a size metric?
(a)   LOC
(b)   Function count
(c)   Program Length
(d)   Cyclomatic Complexity

63   Minimal implementation of any algorithm was given the following name by Halstead
(a)   Volume

(b)   Potential Volume
(c)   Effective Volume
(d)   None of the above

64   Which one is not a measure of Software Science theory?
(a)   Vocabulary
(b)   Volume
(c)   Level
(d)   Logic

65   Minimum possible value of reliability is
(a)   100
(b)   10
(c)   1
(d)   0

66   Which level of CMM is for process control?
(a)   Initial
(b)   Defined
(c)   Managed
(d)   Optimizing

67   How many product quality factors have been proposed in McCall quality model?
(a)   2
(b)   3
(c)   11
(d)   6

68   Function oriented metrics were first proposed by?
(a)   John
(b)   Gaffney
(c)   Albrecht
(d)   Basili

69   Which of the following is not a product metric?
(a)   Size
(b)   Reliability
(c)   Productivity
(d)   Functionality

70   Which of the following is not a process metric?
(a)   Productivity
(b)   Functionality
(c)   Quality
(d)   Efficiency

Ans. (1)(d), (2)(a), (3)(b), (4)(b), (5)(c), (6)(d), (7)(a), (8)(c), (9)(d), (10)(a), (11)(c), (12)(b), (13)(d), (14)(a), (15)(a), (16)(a), (17)(a), (18)(a), (19)(a), (20)(a), (21)(b), (22)(b), (23)(d), (24)(c), (25)(d), (26)(a), (27)(c), (28)(c), (29)(a), (30)(b), (31)(c), (32)(e), (33)(e), (34)(d), (35)(d), (36)(c), (37)(a), (38)(c), (39)(a), (40)(c), (41)(b), (42)(c), (43)(a), (44)(b), (45)(d), (46)(b), (47)(a), (48)(d), (49)(a), (50)(d), (51)(d), (52)(d), (53)(d), (54)(d), (55)(a), (56)(c), (57)(d), (58)(d), (59)(d), (60)(a), (61)(d), (62)(d), (63)(b), (64)(d), (65)(d), (66)(d), (67)(b), (68)(c), (69)(c), (70)(b)

(c)   Fill in the Blanks:

1   OOSE stands for _____
2   _____ model aims to verify the system.
3   System development is a set of interacting _____.
4   In _____model we create a conceptual picture of the system.
5   The _____dimension provides the details for presenting the system to the outside world.
6   The requirements model will be realized into _____ model.
7   In _____process we develop the system from the models created within the analysis process.
8   _____ model can be viewed as a collection of procedures or behaviors that taken together reflect the behavior of a system over time.
9   _____ model can be viewed a s a snapshot of a system's parameter at rest or a specific point in time.

Ans.   (1)(Object Oriented Software Engineering), (2)(Test), (3)(processes), (4)(analysis), (5)(presentation), (6)(design), (7)(construction), (8)(Dynamic), (9)(Static)

II   Short Answer Type Questions:

1   "Each process can consist of a number of communicating sub-processes". Comment.
2   Distinguish between entity and interface object.
3   Explain the role of processes in system development.
4   Discuss component process with example.
5   Differentiate between information and behaviour dimension of analysis model.
6   Discuss testing process in detail.
7   What are interface descriptions?
8   Compare include and extend relationship.
9   Explain the tools layer of OOSE?
10   What are the features of control object of analysis model?
11   What are the features of analysis model and design? Explain with examples.
12   How the actors are identified?
13   How the use cases are identified?
14   Why analysis is a difficult activity?
15   What is the purpose of analysis? Why do we need analysis?
16   What is Actor object, Boundary object, Controller object, Entity object in sequence diagram?

17   The goal of the analysis model is to develop a model of what the system will do?
18   Compare iterative enhancement model and evolutionary development model.
19   Justify the statement "In model we create a conceptual picture of the system."?
20   Explain the concept of forward and reverse engineering.
21   Generate an object oriented design of a banking system as per your perception. Each class and its members should be clearly defined. Further, also explain any relationship that may exist among multiple classes.
22   Elaborate Super State & Composite State in state chart diagram.
23   What is CRC card?
24   What are the ways in which object can be represented in collaboration diagrams?
25   Elaborate Swim Lanes in Activity diagrams.
26   What is Port diagram?
27   Explain Dependencies in Component Diagram?
28   What is Actor object and Boundary Object?
29   Explain Controller object & Entity Object.
30   When the role of software testing start in software life cycle? When can planning for software testing start?
31   Differentiate between validation and verification.
32   Will exhaustive testing guarantee that the program is 100% correct? Justify.
33   Why does software testing need extensive planning?
34   Who could test well, developer or independent tester? Justify your answer.
35   Discuss the suggestions that may be useful for the modification of legacy code.

III   Long Answer Type Questions:

1   Difference between object oriented software engineering and classical software engineering.
2   Discuss the architecture layer of OOSE in detail.
3   Compare the requirement and analysis model with example.
4   Explain the relationship between processes and models with an example
5   How use case diagrams acts as a base for other models in Object Oriented software Engineering? Explain.
6   What is Object Oriented software Engineering? Explain its layers with examples.
7   Discuss the requirement model in detail.
8   Explain the problem domain object model with example.
9   What is the role of a use case model in system development?
10   Discuss the various objects and dimensions of analysis model with examples.
11   How system development is model building in Object Oriented Software Engineering?
12   Explain the analysis model with the help of an example.
13   The identification of classes and objects is the hardest part of object oriented analysis and design. Discuss with the help of an example.
14   The goal of analysis model is to develop a model of what the system will do". Explain this statement with the help of the steps that an analyst will follow throughout the analysis?
15   What is the relationship between object oriented analysis, software requirement and object oriented design? Explain using suitable examples.

16   Define the steps involve in OOA.
17   How the classes are identified with use case modelling?
18   What are the guidelines to define relationships among classes?
19   Develop an activity diagram of a meeting scheduler system for a company. State any assumption you make about this system while doing this.
20   Define OOD and OOSA object oriented methodologies.
21   What is analysis model? Suggest some heuristics for identifying objects during object oriented analysis of problem.
22   "The Requirements Model aims to delimit the system and to define the functionality that the system should offer". Give the comment and explain with example.
23   What is Design Model? Consider Railway ticket reservation system. Identify entity, control and interface objects.
24   Write the Use case Scenario and Draw Activity diagram for ATM system (major functions of ATM are pin change, withdrawing cash, fund transfer, utility bill payment, etc.)
25   Compare Rumbaugh's, Booch, Coad-Yourdon and Ivar Jacobson Methodology with relative advantages and disadvantages.
26   ICICI is a Global Commercial Bank. It plans to build an online credit management system (CCMS). In order to obtain an SBI credit card, customers may fill the application through CCMS. In the application, they need to specify the type of credit card they want to apply, e.g. platinum, gold or standard. The difference among them is the requirement on the minimum personal annual income, credit limit & annual fee. Information such as personal contact information, current employment and financial status, is also required in application. Once ICICI accepts the application, it will send a confirmation mail to the applicant and state the available date, expiration date and credit limit of the credit card. When the applicants receive the mail with credit card, they need to call the CCMS to activate the card. Draw Sequence Diagram for Applying & Verification of Credit Card.
27   Describe the purpose of the construction phase? What are the main steps to develop design model? Explain with suitable example.
28   What are the consequences of implementation environment? Why analysis objects are required before design objects? Explain with examples.
29   What is reverse engineering? Discuss levels of reverse engineering.
30   What tools and techniques are available for software maintenance? Discuss any two of them.
31   What are configuration management activities? Draw the Performa of change request form.
32   Discuss various problems during maintenance. Describe some solutions to these problems.
33   How iterative enhancement model is helpful during maintenance? Explain the various stage cycles of this model.

IV   Practical Questions:

1   Create a requirement model for library management system.
2   For a banking system identify the various objects of analysis model.
3   Draw a use case model for ATM.

4   Draw an analysis model for waterfall model.

5   Draw a problem domain and an analysis model for student management system.

6   Draw the analysis model for Tele-Communication system?

7   Draw analysis model for Payroll system and convert it into design model.

8   A publisher publishes different books. An author can write different books but for the same publisher. A contract is sign between the publisher and the author. Reports such as number of books sold, number of complimentarily copies given, royalty amount to be paid to the author etc. Draw a class diagram and object diagram for the above case.

9   Draw the state Chart diagram for ATM transaction (withdrawing cash) with debit card.

UNIT - III

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Which dimension is present in design model but not in analysis model?
      (a)   Implementation environment
      (b)   Behavior
      (c)   Information
      (d)   Presentation

2   Which is the most important property under system design?
      (a)   Stability
      (b)   Security
      (c)   Traceability
      (d)   Flexibility

3   Which testing is concerned with the testing of a single unit?
      (a)   Unit Testing
      (b)   Integration Testing
      (c)   System Testing
      (d)   Performance Testing

4   Which one of the following is a testing strategy?
      (a)   Bottom up
      (b)   Hybrid
      (c)   Divide and Conquer
      (d)   Component

5   How many dimensions are there in design model?
      (a)   3
      (b)   4
      (c)   2
      (d)   5

6   Which model is an input to construction process?
        (a)   Analysis model
        (b)   Test model
        (c)   Design model
        (d)   Implementation model

7   The word 'Error' is synonymous with which of the following words?
        (a)   Incident
        (b)   Defect
        (c)   Mistake
        (d)   Bug

8   Which of the statements below is the best assessment of how the test principles apply across the test life cycle?
        (a)   Test principles only affect the preparation for testing.
        (b)   Test principles only affect test execution activities.
        (c)   Test principles only affect the early test activities such as review.
        (d)   Test principles affect activities throughout the test life cycle.

9   Software Testing is the process of
        (a)   Demonstrating that errors are not present.
        (b)   Executing the program with the intent of finding errors.
        (c)   Executing the program to show that it executes as per SRS.
        (d)   All of the above.

10   Programmers make mistakes during coding. These mistakes are known as
        (a)   Failures
        (b)   Defects
        (c)   Bugs
        (d)   Errors

11   Software Testing is nothing else but
        (a)   Verification only
        (b)   Validation only
        (c)   Both verification & validation
        (d)   None of the above.

12   Test suite is
        (a)   Set of test cases
        (b)   Set of inputs
        (c)   Set of outputs
        (d)   None of the above

13   Which one is not the verification activity?
        (a)   Reviews
        (b)   Path Testing

(c)   Walk throughs

(d)   Acceptance Testing

14   A break in the working of a system is called

(a)   Defect

(b)   Failure

(c)   Fault

(d)   Error

15   One fault may lead to

(a)   One failure

(b)   No failure

(c)   Many failures

(d)   All of the above

16   Which of the following is not a functional testing technique?

(a)   Boundary-Value Analysis

(b)   Decision Table

(c)   Regression Testing

(d)   None of the above

17   Decision tables are useful in situations where

(a)   An action is taken under varying sets of conditions.

(b)   Number of combinations of actions is taken under varying sets of conditions.

(c)   No action is taken under varying sets of conditions.

(d)   None of the above.

18   'Causes' and 'Effects' are related to

(a)   Input and Output

(b)   Output and Input

(c)   Destination and Source

(d)   Source and Destination

19   If 'n' represents the number of variables in a program then Boundary Value analysis yields how many test cases

(a)   4n+2

(b)   4n+1

(c)   n+2

(d)   n+1

20   For a function of 'n' variables, the robustness testing will yield how many cases

(a)   6n+1

(b)   6n+2

(c)   6n+4

(d)   None of above

21   In decision tables, which of the following is true?
      (a)   Number of test cases is equal to number of rules (columns)
      (b)   No. of test cases is not equal to number of rules (or column)
      (c)   Both (a) and (b)
      (d)   None of the above.

22   Cyclomatic complexity is equal to
      (a)   Number of independent paths
      (b)   Number of paths
      (c)   Number of edges
      (d)   None of the above

23   Data flow testing is related to
      (a)   DFD
      (b)   ERD
      (c)   Data Dictionary
      (d)   None of the above

24   In data flow testing, objective is to find
      (a)   All dc-paths that are not du-paths
      (b)   All du-paths
      (c)   All du-paths that are not dc-paths
      (d)   All dc-paths

25   Every node is represented by
      (a)   One row and one column in graph matrix
      (b)   Two rows and two columns in graph matrix
      (c)   One row and two columns in graph matrix
      (d)   None of the above.

26   In diagonal band prioritization scheme
      (a)   Severity equals probability
      (b)   Severity is never equal to probability
      (c)   Either (a) or (b)
      (d)   Both (a) and (b)

27   Some managers found out that
      (a)   Reducing the number of test cases
      (b)   Increased the number of test cases
      (c)   It does not effect the number of test cases
      (d)   None of the above

28   Equivalence partitioning is a technique for?
      (a)   Correction regression testing
      (b)   Retest-all strategy
      (c)   Combinational explosion

(d)   None of the above

29   Which of the following testing strategy is applicable at all three levels of testing
(a)   White box testing
(b)   Mutation testing
(c)   Regression testing
(d)   None of the above

30   Alpha testing involves
(a)   Customers
(b)   Testers
(c)   Developers
(d)   All of the above

31   Which of the following is not a product matrix?
(a)   Size
(b)   Reliability
(c)   Productivity
(d)   Functionality

32   Which of the following comments about object oriented design of software, is not true?
(a)   Objects inherit the properties of class
(b)   Classes are defined based on the attributes of objects
(c)   an object can belong to two classes
(d)   classes are always different

33   If 99% of the program is written in FORTRAN and the remaining 1% in assembly language, the percentage increase in the programming time compared to writing the entire program in FORTRAN and rewriting the 1% in assembly language is?
(a)   10
(b)   5
(c)   13
(d)   8

34   Structured programming codes include?
(a)   sequencing
(b)   alteration
(c)   iteration
(d)   multiple exit from loops
(e)   only A, B and C

35   In object oriented design of software, objects have?
(a)   attributes and names only
(b)   operations and names only
(c)   attributes, name and operations
(d)   None of above

36   Given a source code with 10 operators includes 6 unique operators, and 6 operand including 2 unique operands. The program volume is?
    (a)   48
    (b)   120
    (c)   720
    (d)   insufficient data

37   Project indicator enables a software project manager to?
    (a)   assess the status of an ongoing project
    (b)   track potential risks
    (c)   uncover problem areas before they " go critical "
    (d)   All of above

38   Once object oriented programming has been accomplished, unit testing is applied for each class. Class tests includes?
    (a)   Fault based testing
    (b)   Random testing
    (c)   Partition testing
    (d)   All of above

39   .... Developed a set of software quality factors that has been given the acronym FURPS - Functionality, Usability, Reliability, performance, Supportability?
    (a)   Hewlett - Packard
    (b)   Rambaugh
    (c)   Booch
    (d)   Jacobson

40   The document listing all procedures and regulations that generally govern an organization is the
    (a)   Personal poling bank
    (b)   Organizing manual
    (c)   Administration policy manual
    (d)   Procedure lob

41   What is the order in which test levels are performed?
    (a)   Unit, Integration, System, Acceptance
    (b)   Unit ,System, Integration, Acceptance
    (c)   Unit, Integration, Acceptance, System
    (d)   It depends on nature of a project.

42.   Testing is concerned with behavior of whole product as per specified requirements?
    (a)   Acceptance testing
    (b)   Component testing
    (c)   System testing
    (d)   Integration testing

43   Who is responsible for component testing?
        (a)   Software tester
        (b)   Designer
        (c)   User
        (d)   Developer

44   Component testing is a
        (a)   Black box testing
        (b)   White box testing
        (c)   Grey box testing
        (d)   Both a and b

45.   The testing in which code is checked
        (a)   Black box testing
        (b)   White box testing
        (c)   Red box testing
        (d)   Green box testing

46   Testing done without planning and Documentation is called
        (a)   Unit testing
        (b)   Regression testing
        (c)   Adhoc testing
        (d)   None of the mentioned

47.   SPICE stands for
        (a)   Software Process Improvement and Compatibility Determination
        (b)   Software Process Improvement and Control Determination
        (c)   Software Process Improvement and Capability Determination
        (d)   None of the mentioned

48.   Unit testing is done by
        (a)   Users
        (b)   Developers
        (c)   Customers
        (d)   Developers

49.   Which one of the following is not a software process quality?
        (a)   Productivity
        (b)   Portability
        (c)   Timeliness
        (d)   Visibility
50.   _____&_____ are two kinds of software products.
        (a)   CAD, CAM
        (b)   Firmware, Embedded
        (c)   Generic, Customised
        (d)   Liveware , Firmware

51   Which among these are the rules to be considered to form Class diagrams?
     (a)   Class symbols must have at least a name compartment
     (b)   Compartment can be in random order
     (c)   Attributes and operations can be listed at any suitable place
     (d)   None of the mentioned

52   Which of these are the heuristics?
     (a)   Name classes, attributes, and roles with noun phrases
     (b)   Name operations and associations with verb phrases
     (c)   Stick to binary associations
     (d)   All of the mentioned

53   An object symbol is divided into what parts?
     (a)   Top compartment
     (b)   Bottom Compartment
     (c)   All of the mentioned
     (d)   None of the mentioned

54   When a class serves as base class for many derived classes, the situation is called:
     (a)   polymorphism
     (b)   hierarchical inheritance
     (c)   hybrid inheritance
     (d)   multipath inheritance
     e)   none of these

55   When two or more classes serve as base class for a derived class, the situation is known
     as _____.
     (a)   multiple inheritance
     (b)   polymorphism
     (c)   encapsulation
     (d)   hie0rarchical inheritance
     (e)   none of these

56   Multiple inheritance leaves room for a derived class to have _____ members.
     (a)   dynamic
     (b)   private
     (c)   public
     (d)   ambiguous
     (e)   none of these

57   The _____ view addresses the distribution, delivery and installation of the parts that
     make up of the physical system.
     (a)   use case
     (b)   process
     (c)   implementation

(d)   none

58   A relationship between classes and interfaces can be viewed as _____ relationship.
      (a)   association
      (b)   generalization
      (c)   link
      (d)   realization

59   Interaction diagrams are
      (a)   Sequence Diagram
      (b)   Collaboration Diagram
      (c)   Both a and b
      (d)   None

60   There are generally _____ diagrams used in UML .
      (a)   Seven
      (b)   Eight
      (c)   Nine
      (d)   Ten

61   Which of the following is true of the V-model?
      (a)   It states that modules are tested against user requirements.
      (b)   It only models the testing phase.
      (c)   It specifies the test techniques to be used
      (d)   It includes the verification of designs.

62   Selection of a model is based on
      (a)   Requirements
      (b)   Development team
      (c)   Users
      (d)   Project type and associated risk
      (e)   All of the mentioned

63   Which two models doesn't allow defining requirements early in the cycle?
      (a)   Waterfall & RAD
      (b)   Prototyping & Spiral
      (c)   Prototyping & RAD
      (d)   Waterfall & Spiral

64   If you were a lead developer of a software company and you are asked to submit a project/product within a stipulated time-frame with no cost barriers, which model would you select?
      (a)   Waterfall
      (b)   Spiral
      (c)   RAD

(d)   Incremental

65   Which two of the following models will not be able to give the desired outcome if user's participation is not involved?
       (a)   Waterfall & Spiral
       (b)   RAD & Spiral
       (c)   RAD & Waterfall
       (d)   RAD & Prototyping

66   A company is developing an advance version of their current software available in the market, what model approach would they prefer ?
       (a)   RAD
       (b)   Iterative Enhancement
       (c)   Both a & b
       (d)   Spiral

67   Which of the following is not an attribute of software engineering?
       (a)   Efficiency
       (b)   Scalability
       (c)   Dependability
       (d)   Usability

68   Choose the correct option from given below:
       (a)   Prototyping Model facilitates re-usability of components
       (b)   RAD Model Model facilitates re-usability of components
       (c)   Both RAD & Prototyping Model facilitates re-usability of components
       (d)   None

69   The first item defined for a new system is its
       (a) Storage
       (b) Outputs
       (c) Inputs
       (d) Processing

70   Software engineering primarily aims on
       (a)   reliable software
       (b)   cost effective software
       (c)   reliable and cost effective software
       (d)   none of the above

Ans.   (1)(a), (2)(c), (3)(a), (4)(a), (5)(b), (6)(a), (7)(c), (8)(d), (9)(b), (10)(c), (11)(c), (12)(a), (13)(d), (14)(b), (15)(d), (16)(c), (17)(b), (18)(a), (19)(b), (20)(a), (21)(a), (22)(a), (23)(d), (24)(c), (25)(a), (26)(a), (27)(b), (28)(a), (29)(c), (30)(d), (31)(c), (32)(c), (33)(b), (34)(e), (35)(c), (36)(a), (37)(d), (38)(d), (39)(a), (40)(b), (41)(d), (42)(c), (43)(d), (44)(b), (45)(b), (46)(c), (47)(c), (48)(b), (49)(b), (50)(c), (51)(a), (52)(d),

(53)(c), (54)(b), (55)(a), (56)(d), (57)(d), (58)(d), (59)(c), (60)(c), (61)(d), (62)(e), (63)(b), (64)(c), (65)(d), (66)(c), (67)(c), (68)(c), (69)(b), (70)(c)

(c) **Fill in the Blanks:**

1   Design model is composed of _____
2   A block structure is divided into _____and _____part.
3   The test activities are divided into _____and _____.
4   A _____test is a type of stress test intended to subject the system to stresses beyond what it has been built for.
5   _____testing the entire system.
6   _____ diagrams are the 2-D diagrams.
7   The_____ in the analysis model are replaced by blocks in design model.

Ans.   (1)(blocks), (2)(public/private), (3)(verification/validation), (4)(negative), (5)(system), (6)(Interaction/Sequence), (7)(objects)

II **Short Answer Type Questions:**

1   What are the features of implementation model?
2   Difference between design and implementation model.
3   Give the circumstances with examples under which the transition should occur from analysis to design.
4   Difference between overload and negative testing.
5   What are the characteristics of a test model?
6   What is system testing?
7   What do you mean by traceability?
8   Why implementation environment dimension is important in design model?
9   What is the role of components in construction process?
10   Why do we need to have integration testing?
11   How is object oriented testing different than Procedural testing?
12   Derive the artifact of test and list the main workers of testing.
13   Why test case is important?
14   What are the steps involve in test plan?
15   Explain smoke testing.
16   Define Negative test with example
17   Define Compatibility testing
18   Explain GUI and API testing
19   What is the Exploratory Testing?
20   What are the goals of Usability Testing?
21   Explain Usability Testing Process
22   What is State matrix for object oriented testing.
23   What do you mean by testing phase in software engineering? Describe the difference between white box and black box testing. Explain unit testing, integration testing and system testing.
24   What is State based Testing & System Testing?
25   Elaborate OMT (Object Modeling Techniques)

26   Difference between Physical and Catalogue?
27   What is Homomorphism aggregation with proper example?
28   What is Exclusion- OR?
29   Explain Reflexive association with example.
30   Differentiate between various categories of metrics.
31   Explain the significance of software reliability engineering.
32   What are Software Metrics? Describe Data Structure Metrics.
33   Define Reliability?
34   Which one is the most appropriate size estimation technique and why?

III   Long Answer Type Questions:

1   What is the role of state-chart diagrams in design model?
2   Discuss design model in detail.
3   Compare analysis and design model along with examples.
4   What is the significance of sequence diagrams in design model?
5   Discuss the various objects and dimensions of design model with examples.
6   What are the major steps to develop a design model one should perform?
7   What is a block design? Explain in detail.
8   What is a construction process? Explain its significance in system development.
9   Discuss various testing techniques of OOSE in detail.
10   What are the various testing levels in OOSE? Explain.
11   Explain the testing process in detail.
12   Explain unit and integration testing in the object-oriented context. Differentiate between thread-based integration testing and use-based strategies for integration testing.
13   How is object orientation different from classical procedural software design? Briefly discuss different aspects of Booch's methodology for object oriented design?
14   What are the several ways of testing software? Explain a test plan and a test report.
15   Define the steps involve in OOD.
16   What is the role of use cases in designing view layer classes?
17   List the testing principles.
18   Describe the testing model.
19   Describe various testing activities.
20   What is the impact of OO on testing?
21   What is Performance testing? Explain the commercial tools along with the pros and Cons of Performance Tester tool.
22   What is Usability Testing? Explain the different need for Usability testing
23   Differentiate among State based and Category based partitioning testing techniques.
24   Describe the purpose of the construction phase? What are the main steps to develop design model?
25   What are the consequences of implementation environment? Why analysis objects are required before design objects? Explain with example.
26   "The Requirement model aims to delimit the system and define the Functionality that the system should offer". Give the comment and Explain with example.
27   Draw a Use-case Diagram for MCA college that would like to keep track of each students. In order to maintain strong ties to its alumni, the college holds various events. The college needs to track of which student have attended which events. The college

keeps in contact with the students by mail, email, telephone and fax to announce each event and keep students information up to date. The college would like to be able to produce a report showing the latest information about a student and the events the graduate attended. Write the use case template for any one use case.

28   What is RUP (Rational Unified Process) Model? Explain Iterations, Workflow & Outcomes of each phase.

29   What is incremental integration testing? Explain Thread based, Use based and Cluster strategies for integration testing.

30   List the steps involved in construction of State Transition diagram. Draw the state transition Diagram for ATM system.

IV   Practical Questions:

1   For a payroll management system draw the analysis and design model.
2   Draw the analysis and design model for railway reservation system.
3   Draw a design model for banking system.
4   Draw state chart diagram/diagrams to implement library management system.
5   Give a design model for ATM.
6   Draw the sequence diagram for P C Jewels has specialized in online jewellery, selling wonderful ranges of Women's jewellery. A customer can register online so that he/ she can place the order & check the status of placed order. A customer can purchase any jewellery item online either by using his / her existing account or as anonymous user specifying shipping address & contract information. Customer can only check the status of his/ her order if he/she create an account. The customer can pay online through credit card or debit card and the order will be delivered on the shipping address with in one week.
7.   Draw the sequence diagram for An Automated Teller Machine (ATM) is offered to bank customers as a convenience. At the ATM, customers can make deposits to or withdrawals from their account(s). They can also transfer funds between their accounts, and can make inquiries as to account balances. In order to access the services of the ATM, customers must have an ATM card and Personal Identification Number (PIN) .The components of the ATM include a User Interface, a card reader, an envelope slot, a cash drawer and a printer. The User Interface has a display and buttons. There are 10 numeric entry buttons, 4 transaction selection buttons, an "Enter" button and a "Cancel" button. Each ATM is connected to the bank computer via a network. Each ATM has a unique network identification number. The ATM validates account balances and account status by communicating with the bank computer. ATM's require periodic servicing. This servicing can include maintenance, restocking cash in the money holder, and removing deposited envelopes from the envelope repository. From the envelope when the rear service panel is open, the ATM suspends interactions with the customers. Each ATM has a particular branch of the bank that is responsible for service and maintenance.
8   Draw the Activity diagram for the following case. Consider an order processing system. Initially, the customer analyses his requirement and build up an order. In the company, the order desk gives the quotation for the order and request for confirmation from the customer. Once the customer confirms the order, the company shipping desk verify for

stock. If available, it processes the order and ships it. It also updates the stock level. If sufficient inventory are not available, then it updates its stock and then process the order.

9   Draw the sequence diagram for the following case.

SBI is a Global Commercial Bank. It plans to build an online credit management system (CCMS). In order to obtain an SBI credit card, customers may fill the application through CCMS. In the application, they need to specify the type of credit card they want to apply, e.g. platinum, gold or standard. The difference among them is the requirement on the minimum personal annual income, credit limit & annual fee. Information such as personal contact information, current employment and financial status, is also required in application. Once SBI accepts the application, it will send a confirmation mail to the applicant and state the available date, expiration date and credit limit of the credit card. When the applicants receive the mail with credit card, they need to call the CCMS to activate the card.

UNIT - IV

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   The conceptual model of UML consists of:
(a)   Building Blocks of UML
(b)   Rules of UML
(c)   Common Mechanisms in UML
(d)   All of the above

2   Which is not the building block of the UML?
(a)   Things
(b)   Relationships
(c)   Diagrams
(d)   Project Plans

3   An example of node is
(a)   Server
(b)   Class
(c)   Memory
(d)   Component

4   Which one of the following are the explanatory parts of UML model?
(a)   Structural Things
(b)   Grouping Things
(c)   Annotational Things
(d)   Behavioral Things

5   Which one is the element of a sequence diagram?
(a)   Message

(b)   Aggregation
(c)   Class
(d)   Things

6   Component diagrams do not include:
(a)   Executable components
(b)   Library components
(c)   Database tables
(d)   Web Server

7   Knowing UML means one can handle object-oriented analysis and design.
(a)   True
(b)   False
(c)   Can't Determine
(d)   a or b

8   Class diagrams at conceptual level should include:
(a)   attributes ONLY
(b)   operations ONLY
(c)   both attributes and operations
(d)   None of these

9   Which of the following statements are true for Activity diagrams?
(a)   can be used to depict workflow for a particular business activity
(b)   can be used to explore/discover parallel activities
(c)   do not tell you who does what and are difficult to trace back to object models
(d)   all of the above

10   What are the strengths and weakness of Interaction Diagrams?
(a)   when you want to look at the behavior of several objects within a single use case
(b)   they are good at precise definition of the behavior
(c)   they are good at showing collaborations among objects
(d)   they are good at exploring concurrency and multi-thread issues

11   Package diagrams are designed for:
(a)   organizing a large project into components
(b)   depicting the overall structure of a system
(c)   assisting testing
(d)   assisting deployment
(e)   reducing dependency

12   Which statements are true about Class Diagrams?
(a)   From the conceptual perspective, associations represent conceptual relationships between classes
(b)   Naming role is optional. If missing, it is named after the source class
(c)   Multiplicities are normally 0, 1, *. It does not support for a range number e.g. 2-4

(d)   Within the specification perspective, associations represent methods.

(e)   From the conceptual perspective, associations have no arrow heads meaning that they are non-directional

(f)   From specification perspective, association lines with arrows indicate navigability. The source class has responsibility of 'knowing' the target class but not the other way round.

13   Which statements are true about associations in Class Diagrams?

(a)   It is good practice to name every association and most data modelers prefer to name association using a "verb"

(b)   Most object modelers prefer to assign role name using a "noun" to association

(c)   If there is no name on the role, the implied name is the name of target class

(d)   All of above

14   What is the difference between an attribute and an association?

(a)   From the conceptual perspective, there is a distinct difference.

(b)   From specification and implementation perspective, an attribute is owned by a type while an association allows one to navigate from one type to another

(c)   UML syntax for attribute - visibility name: type = default value

(d)   None of these

15   Which of the following are true about operations of a class?

(a)   At conceptual level, operations are used to specify the interface of a class

(b)   The UML syntax for operation is: visibility name (parameter-list) : return-type-expression {property-string}

(c)   Most people use operation and method interchangeably. Strictly speaking, operation is method declaration while method is referring to the body of procedure.

16   Constraints can be represented in UML by:

(a)   [text string]

(b)   { text string }

(c)   Notes

(d)   constraint

17   Which of the following statements are true?

(a)   As models are refined, it is acceptable to use the same set of class diagrams for different perspectives: conceptual, specification and implementation.

(b)   Maintaining different models for different perspectives will run into a risk of inconsistency among models.

(c)   All of the above

(d)   None of the above.

18   Which of the following statements are true?

(a)   According to Rebecca Wirfs-Brock, a stereotype is a high-level classification of an object such as "controller" and "coordinator".

(b) According to Jacobson, class stereotypes are: interface object, control object and entity object.

(c) Within UML, stereotypes are used for meta-model extensions.

(d) All of the above.

(e) None of the above.

19 Which of the following statement is false?
(a) Aggregation is a special kind of Association.
(b) Both Aggregation and Composition are 'part-of' relationship.
(c) When the whole is deleted, parts in aggregation are also removed
(d) All of the above
(e) None of the above

20 Which of the following statements are true?
(a) Derived associations and attributes can be found in class diagrams and interaction diagrams.
(b) Derived associations and attributes can be found in class diagrams only.
(c) Within a specification perspective, derived associations and attributes indicate an implementation option e.g. optimization and performance considerations.
(d) Within a specification perspective, derived associations and attributes indicate a constraint between values.

21 Which of the following statement is true about visibility?
(a) UML uses # for public element
(b) UML uses - for private element
(c) UML uses * for protected element
(d) UML adopts Java's convention
(e) All of the above

22 Which of the following statement are false about interaction diagrams?
(a) Interaction diagrams is the superset of Sequence diagrams and Collaboration diagrams
(b) An interaction diagram captures the behavior of a single or more use cases
(c) Within Sequence Diagram, each vertical line is called the object's lifeline; each message is represented by an arrow between the lifelines.
(d) Condition is represented by { xxx }
(e) Iteration is represented by *
(f) Self-delegation message is sending message to itself
(g) Return messages are implied and it is unnecessary to show them

23 Which of the following statement are false about sequence diagrams?
(a) Sequence Diagrams can also capture concurrent activities.
(b) Activations should not be used for concurrent activities
(c) Asynchronous message is represented by "half-arrow";
(d) Asynchronous message blocks the caller until it is completed.

(e) Asynchronous message must create a new thread, create a new object and communicate with a thread that is already running

(f) Object deletion, indicated by a large X, must be self-delegation (cleaning up your own mess)

24 Which of the following statement are true about collaboration diagrams?

(a) Basically sequence diagrams and collaboration diagrams are used to depict objects interaction. Sequencing is indicated by decimal numbering scheme (UML standard)

(b) The numbering scheme starts from 0

(c) UML object naming syntax - objectName : ClassName

(d) Collaboration Diagrams are preferred because the layout indicates how objects are statically connected

(e) Interaction diagrams can support complex conditional or looping behavior either by creating separate diagrams for each scenario or by inserting conditions on message [condition]

25 When to use Interaction Diagrams?

(a) When you want to look at the behavior of several objects within a single use case or several use cases

(b) They are good at showing collaborations among objects; they are not so good at conditions and looping

(c) They are good to look at behavior of a single object across many use cases.

(d) All of the above

(e) None of the above

26 Which of the following statements are true about Package Diagrams?

(a) Package in UML is similar to Java, to avoid name collision

(b) Package is a grouping mechanism that can be applied to classes only

(c) Package diagrams are particularly useful for testing

(d) Package dependency and class dependency are not the same.

(e) Dependency is indicated by a solid line with arrow head at one end

(f) Package is an object-oriented approach in managing system structure

(g) A package may contain class(es), list of classes, another package

(h) Whenever a class diagram that encompasses the whole system is no longer legible on a single letter-size sheet of paper.

27 Which of the following statements are false about State Diagrams?

(a) It is used to depict all possible states of a particular object and which event is causing the object to transition to that state

(b) More advanced State Diagrams are drawn for multiple objects

(c) A state diagram may contain the following elements: Start (solid black-circle), State (round-cornered rectangle), transition (solid line with arrow-head) and End (double circle with inner solid black-circle).

(d) UML transition syntax has 3 parts: Event [Guard] / Action, all of which are optional

(e) Actions are associated with transitions and are considered to be processes that occur quickly and are not interruptible.

28   Which of the following statements are true?
        (a)   State diagrams are good at describing the behavior of an object across several use
                cases.
        (b)   To describe behavior that involves a number of objects in a use case, use
                interaction diagrams
        (c)   To describe behavior that involves a number of objects in several use cases, use
                activity diagrams
        (d)   UI and control objects are ideal candidates to be depicted by a state diagram.
        (e)   All of the above
        (f)   None of the above

29   Which of the following statements are false about Activity Diagrams?
        (a)   From conceptual perspective, an activity is some task that needs to be done,
                whether automated or manual
        (b)   From specification perspective, an activity is a method of a class
        (c)   It is illegal to have an activity followed by another activity
        (d)   Activity diagrams may contain the following elements: activity, trigger (solid-line
                with arrow at one end), guard ([condition]), decision (diamond), synchronization
                bar, start and end point
        (e)   Activity diagram could depict parallel activities and it imposes which one should
                be executed first

30   Which of the following statements are true?
        (a)   Modeling language is a notation, a way you use to express your thinking and
                others can understand.
        (b)   Process is "Who is doing What and How" do you organize OOP activities, such as
                RUP and waterfall process.
        (c)   Methodology = Process + Notatione.g.Booch Method = Booch Process + Booch
                Notation
        (d)   All of the above

31   Which of the following statements are false about the following Traceability through life
        cycle diagram? Business Use Case -> System Use Case -> Flow of Events ->
        Sequence/Collaboration Diagram -> Class Diagram -> Component Diagram -> Code
        (a)   Each of the system use cases should be able to be traced back to a business use
                case.
        (b)   The mapping between Business Use Cases and System Use Cases is one-to-one.
        (c)   Not all business use cases will be supported by system use cases.
        (d)   Each functional requirement MUST be traced to a system use case.

32   What methods must be implemented by the CreditProcessor class in the payment
        sequence diagram?
        (a)   checkCredit, generateConfirmationCode, displayCofirmation
        (b)   checkCredit, generateConfirmationCode
        (c)   checkCredit, generateConfirmationCode, reserveSeat
        (d)   checkCredit, reserveSeat, displayCofirmation

(e)   checkCredit, reserveSeat

33   What is the minimum number of threads that can be running during the execution of the activity diagram?
(a)   2
(b)   3
(c)   1
(d)   4
(e)   5

34   Which of the statements are false about derived elements?
(a)   At the analysis level, a derived element is semantically unnecessary.
(b)   In the design-level model, a derived element represents an optimization.
(c)   At the analysis level, a derived element is semantically necessary.

35   Consider the following statement of requirements for the first iteration of a Library System. Books and Journals: The library contains books and journals. It may have several copies of a given book. Some of the books are for short term loans only. All other books may be borrowed by any library member for three weeks. Members of the library can normally borrow up to six items at a time, but members of staff may borrow upto twelve items at one time. Only members of staff may borrow journals. Borrowing : The system must keep track of when books and journals are borrowed and returned, enforcing the rules described above. Which of the following classes are part of the Library System?
(a)   book, journal, copy (of book), library member, member of staff
(b)   item, copy (of book), library member, member of staff
(c)   item, library member, member of staff
(d)   system, rule, week, item, member

36   Which of the following statements are true?
(a)   Abstraction is when a client of a module does NOT need to know more than is in the interface.
(b)   Abstraction is when a client of a module does need to know more than is in the interface.
(c)   Encapsulation is when a client of a module is able to know more than is in the interface.

37   Consider the mirror hierarchy shown in the diagram. In this case, the type of equipment contained in a laboratory reflects the type of laboratory. According to the Liskov's Substitution Principle, you should be able to substitute instances of a subclass for its superclass, which indicates that you should be able to use nuclear equipment wherever you can use equipment. According to the figure, you can use equipment in a lab, therefore, you can also use nuclear equipment in a lab. Which design imposes the constraint that nuclear equipment can only be used in a nuclear lab?
(a)   Design N1
(b)   Design N2
(c)   Design N3

(d)   Design N4

38   Which of the following statement is false?
(a)   Identity is used to compare Reference objects. Equality test operator is used to compare Value objects.
(b)   Value objects should be immutable.
(c)   In UML, associations are usually used for value objects and attributes are used for reference objects.

39   Which of the following statements are true?
(a)   Generalization is transitive; classification is NOT transitive.
(b)   Generalization is transitive; classification is transitive.
(c)   We can combine generalization followed by a classification, but not vice-versa.
(d)   Generalization is NOT transitive; classification is transitive.

40   Use case: Purchase Ticket Actors : Customer Preconditions: The customer is logged onto the systeem. The customer profile already exists. Post conditions: The ticket is sold and the seats are assigned to the customer and the system is updated. Primary Flow: 1. The use case begins when the customer selects the option to view flight information. 2. The system prompts for the departure and destination cities and the departure and return dates. 3. The user enters the departure and destination city, departure date, and return date. 4. The system displays a list of available flights, including the fare. 5. The user selects the flight they would like to reserve. 6. The system displays all available fare options for that flight. 7. The user selects the fare option they would like to reserve. 8. The system displays the fare that the user will pay. 9. The user confirms the rate. 10. The system pormpts for a credit card type, number, name and expiration date. 11. The user enters the card type, number, name, and expiration date. 12. The system submits the credit purchase. 13. The system reserves a seat on the plane for the user. 14. The system generates and displays a confirmation code to the user. 15. The user confirms receipt of the code. 16. The use case ends. Which of the following is the BEST list of candidate interaction diagrams to support the use case?
(a)   select departure and destination cities and departure and return dates, select flight, confirm the rate, enter credit information, seat is reserved, confirmation number is generated and the confirmation is displayed
(b)   select departure and destination cities and departure and return dates, select flight, confirm the rate, enter credit information, seat is reserved
(c)   select flight, confirm the rate, enter credit information, seat is reserved, confirmation number is generated and the confirmation is displayed
(d)   select departure and destination cities and departure and return dates, select flight, confirm the rate, enter credit information, seat is reserved, confirmation number is generated and the confirmation is displayed

41   When does the testing process stops?
(a)   When resources (time and budget) are over
(b)   When some coverage is reached

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(c)   When quality criterion is reached
(d)   Testing never ends

42   Which of the following is not a part of a test design document?
(a)   Test Plan
(b)   Test Design Specification
(c)   Test Case Specification
(d)   Test Log

43.   Which of the following are the valid relationships in Use Case Diagrams
(a)   Generalization
(b)   Include
(c)   Extend
(d)   All of the mentioned

44   _____ allows us to infer that different members of classes have some common characteristics.
(a)   Realization
(b)   Aggregation
(c)   Generalization
(d)   Dependency

45   Which of the following is golden rule for interface design?
(a)   Place the user in control
(b)   Reduce the user's memory load
(c)   Make the interface consistent
(d)   All of the mentioned

46   Which of the following is not a design principle that allows the user to maintain control?
(a)   Provide for flexible interaction
(b)   Allow user interaction to be interrupt-able and undo-able
(c)   Show technical internals from the casual user
(d)   Design for direct interaction with objects that appear on the screen

47   Which of the following is not a user interface design process?
(a)   User, task, and environment analysis and modeling
(b)   Interface design
(c)   Knowledgeable, frequent users
(d)   Interface validation

48   When users are involved in complex tasks, the demand on _____ can be significant.
(a)   short-term memory
(b)   shortcuts
(c)   objects that appear on the screen
(d)   all of the mentioned

49   What establishes the profile of end-users of the system?
        (a)   design model
        (b)   user's model
        (c)   mental image
        (d)   system image

50.   What combines the outward manifestation of the computer-based system, coupled with all supporting information that describe system syntax and semantics?
        (a)   mental image
        (b)   interface design
        (c)   system image
        (d)   interface validation

51   A constraint extends the _____ of a UML building bock.
        (a)   Vocabulary
        (b)   Properties
        (c)   Sementics
        (d)   Definition

52   The process of compartmentalizing the elements of an abstraction that constitute its structure and behavior is called as
        (a)   Hierarchy
        (b)   Encapsulation
        (c)   Modularity
        (d)   Entity Abstraction

53   Single inheritance, Multiple inheritance, and Aggregation comes under _____.
        (a)   Modularity
        (b)   Typing
        (c)   Hierarchy
        (d)   None of the mentioned

54   What is that concept in type theory in which a single name may denote objects of many different classes that are related by some common super class referred to _____.
        (a)   Monomorphism
        (b)   Type Checking
        (c)   Polymorphism
        (d)   Generalization

55   What is the programming style of the object oriented conceptual model?
        (a)   Invariant relationships
        (b)   Algorithms
        (c)   Classes and objects
        (d)   Goals, often expressed in a predicate calculus.

56   In which of the following mechanisms, types of all variables and expressions are fixed at compilation time.
(a)   Strong Typing
(b)   Weak Typing
(c)   Static Binding/ early binding
(d)   Dynamic Binding/ late binding

57   Which of the following statements about Persistence is correct?
(a)   It is the enforcement of the class of an object, such that objects of different types may not be interchanged, or at the most they may be interchanged only in very restricted ways.
(b)   It is the property of an object through which its existence transcends time and/or space.
(c)   It is the property that distinguishes an active object from one that is not active.
(d)   All of the mentioned

58   A_____ is a contract or an obligation of a class.
(a)   constraint
(b)   Note
(c)   Responsibility
(d)   None

59   In which of the following mechanisms, types of all variables and expressions are fixed at compilation time.
(a)   Strong Typing
(b)   Weak Typing
(c)   Static Binding/ early binding
(d)   Dynamic Binding/ late binding

60   When two or more classes serve as base class for a derived class, the situation is known as _____.
(a)   Multiple inheritance
(b)   Polymorphism
(c)   Encapsulation
(d)   Hierarchical inheritance
(e)   None of these

61   Which of the following is true?
(a)   Class Diagram are graphical form of class models
(b)   Object Diagram are graphical forms of object models
(c)   All of the mentioned
(d)   none of the mentioned

62   Which of these are types of class model used in object oriented analysis?
(a)   Analysis Class models/ Conceptual Models
(b)   Design Class Models

(c)   Implementation Class Models
(d)   All of the mentioned

63   Which of the following represents the use of Conceptual models during product design?
(a)   Understanding the problem design
(b)   Setting Data Requirements
(c)   Validating Requirements
(d)   All of the mentioned

64   Top-down programming is
(a)   a group of related fields
(b)   a map of the programmer's view of the data
(c)   an approach in which the top module is first tested then program modules are added from the highest level to the lowest level
(d)   a series or group of components that perform one or more operations of a more complex system
(e)   None of the above

65   A decision table facilitates conditions to be related to
(a)   Actions
(b)   Programs
(c)   Tables
(d)   Operation
(e)   None of the above

66   Which of the following appropriately explains the desirable characteristic of good system design?
(a)   Modular approach
(b)   Proper documentation
(c)   Conversion
(d)   Long discussions
(e)   None of the above

67   In the system concepts, term Integration
(a)   implies structure and order
(b)   Refers to the manner in which each component functions with other components of the system.
(c)   Means that parts of the computer system depend on one another.
(d)   refers to the holism of systems
(e)   None of the above

68   Top down approach is used for
(a)   Development
(b)   Identification of faults
(c)   Testing and validation
(d)   Reverse engineering

69   Coupling and cohesion can be represented using a
        (a)   Cause-effect graph
        (b)   Dependence matrix
        (c)   Structure chart
        (d)   SRS

70   Which are the tools not used for System Analysis
        (a)   System - test data
        (b)   Decision table
        (c)   Data Flow Diagram
        (d)   Flowcharts
        (e)   None of the above

Ans.   (1)(d), (2)(d), (3)(a), (4)(c), (5)(a), (6)(d), (7)(a), (8)(a), (9)(a), (10)(b), (11)(c), (12)(b),
        (13)(a), (14)(b), (15)(b), (16)(a), (17)(a), (18)(a), (19)(a), (20)(b), (21)(a), (22)(b),
        (23)(b), (24)(b), (25)(a), (26)(c), (27)(b), (28)(a), (29)(b), (30)(b), (31)(b), (32)(c),
        (33)(c), (34)(a), (35)(a), (36)(a), (37)(a), (38)(c), (39)(a), (40)(a), (41)(c), (42)(d), (43)(d),
        (44)(c), (45)(d), (46)(c), (47)(c), (48)(a), (49)(b), (50)(c), (51)(c), (52)(b), (53)(c),
        (54)(c), (55)(c), (56)(c), (57)(c), (58)(c), (59)(c), (60)(a), (61)(d), (62)(c), (63)(d),
        (64)(d), (65)(c), (66)(a), (67)(a), (68)(d), (69)(a), (70)(b)

(c)   Fill in the Blanks:

1   UML stands for _____
2   _____ is a collection of operations that specify a service of a class or components.
3   _____things are the dynamic parts of UML models.
4   _____is the number of instances participating in the relationship.
5   Initial state is also called as a _____.
6   The _____ activities are the one that occur simultaneously.
7   A_____ extends the vocabulary of UML.

Ans.   (1)(Unified Modelling Language), (2)(Interface), (3)(Behavioral), (4)(Multiplicity),
        (5)(Pseudostate), (6)(Concurrent), (7)(stereotype)

II   Short Answer Type Questions:

1   What is modeling?
2   What is UML?
3   Distinguish between Structural and Behavioral things.
4   What are Annotational things? Give an example.
5   Difference between association and generalization.
6   What is realization? Give an example.
7   What do you mean by aggregation?
8   Compare class diagram and object diagram.
9   What are extensibility mechanisms in UML?

10   What are history states?
11   Difference between component and deployment diagram.
12   Difference between composition and aggregation.
13   What are superstates?
14   Explain nested states with example.
15   What are the advantages of UML?
16   Define Model. What are the advantages of modeling the system?
17   Describe various views in UML architecture.
18   Describe the consistency of common mechanism used in UML.
19   What are the various notations used to represent Actor?
20   Give example for relationships used in Use Case diagram.
21   Define class. Describe class notation with example.
22   When will you use collaboration diagram to show interaction of classes?
23   How the activity diagram is used to represent complex functionality?
24   What is swim lane?
25   What is CRC? What are the 3 steps in CRC process?
26   What are the object modeling techniques?
27   What is the role of swim lanes and guard conditions in activity diagram?
28   Explain the difference among bidirectional, unidirectional and reflexive associations?
29   What is Super state and composite state?
30   Explain the basic blocks of UML? Discuss about UML deployment and component diagrams.
31   What do you mean by unified process? Explain various phases of unified process in OOAD.
32   Explain Port & Dependency Component Diagram.
33   Explain Extends, Uses & Grouping Relationship in Use cases.
34   State Super State with state diagram.
35   Explain Composite State with example?
36   What is Conceptual Modeling with diagram?
37   State Collaboration diagram?
38   Difference between Activity diagram and Sate chart diagram?
39   Differentiate between preventive and perfective maintenance.
40   What are the components of software maintenance?
41   Is software crisis related to software maintenance? Justify your answer.
42   Discuss reverse engineering and re-engineering.
43   Discuss the suggestions that may be useful for the modification of legacy code.

III   Long Answer Type Questions:

1   Discuss the conceptual model of UML.
2   What are the various kinds of grouping things? Explain in detail.
3   Explain the various UML diagrams with example.
4   Discuss the features of UML.
5   What are activity diagrams? Discuss its various elements with example.
6   Explain deployment diagrams with the help of an example.
7   Discuss the vocabulary of UML.

8   What are the various rules of the UML? Explain in detail.
9   What are collaboration diagrams? Discuss.
10   What are sequence diagrams? Discuss its various elements with example.
11   What is architecture of UML? How many types of diagrams are used in UML?
12   What are the basic building blocks of UML? Develop a UML diagram for Library Information System?
13   Critically evaluate and analyze model construction using UML. How UML catalyze the finalization of the basic structure of a model. Explain using appropriate illustration.
14   What are the UML foundations?
15   Can UML be a 'Complete Solution Provider'? Support your answer with proper justification.
16   Summarize the benefits of UML diagrams.
17   How UML diagrams are applied to various phases of software development phases?
18   How patterns and frameworks are modeled in UML?
19   What does an activity diagram represent? What are the Transition, Forks, Join, Swim lanes and object in activity diagram. Explain with suitable diagram.
20   Explain the significance of uses causes and collaboration.
21   Differentiate between Sequence diagram & Collaboration diagram.
22   Difference between Full Scale Test, Performance Test & Overload Test.
23   What is UML? Draw 4n+1 Architecture of UML.
24   Compare OMT, OOSE, OOD& OOSA method of Object Oriented Analysis & Design.
25   What is Collaboration Diagram? Draw the collaboration diagram to organize a seminar in the college.
26   A University gives a loan to students before getting a loan, there is an evaluation process after which if the loan is approved, agreement is reached. A transaction records each step of the evaluation process, and another transaction records the over all loan agreement. A student can take any number of loans, but only one can be active t any time. Each loan is initiated by a separate transaction. Then, the student repays the loan with a series of repayments. Each repayments transaction is recorded. After the complete settlements, finally the loan account is closed.
27   What is collaboration diagram? Draw the collaboration diagram for apply for loan and balance enquiry use case.
28   Draw Object diagram and Class Diagram for student Loan System .
29   What is Analysis Model? Develop Analysis Model for Banking System.
30   Discuss various problems during maintenance. Describe some solutions to these problems.
31   How iterative enhancement model is helpful during maintenance? Explain the   various stage cycles of this model.
32   Describe various maintenance cost estimation models.
33   Write a short note on Baledy and Lehman model for calculation of maintenance effort.
34   Do you agree with the statement: "System testing can be considered a pure black-box test? Justify your answer.

IV   Practical Questions:

1   Draw Sequence diagram for Cash Withdrawal from ATM machine.

2   A product is to be installed to control n elevators in a building with m floors. The problem concerns the logic required to move elevators between floors according to the following constraints:

      (i)   Each elevator has a set of m buttons, one for each floor. These illuminate when passed and cause the elevator to visit the corresponding floor. The illumination is cancelled when the elevator visits the corresponding floor.

      (ii) Each floor, except the first floor and top floor, has two buttons, one to request an up-elevator and one to request a. down - elevator. These buttons illuminate when passed. The illumination is cancelled when an elevator visits the floor and then moves in the desired direction.

      (iii) When an elevator has no request it remains at its current floor with its door Closed.

      Given this problem description identify classes and draw class diagram to show the relationship among the classes. You can make suitable assumptions regarding the details of various features of Elevator but you must clearly write down the assumptions you make.

3   Draw a class and object diagram for the library management system.

4   Draw a sequence diagram for taking out of the cash from ATM.

5   Draw a sequence diagram for the execution of a process by the operating system?

6   Draw a class diagram for railway reservation system.

7   Draw a sequence diagram for Prototype model in software engineering.

8   Draw a use case diagram and a class diagram for the steps followed in website development.

9   Draw a collaboration diagram of calculating the salary of an employee.

10   Draw a state chart diagram for the various states of a process during its execution.

11   Draw an activity diagram for registration of an user account on any particular website.

12   Prepare a class diagram for dining philosopher problem. There are 5 philosophers and 5 forks around a circular table. Each philosopher has access to 2 forks, one on either side. Each fork is shared by 2 philosophers. Each fork may be either on the table or in use by one philosopher. A philosopher must have 2 forks to eat.

13   Draw an activity Diagram for the use case given below:

      When an order is received Each Line Item on the order is checked to see if there are goods in stock. If so the goods are assigned to the order. If this assignment sends the quantity of those goods in stock below the reorder level, the goods are reordered. While doing this the payments is checked whether it is ok. If the payment is ok and there are goods in stock the order is dispatched. If the payments are ok and there are not goods, the order is left waiting. If the payments are not ok the order is cancelled.

14   Draw the Activity diagram for MCA Admission procedure is controlled by ABC University.

QUESTION BANK

WEB TECHNOLOGIES

MCA-210

QUESTION BANK
WEB TECHNOLOGIES - MCA 210
MCA IV

UNIT – I

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   What is the correct JavaScript syntax to write "Hello World"?
(a)   "Hello World"
(b)   response.write("Hello World")
(c)   document.write("Hello World")
(d)   ("Hello World")

2   Where is the correct place to insert a JavaScript?
(a)   the<body> section
(b)   the<head> section
(c)   Both the <head> section and the <body> section are correct
(d)   None of the above

3   How do you write "Hello World" in an alert box?
(a)   alertBox("Hello World")
(b)   alert("Hello World")
(c)   alertBox="Hello World"
(d)   msgBox("Hello World")

4   How do you create a function?
(a)   function:myFunction()
(b)   functionmyFunction()
(c)   function=myFunction()
(d)   Create function myFunction()

5   How do you write a conditional statement for executing some code if "i" is equal to 5?
(a)   if i= =5 then
(b)   if i=5
(c)   if i=5 then
(d)   if (i= =5)

6   What is the correct JavaScript syntax for opening a new window called "w2"?
(a)   w2=window.new("http://www. yahoo.com");
(b)   w2=open("http://www. yahoo.com");
(c)   w2=new("http://www. yahoo.com");
(d)   w2=window.open("http://www.yahoo.com");

7   How do you write a conditional statement for executing some code if "i" is NOT equal to 5?
    (a)   if =! 5 then
    (b)   if (i != 5)
    (c)   if (i <> 5)
    (d)   if<>5

8   How does a "while" loop start?
    (a)   while (i<=10;i++)
    (b)   while i=1 to 10
    (c)   while (i<=10)
    (d)   while(i=0;i<=10;i++)

9   What is the correct way to write a JavaScript array?
    (a)   var txt = new Array:1=("tim")2=("kim")3=("jim")
    (b)   var txt = new Array(1:"tim",2:"kim",3:"jim")
    (c)   var txt = new Array="tim","kim","jim")
    (d)   var txt = new Array("tim","kim","jim")

10   What is the correct JavaScript syntax to insert a comment that has more than one line?
    (a)   <!--This comment has
           more than one line-->
    (b)   /*This comment has
           more than one line*/
    (c)   //This comment has
           more than one line//
    (d)   <//This comment has
           more than one line//>
11   What is the correct HTML for making a text input field?
    (a)   <input type="textfield" />
    (b)   <textinput type="text" />
    (c)   <textfield>
    (d)   <input type="text" />

12   What does HTML stand for?
    (a)   Hyperlinks and Text Markup Language
    (b)   Home Tool Markup Language
    (c)   Hyper Text Markup Language

13   Who is making the Web standards?
    (a)   Mozilla
    (b)   Microsoft
    (c)   The World Wide Web Consortium

14   Choose the correct HTML tag for the largest heading
    (a)   <h6>

(b)   `<heading>`
(c)   `<head>`
(d)   `<h1>`

15   What is the difference between XML and HTML?
       (a)   HTML is used for exchanging data, XML is not.
       (b)   XML is used for exchanging data, HTML is not.
       (c)   HTML can have user defined tags, XML cannot

16   What is the correct HTML tag for inserting a line break?
       (a)   `<br />`
       (b)   `<break />`
       (c)   `<lb />`

17   What is the preferred way for adding a background color in HTML?
       (a)   `<body background="yellow">`
       (b)   `<background>yellow</background>`
       (c)   `<body style="background-color:yellow">`

18   What is the correct HTML for creating a hyperlink?
       (a)   `<a name="">A</a>`
       (b)   `<a>B</a>`
       (c)   `<a href="http://www.example.com">example</a>`
       (d)   `<a url="http://www.example.com">example</a>`

19   .How can you make a list that lists the items with bullets?
       (a)   `<ol>`
       (b)   `<list>`
       (c)   `<ul>`
       (d)   `<dl>`

20   What is the correct HTML for inserting an image?
       (a)   `<image src="image.gif" alt="MyImage" />`
       (b)   `<imghref="image.gif" alt="MyImage" />`
       (c)   `<img alt="MyImage">image.gif</img>`

21   All HTML tags are enclosed in what?
       (a)   `<>`
       (b)   `<?php and ?>`
       (c)   # and #
       (d)   `<!-- and -->`

22   Why so JavaScript and Java have similar name?
       (a)   JavaScript is a stripped-down version of Java
       (b)   JavaScript's syntax is loosely based on Java's
       (c)   They both originated on the island of Java

(d)   None of the above

23   When a user views a page containing a JavaScript program, which machine actually
       executes the script?
       (a)   The User's machine running a Web browser
       (b)   The Web server
       (c)   A central machine deep within Netscape's corporate offices
       (d)   None of the above

24   _____ JavaScript is also called client-side JavaScript.
       (a)   Microsoft
       (b)   Navigator
       (c)   LiveWire
       (d)   Native

25   _____ JavaScript is also called server-side JavaScript.
       (a)   Microsoft
       (b)   Navigator
       (c)   LiveWire
       (d)   Native

26   What are variables used for in JavaScript Programs?
       (a)   Storing numbers, dates, or other values
       (b)   Varying randomly
       (c)   Causing high-school algebra flashbacks
       (d)   None of the above

27   _____ JavaScript statements embedded in an HTML page can respond to user events
       such as mouse-clicks, form input, and page navigation.
       (a)   Client-side
       (b)   Server-side
       (c)   Local
       (d)   Native

28   What is mean by "this" keyword in javascript?
       (a)   It refers current object
       (b)   It refers previous object
       (c)   It is variable which contains value
       (d)   None of the above

29   In JavaScript, Window.prompt() method return true or false value?
       (a)   False
       (b)   True

30   <script language="javascript">
       function x()

```
{
document.write(2+5+"8");
}
</script>
```

(a)   258
(b)   Error
(c)   7
(d)   78

31   To interpret the HTML code, and get a visual layout we need a:
(a)   Turbo-C Compiler
(b)   Any Text Editor
(c)   Any Web-Browser
(d)   Google's V8 engine

32   The HTML syntax of HTML5 requires a .... to be specified to ensure that the browser
renders the page in standard mode.
(a)   DOCTYPE
(b)   HEAD
(c)   BODY
(d)   TITLE

33   The doctype declaration for the HTML is
(a)   case-sensitive
(b)   case-insensitive
(c)   case-impsensitive
(d)   None of the above

34   The DIV element is a
(a)   block-level element
(b)   High-level element
(c)   low-level element
(d)   middle-level element

35   Which element is an inline element?
(a)   strong element
(b)   span element
(c)   div element
(d)   All of the above

36   The Disadvantages of Cascading Style Sheets is
(a)   Low Performance:
(b)   High Performance:
(c)   Browsers Compatibility:
(d)   All of the above

37   The id selector is used to specify a style for
        (a)   multiple,common element
        (b)   multiple,unique element
        (c)   single, common element
        (d)   single, unique element

38   Match the following JavaScript function with their description. i) onblur a) script runs
        when element changes ii) onmouseup b) script runs when the form is reset iii) onchange
        c) script runs when the element lost focus. iv) onreset d) script runs when mouse button is
        released.
        (a)   i-d, ii-c, iii-a, iv-b
        (b)   i-b, ii-c, iii-a, iv-d
        (c)   i-c, ii-d, iii-a, iv-b
        (d)   i-a, ii-c, iii-d, iv-b

39   What does NaN function do in JavaScript?
        (a)   Return true if the argument is not a number.
        (b)   Return false if the argument is not a number.
        (c)   Return true if the argument is a number.
        (d)   None of the above

40   State whether the following statements are True or False. i) JavaScript ignores spaces,
        tabs and newlines that appear in JavaScript program. ii) Semicolons are necessary while
        writing JavaScript statements. iii) JavaScript is a case-sensitive language.
        (a)   i- True, ii- False, iii-True
        (b)   i- False, ii- True, iii-True
        (c)   i-True, ii-True, iii-False
        (d)   i- False, ii- False, iii-True

41   Marquee is a tag in HTML to
        (a)   Mark the list of items to maintain inqueue
        (b)   Mark the text so that it is hidden in browser
        (c)   Display text with scrolling effect
        (d)   None of above

42   There are ____ different of heading tags in HTML
        (a)   4
        (b)   5
        (c)   6
        (d)   7

43   Which tag creates a check box for a form in HTML?
        (a)   <checkbox>
        (b)   <input type="checkbox">
        (c)   <input=checkbox>
        (d)   <input checkbox>

44   \<b\> tagsmakes the enclosed text bold. What is other tag to make text bold?
       (a)   \<strong\>
       (b)   \<dar\>
       (c)   \<black\>
       (d)   \<emp\>

45   Which attribute is used to name an element uniquely?
       (a)   class
       (b)   id
       (c)   dot
       (d)   all of above

46   \<UL\> … \</UL\> tag is used to _____
       (a)   display the numbered list
       (b)   underline the text
       (c)   display the bulleted list
       (d)   bold the text

47   DHTML consists of which two components together?
       (a)   Java and HTML
       (b)   JavaScript and HTML
       (c)   XML and XHTML
       (d)   HTML and CSS

48   The following statements are about three important browser objects in JavaScript.
       I.   window object : The highest of all objects in the client-side JavaScript object
               hierarchy.
       II.   navigator object : A collection of information about the browser. Useful in
               browser sniffing.
       III.   document object : Provides access to the document being viewed.
               Which of the above statements is/are true?
       (a)   Only (I) above
       (b)   Only (II) above
       (c)   Only (III) above
       (d)   Both (I) and (II) above
       (e)   All (I), (II) and (III) above.

49   Which tag allows you to add a row in a table?
       (a)   \<td\> and \</td\>
       (b)   \<cr\> and \</cr\>
       (c)   \<th\> and \</th\>
       (d)   \<tr\> and \</tr\>

50   To create a combo box (drop down box) which tag will you use?
       (a)   \<select\>
       (b)   \<list\>

(c) <input type="dropdown">
(d) all of above

51 What is empty elements in HTML?
 (a) An element with no tag
 (b) An element with no type
 (c) An element with no content
 (d) An element with no comment

52 What is the use of alt attribute in HTML?
 (a) alt attribute specifies an alternate text for an image
 (b) alt attribute specifies an alternate link for an image
 (c) alt attribute specifies an alternate image for an image
 (d) alt attribute specifies an alternate source for an image

53 We can redirect the webpage in JavaScript by using _____method.
 (a) Window.reload
 (b) Window. Location
 (c) Page. Location
 (d) url.newliocation

54 _____ is a built-in JavaScript function which can be used to execute another function after a given time interval.
 (a) Timeout()
 (b) TimeInterval()
 (c) setTimeout()
 (d) all of the above

55 We can refresh the webpage in JavaScript by using _____ method.
 (a) Window.reload
 (b) Location.reload
 (c) Window.refresh
 (d) Page.refresh

56 What is the purpose of <noscript> tag?
 (a) Prevents scripts on the page from executing.
 (b) Enclose text to be displayed by non-JavaScript browsers.
 (c) Suppresses the result to be displayed on the web page.
 (d) None of the above.

57 JavaSript entitites start with _____ and end with _____
 (a) Semicolon, colon
 (b) Semiolon, Ampersand
 (c) Ampersand, colon
 (d) Ampersand, semicolon

58   Which of the following is a server side JavaScript object?
        (a)   Function
        (b)   File
        (c)   FileUpload
        (d)   Date

59   What type of image map could be used with JavaScript?
        (a)   Client side image maps
        (b)   Server side image maps
        (c)   Both (a) and (b)
        (d)   Localhost image maps

60   Which of the following are capable of JavaScript functions?
        (a)   Returning multiple values
        (b)   Accepting parameters and returning values
        (c)   Accepting parameters
        (d)   All of the above

61   Javascript is _____ language.
        (a)   Programming
        (b)   Application
        (c)   None of These
        (d)   Scripting

62   JavaScript is _____ **Side Scripting Language**.
        (a)   Server
        (b)   ISP
        (c)   None of These
        (d)   Browser

63   JavaScript is designed for following purpose –
        (a)   To Style HTML Pages
        (b)   To add interactivity to HTML Pages.
        (c)   To Perform Server Side Scripting Opertion
        (d)   To Execute Query Related to DB on Server

64   Select Appropriate Option(s) : JavaScript is can be written –
        (a)   directly into JS file and included into HTML
        (b)   None of these
        (c)   directly on the Server Script
        (d)   directly into HTML pages

65   JavaScript is an _____ **language**.
        (a)   compiled
        (b)   interpreted

66   Cost for Using JavaScript in your HTML is _____ .
        (a)   Its Free !!!
        (b) $10 / Year
        (c) $15 / Year
        (d) $5 / Year

67   JavaScript Code is written inside file having extension _____.
        (a)   .jvs
        (b)   .javascript
        (c)   .js
        (d)   .jsc

68   Why JavaScript is called as Lightweight Programming Language ?
        (a)   because JS is available free of cost.
        (b)   because JS is client side scripting
        (c)   because we can add programming functionality inside JS
        (d)   because JS can provide programming functionality inside but up to certain extend

69   Choose appropriate Option(s) : JavaScript is also called as _____.
        (a)   None of These
        (b)   Server Side Scripting Language
        (c)   Client Side Scripting Language
        (d)   Browser Side Scripting Language

70   Local Browser used for validations on the Web Pages uses _____.
        (a)   Java
        (b)   CSS
        (c)   HTML
        (d)   JS

Ans.   (1)(c), (2)(c), (3)(b), (4)(b), (5)(d), (6)(d), (7)(b), (8)(c), (9)(d), (10)(b), (11)(d), (12)(c),
        (13)(c), (14)(d), (15)(b), (16)(a), (17)(c), (18)(c), (19)(c), (20)(a), (21)(a), (22)(b), (23)(a),
        (24)(b), (25)(c), (26)(a), (27)(a), (28)(a), (29)(a), (30)(d), (31)(c), (32)(a), (33)(b), (34)(a),
        (35)(b), (36)(c), (37)(d), (38)(c), (39)(a), (40)(a), (41)(c), (42)(c), (43)(b), (44)(a),
        (45)(b), (46)(c), (47)(b), (48)(e), (49)(d), (50)(a) ,(51)(c), (52)(a), (53)(b), (54)(c),
        (55)(b), (56)(b), (57)(d), (58)(b), (59)(a), (60)(c), (61)(d), (62)(d), (63)(b), (64)(d),
        (65)(b), (66)(a), (67)(c), (68)(d), (69)(c), (70)(d)

(b)   Fill in the Blanks:

1   CSS stands for_____.
2   In an HTML document the correct place to refer to an external style sheet is
        _____section.
3   _____tag is used to define an internal style sheet.
4   _____attribute is used to define inline styles.
5   A user request form can be created with the _____HTML tags.

6   _____are used to store values that can be used in other parts of a program.

7   _____are named collections of data that have properties and may be accessed via methods.

8   JavaScript event handlers can be divided into two types _____ and _____.

9   _____object is used to access information about the browser that is executing the current script.

10   The method property is used to specify the method used to send data, which can be _____or _____.

Ans.   (1)(Cascading Style Sheets), (2)(head), (3)(Style), (4)(style), (5)(<Form>…</form>), (6)(Variables), (7)(Objects), (8)(Interactive, Non-Interactive), (9)(Navigator), (10)(Get, Post)

II   Short Answer Type Questions:

1   What is the JavaScript? When do we use JavaScript?
2   Is Java and JavaScript same? Give Reasons. How to use JavaScript on HTML pages?
3   What are frames in HTML? How do we create them?
4   How do we write comments in JavaScript?
5   How do we create lists in HTML?
6   How do we define a JavaScript Variable? What is the Lifetime of a JavaScript variable?
7   Write a short note on Built-in functions.
8   What are Cookies?
9   How do we use RegExp Object in JavaScript?
10   What are validations?
11   What is CSS? How do we define grouping in CSS?
12   What is VB Script?
13   What is a class selector?
14   What is the relationship between CSS and HTML?
15   What are the advantages of using CSS?
16   Is JavaScript Case-Sensitive or not? Is CSS case sensitive?
17   What is Internet?
18   What is Intranet?
19   What is the difference between HTML and DHTML?
20   Differentiate between static and dynamic web pages.
21   What is Document Object Model?
22   Can we have animated web pages? If yes, how? If no, why?
23   Difference between client side scripting and server side scripting.
24   What is rowspan and colspan in table tag? Give an example.
25   What is Document Object Model?
26   What is HTML 5?
27   Name the browsers that support HTML5.
28   Compare the link tag in HTML 4 and HTML 5.
29   What is web forms 2.0?
30   Discuss the following with examples in HTML5:
       (a)   section

(b)   article
(c)   nav
(d)   figure

31   What are HTML, CSS and JavaScript? What is the HTML format for an inline image?

32   What is internet and Internet?

33   What is the difference between form get and form post?

34   What is the importance of the HTML DOCTYPE?

35   Define the term quirks mode.

36   What are the key steps involved in the design of a website?

37   Design your own website with the help of various commonly used HTML tags

38   Difference between internet and www.

39   Explain history and origin of the internet

40   What is DHTML? Explain with examples

41   What is the significance of using Dreamweaver and gif animator in designing a website?

42   Explain ASP.NET framework and its programming languages with illustrations.

43   Explain three different development models supported by ASP.NET .

44   Which browsers support HTML5?

45   Is HTML5 backward compatible with old browsers?

46   What is the purpose of 'section' tag in HTML5?

47   What is the purpose of 'footer' tag in HTML5?

48   What is the purpose of 'nav' tag in HTML5?

49   What are implicit tags and explicit tags ?

50   Differentiate between server side scripting and client side scripting.

51   What is the importance of validation ?

52   What are stylesheets?

53   Name different tools available for designing the web page.

III   Long Answer Type Questions:

1   Explain the various Conditional Statements in JavaScript?

2   How you define Popup Boxes in JavaScript? Explain each one of them.

3   How do we create cookies? How can they be managed?

4   How you define Events in JavaScript? Explain.

5   Explain the various validations in JavaScript.

6   How can we insert Style Sheet in the HTML document? Explain in detail.

7   Discuss the concept of classes in CSS.

8   Explain the DOM of JavaScript in detail.

9   What are the various Operators in JavaScript? Explain.

10   Explain the features of JavaScript in detail.

11   Explain how tables can be created in an HTML page emphasizing on all the attributes that can be used.

12   Explain the concept of forms in context of web pages. How can they be created?

13   What are filters and transitions in DHTML?

14   State different advantages and disadvantages of using frames in our website?

15   State different guidelines to create a website.

16   Explain the usage of different dialog boxes in JavaScript with an example.

17   Explain the usage and types of style sheets.
18   Explain the hierarchical structure of document object model.
19   Discuss the new features of HTML 5 in detail.
20   Compare HTML 4 and HTML 5 with examples.
21   Describe the origins of JavaScript. Also describe the differences between Java and JavaScript. Write the JavaScript code to generate an alert message when a link is clicked.
22   Differentiate between server-side and client-side Javascript applications. List the key Javascript characteristics. Write the JavaScript code to display messages in the status bar when the mouse is moved over a link.
23   What are the different levels of heading in HTML? What steps did you use in placing heading in your HTML document? What happens if you forget a slash at the end of a header tag?
24   What is the HTML tag for an unordered list? What is the tag for an ordered list? What steps did you use in adding list to your HTML document?
25   What is an array? Demonstrate how you would create an array in JavaScript using various methods.
26   What is the purpose of 'section' tag in HTML5?
27   What are the another tags provided for better structuring in HTML5?
28   What is a named function in JavaScript? How to define a named function?
29   What is arguments object in JavaScript?
30   How to handle exceptions in JavaScript?
31   Explain the usage of Javascipt.
32   Explain the classification of HTML Tags.
33   Differentiate between Forms and Frames. Also explain how they are created.
34   Explain the usage and different methods of creation of Cascading Style Sheets
35   Explain the usage of web design tools- Dreamweaver

IV   Practical Questions:

1   Design your resume-using HTML and apply CSS to it. Also apply all validations on it.
2   Design a Registration Form using HTML and apply CSS to it.
3   Write a program in java script to illustrate a mouse event, a keyboard event, focus event, load event, submit event, and blur event.
4   Design a CSS file that makes all unvisited hyperlinks RED in color, visited hyperlinks are marked as BLUE, the text/normal font color is GREEN and the background as a shade of gray.
5   Write a CSS to convert small case letters to uppercase letters.
6   Perform binary search using JavaScript.
7   Design a web page to show the use of various types of CSS.
8   Write a java script to change the background color of the document depending upon the button clicked by the user.
9   Write a java script to find out the maximum of the three numbers using functions.
10   Write a script to check whether a number is a palindrome or not.
11   Design a web page for a hospital using HTML.
12   Create an HTML page having three frames line-wise. Open three different sites in all the three frames.

13   Write a script to check whether the entered number is prime or not.

UNIT - II

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Choose the form in which postback occurs
        (a)   HTML forms
        (b)   Webforms
        (c)   Winforms
        (d)   None of the above

2   web.config file is used
        (a)   Configures the time that the server-side codebehind module is called
        (b)   To store the global information and variable definitions for the application
        (c)   To configure the web server
        (d)   To configure the web browser

3   The first event triggers in an aspx page is
        (a)   Page_Init()
        (b)   Page_Load()
        (c)   Page_Click()
        (d)   None of the above

4   What class does the ASP.NET Web Form class inherit from by default?
        (a)   System.Web.UI.Page
        (b)   System.Web.UI.Form
        (c)   System.Web.GUI.Page
        (d)   System.Web.Form

5   File extension used for ASP.NET files.
        (a)   .asp
        (b)   .web
        (c)   .aspx
        (d)   None of the above

6   Why is Global.asax is used?
        (a)   Declare Global variables
        (b)   Implement application and session events
        (c)   None of the above

7   Which of the following is not a member of ADODBCommand object?
        (a)   ExecuteScalar
        (b)   ExecuteStream

(c)   Open
(d)   ExecuteReader

8   ASP.NET is
(a)   Procedure oriented
(b)   Object oriented
(c)   Object based
(d)   None of the above

9   How many validation controls does ASP.NET include?
(a)   five
(b)   six
(c)   four
(d)   three

10   Calendar is a _____control.
(a)   Web control
(b)   Rich control
(c)   Validation control
(d)   None of the above

11   What is the name of the property of ASP.NET page that you can query to determine that a ASP.NET page is being requested not data being submitted to web server?
(a)   FirstGet
(b)   Initialized
(c)   IncludesData
(d)   IsPostBack

12   For separating server-side code from client-side code on a ASP.NET page, what programming model should you use?
(a)   Separation model
(b)   Code-Behind model
(c)   In-Line model
(d)   Client-Server model

13   Which of the following operations can you NOT perform on an ADO.NET DataSet?
(a)   A DataSet can be synchronised with the database.
(b)   A DataSet can be synchronised with a RecordSet.
(c)   A DataSet can be converted to XML.
(d)   You can infer the schema from a DataSet.

14   A _____ control defaults to displaying the files in the current directory?
(a)   List Box
(b)   Drive List Box
(c)   Directory List Box

(d)   File List Box

15   How can you get the ColumnName, DataTypeColumnSize, IsKeyColumn, IsAutoIncrement of the table from the dataset?
(a)   GetSchemaTable method of the DataReader
(b)   Fill method of data adaptor
(c)   GetTableDetails method
(d)   Dataset.GetDataTable()

16   You have designed a logon form with two TextBox controls named txtUserName and txtpassword. You want to ensure that the user can enter only lowercase characters in the controls. Which of the following solutions will fulfill this requirement using the simplest method?
(a)   Program the KeyPress event of the TextBox controls to convert uppercase letters to lowercase letters.
(b)   Create a single event handler that is attached to the KeyPress event of the form. Program this event handler to convert the uppercase letters to lowercase ones.
(c)   Set the CharacterCasing property of the Textbox controls to Lower.
(d)   Use the CharacterCasing method of the controls to convert the letters to lowercase letters.

17   Which of the following events will fire when the Insert key is pressed?
(a)   KeyDown
(b)   KeyPress
(c)   KeyUp
(d)   KeyDown,KeyPress

18   The web page is having a TextBox control and a Help button that the user can press to get help on allowable values. The page validates the data entered by the user in the TextBox control. If the user enters an invalid value, the page set the focus back in the control using the Cancel property of the CancelEventArgs. A user reports that once he enters invalid data in the text box, he cannot click the Help button. What should be done to correct the problem?
(a)   Set the CausesValidation property of the text box to false.
(b)   Set the CausesValidation property of the text box to true.
(c)   Set the CausesValidation property of the Help button to false.
(d)   Set the CausesValidation property of the Help button to true.

19   What is the last stage of the Web forms lifecycle?
(a)   Event Handling
(b)   Page_Load
(c)   Validate
(d)   Page_Unload

20   Where would you define application and session level events?
(a)   Global.asax

(b)   Default.aspx
(c)   Web.Config
(d)   General.aspx

21   What attribute must be set on a validator control for the validation to work?
(a)   Validate
(b)   ValidateControl
(c)   ControlToBind
(d)   ControlToValidate

22   Which Page Cycle All Controls Are Fully Loaded?
(a)   Page_Load()
(b)   Page_Init()
(c)   Page_Render()
(d)   Page_Unload()

23   The public methods and properties of a master page can be accessed in a content page by assigning a class name to the master page. Which directive can be used to assign a class name to the master page?
(a)   <%@ Control %>
(b)   <%@ Master %>
(c)   <%@ MasterType %>
(d)   <%@ Page %>

24   What DataType is return in IsPostback property?
(a)   Bit
(b)   Boolean
(c)   Int
(d)   String

25   Which method do you invoke on the Data Adapter control to load your generated dataset?
(a)   Fill( )
(b)   Read( )
(c)   ExecuteQuery( )
(d)   None of these

26   Which of the following is not a valid statement in ASP.Net?
(a)   Server.Transfer("SomePage.aspx");
(b)   Response.Redirect("SomePage.aspx");
(c)   Server.Redirect("SomePage.aspx");
(d)   Server.Execute("SomePage.aspx");

27   Which control would you use if you needed to make sure the values in two different controls matched?
(a)   Required Field Validator

(b)   Custom Validator control
(c)   CompareValidator control
(d)   Regular expression validator Control

28   Which property on a Combo Box do you set with a column name, prior to setting the DataSource, to display data in the combo box?
(a)   DataTextField property.
(b)   DataValueField Property
(c)   DataMember
(d)   None of these

29   Can you edit data in the Repeater control?
 (a)   True
 (b)   False

30   Which template must you provide, in order to display data in a Repeater control?
(a)   EditItemTemplate
(b)   ItemTemplate

31   Which of the following server control shows data in a tabular format and allows sorting, paging, edit, delete each record?
(a)   ListBox
(b)   GridView
(c)   Repeater
(d)   None of these

32   Which of the following webserver control used as container for other server controls in a ASP.NET webpage?
(a)   PlaceHolder
(b)   Panel
(c)   Table
(d)   ImageMap

33   By using which of the following web server control data can be retrieved from a relational database?
(a)   ObjectDataSource
(b)   SqlDataSource
(c)   AccessDataSource
(d)   XmlDataSource

34   AccessDataSource Control work with which of the following file types?
(a)   .mpd file
(b)   .mdf file
(c)   .mdb file
(d)   .myd file

35   In _____, the hidden form fields are used to store the state of objects on client side and returned back to server in subsequent request (as postback occurs).
(a)   View State
(b)   Session
(c)   Cookies
(d)   Query String

36   The _____ file contains ASP.NET settings for all of the applications on the server -- it is at the top of the configuration file hierarchy, thus web.configs can override it.
(a)   Webconfig.config
(b)   Web.Config
(c)   Application.Config
(d)   Machine.Config

37   When an ASP.NET file is placed on an IIS server and viewed through a browser, the resulting HTML page contains?
(a)   all ASP.NET code
(b)   as much ASP.NET code as is in the ASP.NET file
(c)   a mix of ASP.NET and HTML code
(d)   all HTML code

38   What property must you set, and what method must you call in your code, in order to bind the data from some data source to the Repeater control?
(a)   Set the DataField property and call the DataBind() method.
(b)   Set the DataSource property and call the DataBind() method.
(c)   Set the DataSource property and call the DataFill() method.
(d)   Set the DataSource property and call the DataCall() method.

39   What are the two properties common in every validation control?
(a)   ControlToValidate property and Text property.
(b)   ControlToValidate property and Value property.
(c)   ControlToTest property and Text property.
(d)   ControlToValidate property and Message property.

40   _____ is an automatic way to associate page events and methods in ASP.NET page framework.
(a)   AutoEventWireup attribute of the Page directive is set to true
(b)   AutoEventWireup attribute of the Page directive is set to False
(c)   It is not possible to set automatically page events and methods
(d)   None of the above

41   Which of the following is not a DataGridproperty
(a)   Allowpaging, AllowCustomPaging
(b)   AllowSorting

(c)   CurrentPageIndex
(d)   Disposed

42   The **DataSet** is a _____representation of data that provides a consistent relational programming model regardless of the data source.
(a)   Memory dependent
(b)   Memory-resident
(c)   Memory independent
(d)   Memoryless

43   EditItem Template property of the DataList control is useful for
(a)   edit the list
(b)   binding data ti the control
(c)   in-place editing of the data
(d)   none of these

44   What does XSD stand for
(a)   extended software definition
(b)   XML schema definition language
(c)   XML software definition
(d)   none of these

45   LINQ to DataSet provides _____for disconnected data stored in a DataSet
(a)   language-integrated querying capabilities
(b)   language independent querying capability
(c)   platform independent capability
(d)   language and platform independent capabilities

46   If no XML Schema or XDR schema is available in the XML, the schema of the DataSet can be inferred from the
(a)   Web form
(b)   structure of the XML elements and attributes
(c)   database
(d)   querying the web page

47   Which of the following are the type web controls used in ASP.Net
(a)   HTML controls
(b)   HTML Server controls
(c)   ASP.NET Server controls
(d)   ASP.NET Ajax Server controls
(e)   All of the above

48   _____ controlsare various lists and tables, which can bind to data from data sources for displaying.
(a)   Data source controls
(b)   Data view controls

(c) Validation controls
(d) Personalization controls

49 Which of the following is not a property of Server controls
(a) BindingContainer
(b) ChildControlCreated
(c) DataItemContainer
(d) DataSource

50 Which of the following are methods of server control
(a) ApplyStyleSheetSkin
(b) ClearChildState
(c) HasControls
(d) OnBubbleEvent
(e) All of the above

51 A lighter alternative to traditional ASP.NET is called
(a) C#
(b) MVC
(c) Both (a) and (b)
(d) None of these

52 MVC separates web applications into three different components
(a) Models for data
(b) Views for display
(c) Controllers for input
(d) All of these

53 What is the default value for the method attribute in a ASP.NET server side form ontrol?
(a) GET
(b) POST
(c) SOAP
(d) SMTP

54 Which property allows ASP.NET controls to maintain their values when a page is posted to itself.
(a) EnableViewState
(b) MaintainValue
(c) SaveValue

55 If a form is posted to a different page, we can retrieve the values of the form elements by
(a) Using the properties of the ASP.NET controls
(b) Using the GetElementByID() method
(c) Using Request.Params
(d) The values cannot be retrieved

56   We need to enable paging for a DataGrid control
        (a)   We can use a DataReader
        (b)   We can use a DataTable
        (c)   We can use either the DataReader or DataTable
        (d)   A DataGrid does not support paging

57   The settings in the web.config file can be configured to apply to
        (a)   An application
        (b)   An application or a particular directory
        (c)   An application or a particular directory or even an individual
        (d)   The web.config file always applies to all pages in the current directory and its
                subdirectories

58   In an ASP.NET page, which is the best way to find if the contents of a TextBox has
        changed after the form containing the TextBox has been posted back to the server
        (a)   By comparing the old value with the new value
        (b)   By checking the new value property of the textbox control
        (c)   By handling the textbox control's TextChanged event
        (d)   By checking the HasChanged property of the textbox

59   If we are using the DataSet and we have to display the data in sorted order what will we
        do?
        (a)   Use Sort method of DataTable
        (b)   Use Sort method of DataSet
        (c)   Use DataView object with each sort
        (d)   Use datapaging and sort the data

60   What property contains the actual error message returned by SQL Server?
        1.   SqlException.Source
        2.   SqlException.Message
        3.   SqlError.Class
        4.   SqlError.Message
        (a)   1,2
        (b)   1,2,3
        (c)   1,3
        (d)   2,4

61   How do you determine the actual SQL data type of a SqlParameter (the type expected by
        the SQL Server)?
        (a)   It is the .NET Framework data type in your application that the parameter
                represents.
        (b)   It is the type of column or data in SQL Server that the command expects.
        (c)   It is the type of column in a DataTablethat it represents.
        (d)   It is any type defined in the SqlDbDataTypeenumeration.

62 Which of the following is true?
   (a)   DataTable object contain DataRow and DataColoumn objects
   (b)   DataSet and DataTable can be binary serialized
   (c)   DataSet and DataTable can be XML serialized
   (d)   All of the above

63 If you are using the DataSet and you have to display the data in sorted order what will you do?
   (a)   Use Sort method of DataTable
   (b)   Use Sort method of DataSet
   (c)   Use DataViev object with each sort
   (d)   Use datapaging and sort the data.

64 In which Event you can set the value of a Theme?
   (a)   Page_Load
   (b)   Page_Render
   (c)   Page_PreRender
   (d)   Page_PreInit

65 You need to initialize some variable only when the first user accesses the application. What should you do?
   (a)   Add code to the Application_OnStart event handler in the Global.asax file.
   (b)   Add code to the Application_BeginRequest event handler in the Global.asax
   (c)   Add code to the Session_OnStart event handler in the Global.asax file
   (d)   None of the above

66 Which of the following template supports by Repeater control?
   (a)   <ItemTemplate>
   (b)   <AlternatingItemTemplate>
   (c)   <SeperatorTemplate>
   (d)   All of the above

67 Which of the following works on client side?
   (a)   ViewState
   (b)   HiddenField
   (c)   ControlState
   (d)   All of the above

68 Which of the following works on server side?
   (a)   ViewState
   (b)   HiddenField
   (c)   Application and session
   (d)   All of the above

69 Application_Start event is available in which file?
   (a)   Global.asax

(b)   Local.asax
(c)   Web.config
(d)   None of the above

70   You have to log the data into database if your session times out. Which event you will use?
(a)   Session_End
(b)   Application_End
(c)   Application_Start
(d)   Application_SessionTimeout

Ans.   (1)(b), (2)(b), (3)(b), (4)(a), (5)(c), (6)(a), (7)(c), (8)(b), (9)(b), (10)(b), (11)(d), (12)(b), (13)(b), (14)(d), (15)(a), (16)(c), (17)(d), (18)(c), (19)(d), (20)(a), (21)(d), (22)(a), (23)(b), (24)(b), (25)(a), (26)(c), (27)(c), (28)(a), (29)(a), (30)(b), (31)(b), (32)(b), (33)(b), (34)(c), (35)(a), (36)(d), (37)(d), (38)(b), (39)(a), (40)(a), (41)(d), (42)(b), (43)(c), (44)(b), (45)(a), (46)(b), (47)(e), (48)(b), (49)(d), (50)(e), (51)(b), (52)(d), (53)(b), (54)(a), (55)(c), (56)(b), (57)(c), (58)(c), (59)(c), (60)(d), (61)(b), (62)(d), (63)(c), (64)(d), (65)(a), (66)(d), (67)(d), (68)(c), (69)(a), (70)(a)

(b)   Fill in the Blanks:

1   The _____method is usually used to execute a query that retrieves only a single field.
2   The _____method executes commands that don't return a result set.
3   The command text can be a _____, _____or _____.
4   The .NET Framework is bundled with a set of _____providers.
5   The _____control allows you to validate text by matching against a pattern defined in a regular expression.
6   _____property returns or sets the keyboard shortcut that allows the user to quickly navigate to the control.
7   All web forms are the instances of ASP.NET _____class.
8   ASP.NET provides an_____model.
9   ASP.NET user controls ends with_____.
10   The _____directory contains all the precompiled .NET assemblies.

Ans.   (1)(ExecuteScalar()), (2)(ExecuteNonQuery()), (3)(SQL statement, stored procedure, name of the table), (4)(four), (5)(RegularExpressionValidator), (6)(AccessKey), (7)(Page), (8)(event driven), (9)(.ascx), (10)(bin)

II   Short Answer Type Questions:

1   Discuss the evolution of ASP.NET.
2   Name the core assemblies for ASP.NET pages.
3   Discuss how a page class is constructed.
4   What is ASP.NET Event model?
5   What is View State?

6   Write a short note on Page class.
7   Describe the various categories of server controls.
8   Explain WebControl Class properties.
9   Difference between HTML controls and web server controls.
10   What is AdRotator control? Given an example.
11   What is machine.config file?
12   Describe the major directories of ASP.NET.
13   Define ADO.NET Data Providers.
14   What are connection strings?
15   What are datasets?
16   Explain the AutoPostBack property of web server controls with an example.
17   Why we use SqlCommandBuilder object in ADO.NET?
18   What is the difference between client side and server side code?
19   What is the use of "GLOBAL.ASAX" file?
20   What are different types of directives in .NET?
21   What is a DataSet?
22   What is a DataTable?
23   What is AutoPostBack?
24   What is the difference between "Web.config" and "Machine.config"?
25   What languages will developers be able to use to create ASP.NET pages?
26   What is the main difference between Gridlayout and Flowlayout?
27   What is the use of connection object**?**
28   What do you mean by binding data to web control**?**
29   How can you prevent users from editing Text in Textbox control on a web form?
30   What are the three values that a TextMode property of TextBox can have?
31   What are master pages?
32   What is ADO.NET? Discuss its working using dataset andXML.
33   How would you enable impersonation in the web.config file?
34   What does the Orientation property do in a Menu control?
35   Differentiate between authentication and authorization.
36   What does the .WebPart file do?
37   Differentiate between a page theme and a global theme?
38   How to Build ASP.Net Page
39   How to work with XML?
40   What is Advanced Control Programming?
41   How to build data to web control?
42   What is form validation?

III   Long Answer Type Questions:

1   Discuss the seven pillars of ASP.NET.
2   What is Visual Studio? Discuss its advantages in detail.
3   Explain Visual Studio IDE in detail.
4   Describe the ASP.NET page life cycle in detail.
5   What are validation controls? Explain all with the help of examples.
6   Discuss the architecture of ADO.NET in detail.

7 Discuss ADO.NET namespace in detail.
8 What are the various methods of DataReader class? Explain with example.
9 Explain the working of DataGrid control with an example.
10 What is Xml control? Explain in detail.
11 Discuss the life cycle of page in brief.
12 What are the different events associated to button Server control? Explain the usage with an example.
13 Explain different aspects of error handling in ASP.NET.
14 What is the use of IsPostBack in ASP.NET? Explain with the help of an example.
15 Develop a simple calculator web page to add, subtract, multiply and divide using the command behavior of a button.
16 Develop a web page to insert, delete, read and modify data from employee table by passing parameters to SqlCommand object using connected architecture of ADO.NET.
17 What's difference between DataGrid and DataList? What is the method to customize columns in DataGrid? How can we format data inside DataGrid?
18 Give the overview of ADO.NET architecture?
19 What are the two fundamental objects in ADO.NET? Write the difference between dataset and datareader. Give an example.
20 What are the various methods provided by the dataset to generate XML?
21 What's the difference between Server controls and HTML controls? Explain with examples.
22 How nested master pages are created using ASP.NET?
23 What are the different methods of navigation in ASP.NET?
24 Explain how a web application works.
25 How you can access the Properties and Controls of Master Pages from content pages?
26 Explain the different parts that constitute ASP.NET application.
27 Describe the application event handlers in ASP.NET
28 Explain form Building with Web Server Controls.
29 Explain Form Validation with Validation Control
30 Explain working with ADO.Net.
31 Explain the usage of the DataList and DataGrid Controls
32 Explain Working with DataSets and XML.

UNIT - III

I **Test Your Skills:**

(a) **Multiple Choice Questions:**

1 Which of the following is the simplest type of caching?
  (a) Data Caching
  (b) Output Caching
  (c) Fragment Caching
  (d) None of the above

2   Which of the following is not a mechanism for windows authentication?
        (a)   Basic authentication
        (b)   Digest authentication
        (c)   Integrated Windows authentication
        (d)   Partial authentication

3   Cookies are browser relative.
        (a)   True
        (b)   False

4   By default Session state mode is set to the value
        (a)   Off
        (b)   InProc
        (c)   StateServer
        (d)   Custom

5   Which of the following is used to cache the entire rendered contents of a page in
        memory?
        (a)   Data Caching
        (b)   Page Output Caching
        (c)   Fragment Caching
        (d)   None of the above

6   Which of the following is not the ASP.NET Framework related to security?
        (a)   Authentication
        (b)   Authorization
        (c)   Membership
        (d)   Login

7   How many authentications can be enabled in an application?
        (a)   One
        (b)   Two
        (c)   Three
        (d)   None

8   Which object can help you maintain data across users?
        (a)   Application object
        (b)   Session object
        (c)   Response object
        (d)   Server object

9   Which of the following ASP.NET object encapsulates the state of the client?
        (a)   Session object
        (b)   Application object
        (c)   Response object
        (d)   Server object

10   Mode of storing ASP.NET session
      (a)   InProc
      (b)   StateServer
      (c)   SQL Server
      (d)   All of the above

11   Which of the following is not the way to maintain state?
      (a)   View state
      (b)   Cookies
      (c)   Hidden fields
      (d)   Request object

12   _____ element in the web.config file to run code using the permissions of a
      specific user
      (a)   < credential> element
      (b)   < authentication> element
      (c)   < authorization> element
      (d)   < identity> element

13   Which of the following is faster and consume lesser memory?
      (a)   SQLDataReader
      (b)   Data Set

14   Where do we include the user lists for windows authentication?
      (a)   < Credential>
      (b)   < authorization>
      (c)   < identity>
      (d)   <authentication>

15   Where do we include the user lists for Form authentication?
      (a)   < credential>
      (b)   < authorization>
      (c)   < Identity>
      (d)   < authentication>

16   Which of the following authentication is best suited for a corporate network?
      (a)   Windows
      (b)   Form
      (c)   User
      (d)   All

17   How do you manage states in asp.net application?
      (a)   Session Objects
      (b)   Application Objects
      (c)   Viewstate
      (d)   All of the above

18   Select the caching type supported by ASP.Net
      (a)   Output Caching
      (b)   DataCaching
      (c)   a and b
      (d)   none of the above

19   Where is the default Session data is stored in ASP.Net?
      (a)   InProcess
      (b)   StateServer
      (c)   Session Object
      (d)   All of the above

20   How do you explicitly kill a user session?
      (a)   Session.Close( )
      (b)   Session.Discard( )
      (c)   Session.Abandon
      (d)   Session.End
      (e)   Session.Exit

21   How to implement authentication via web.config?
      (a)   Include the authentication element.
      (b)   Include the authorization element.
      (c)   Include the identity element.
      (d)   Include the deny element.

22   You need to store state data that is accessible to any user who connects to your Web
      application. Which object should you use?
      (a)   Session
      (b)   Application
      (c)   Response.Cookies
      (d)   Response.ViewState

23   Which of the following is the default authentication mode for IIS?
      (a)   Anonymous
      (b)   Windows
      (c)   Basic Authentication
      (d)   None

24   If I'm developing an application that must accommodate multiple security levels though
      secure login and my ASP.NET web application is spanned across three web-servers
      (using round-robin load balancing) what would be the best approach to maintain login-in
      state for the users?
      (a)   Maintain the login state security through a database.
      (b)   Maintain the login state security through a Session.
      (c)   Maintain the login state security through a View State.
      (d)   All of the Above

25   By default, ASP.NET store SessionIDs in _____.
      (a)   Cookies
      (b)   Cache
      (c)   Database
      (d)   Global variable

26   When will a session be started in an application?
      (a)   Before Application Started
      (b)   After Application Started
      (c)   When the Client first sends a request to browser
      (d)   While closing the application

27   Setting a permanent cookie is not like Session cookie, It is Specially used for particular
      Scenario.
      (a)   True
      (b)   False

28   How many types of cookies are there?
      (a)   1
      (b)   2
      (c)   3
      (d)   4

29   If cookies are not enabled at browser end does form authentication work?
      (a)   Yes
      (b)   No
      (c)   Both Yes And No
      (d)   None of the above

30   Which of the following is TRUE about Windows Authentication in ASP.NET?
      (a)   Automatically determines role membership
      (b)   Role membership determined only by user programming
      (c)   ASP.NET does not support Windows Authentication
      (d)   All of the Above

31   Which of the following is true about session in ASP.NET?
      (a)   Programmers has to take care of delete sessions after configurable timeout
             interval
      (b)   ASP.NET automatically delete sessions after configurable timeout interval
      (c)   The default time interval is 5 minutes
      (d)   None of the Above

32   Windows-based authentication requires that you
      (a)   add a login page to your application
      (b)   set up Windows user accounts for your users

(c)   create a database to store user names and passwords
(d)   sign up for a service offered by Microsoft

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     (a)   add a login page to your application
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     (c)   create a database to store user names and passwords
     (d)   sign up for a service offered by Microsoft

34   When ASP.NET receives a request for an application that uses forms-based authentication from a user who hasn't been authenticated, the server
     (a)   sends a response to the browser that includes a cookie with authentication information
     (b)   uses the user name and password included in the request to authenticate the user
     (c)   redirects the browser to the login page
     (d)   redirects the browser to an error page

35   By default, a password must
     (a)   consist of at least 8 characters
     (b)   consist of at least 8 characters and start with an alphabetic character
     (c).   consist of at least 7 characters with at least one being non-alphanumeric
     (d)   consist of at least 7 characters with at least one being non-alphabetic

36   When you create an access rule, you can apply it to all but one of the following. Which one is it?
     (a)   all users
     (b)   all users in a role
     (c)   anonymous users
     (d)   selected users

37   You can use roles to
     (a)   apply the same access rules to a group of users
     (b)   define groups of users for more than one web site
     (c)   define groups of anonymous users
     (d)   assign the same password to a group of users

38   To create a user from the Web Site Administration Tool, you must provide all but one of the following. Which one is it?
     (a)   user name
     (b)   password
     (c)   email address
     (d)   security question and answer
     (e)   roles

39   To enable page level tracing which attribute is required in Page directive?
     (a)   AutoEventWireup

(b)   Trace
(c)   Inherits
(d)   Debug

40   Windows authentication with ASP.NET can be used in which of the following ways
(a)   Windows authentication without impersonation
(b)   Windows authentication with impersonation
(c)   Windows authentication with fixed-identity impersonation
(d)   All the above

41   _____encryption relies upon a _____ key to encrypt and decrypt while _____encryption relies upon a _____key to encrypt and a _____key to decrypt
(a)   Symmetric, public, asymmetric, public, private
(b)   Symmetric, single, asymmetric, public, private
(c)   asymmetric, public, symmetric,private,private
(d)   asymmetric, private, symmetric, public, private

42   Which of the following are authorization options available in windows
(a)   URL authorization
(b)   File authorization
(c)   Role checks
(d)   All of the above

43   _____authentication offers a performance benefit and also supports additional features such as the ability to use delegation and mutual authentication.
(a)   NTLM
(b)   Kerberos
(c)   SCRAM-SHA-1
(d)   APOP

44   All symmetric algorithm classes are derived from the _____base class in the .NET Framework
(a)   Security.System.Cryptography.SymmetricAlgorithm
(b)   System.Security.Cryptography.SymmetricAlgorithm
(c)   System.Security.SymmetricAlgorithm.Cryptography
(d)   Security.System.SymmetricAlgorithm.Cryptography

45   In an ASP.NET page, the current session variables are exposed through _____the property of the _____object.
(a)   Session,Page
(b)   Page,Session
(c)   Session,Cookie
(d)   Cookie,session

46   Which of the following are alternatives to a session
(a)   Application state

(b) Profile properties
(c) View state
(d) Cookies
(e) All the above

47 Session variables are stored in a object that is exposed through the property
(a) SessionStateItemCollection, HttpContext.Session
(b) HttpContext.Session,SessionStateItemCollection
(c) ContextHttp.Session,SessionStateItemCollection
(d) StateItemSessionCollection,HttpContext.Session

48 In order to specify that session identifiers should not be stored in a cookie we can do so by setting the _____attribute to true in the_____section of the _____file.
(a) cookieless,Web.config,sessionState
(b) cookieless,sessionState,Web.config
(c) sessionState,cookieless,Web.config
(d) Web.config,sessionState,cookieless

49 We can reduce the chance of session data being shared by configuring the application not to recycle session identifiers. To do this we, set the _____attribute of the _____configuration element to _____.
(a) regenerateExpiredSessionId,sessionState,false
(b) regenerateExpiredSessionId,sessionState,true
(c) expiredRegeneateSessionId,sessionState,true
(d) expiredRegeneateSessionId,sessionState, false

50 Point out the wrong statement :
(a) The goal of dotConnect for SQL Server is to enable developers to maintain database applications.
(b) dotConnect for SQL Server combines connected and disconnected data access models in single SqlDataTable component
(c) dotConnect for SQL Server supports new ADO.NET features and technologies as soon as they are released
(d) None of the mentioned

51 What is the maximum number of cookies that can be allowed to a website?
(a) 1
(b) 10
(c) 20
(d) 30

52 Which property of the session object is used to set the local identifier?
(a) SessionId
(b) LCID
(c) Item
(d) Key

53   How do you explicitly kill a user session?
      (a)   Session.Close()
      (b)   Session.Discard()
      (c)   Session.Abandon
      (d)   Session.End
      (e)   Session.Exit

54   Which of the following is true about session in ASP.NET?
      (a)   Programmers have to take care of deleted sessions after configurable timeout
             interval
      (b)   ASP.NET automatically delete sessions after configurable timeout
      (c)   The default time interval is 5 minutes
      (d)   None of the above

55   Which of the following denote value that can be taken by Cache control of ASP.NET?
      (a)   Public
      (b)   Private
      (c)   No-cache
      (d)   All of the above

56   What is the default authentication mode for IIS?
      (a)   Windows
      (b)   Anonymous
      (c)   Basic Authentication
      (d)   None

57   Which of the following is not a valid state management tool?
      (a)   Querystate
      (b)   Hidden Form Field
      (c)   Application State
      (d)   Cookies

58   What is the size of the sessionID?
      (a)   32 bit long string
      (b)   32 bit long double
      (c)   32 bit long character
      (d)   32 bit long integer

59   In ASP.NET the <authorization> section contain which of the following elements?
      (a)   <deny>
      (b)   <allow>
      (c)   Both (a) and (b)
      (d)   None of the above

60   Which of the following is true about windows authentication in ASP.NET?
      (a)   Automatically determines role membership
      (b)   Role membership determined only by user programming
      (c)   ASP.NET does not support Windows Authentication
      (d)   None of the above

61   According to the given below statements, choose the correct option.
      Statement 1:   Application caching is the process of storing data (and not pages) in a
      cache object.
      Statement 2:   Page output caching stores a rendered page, portion of a page, or version
      of a page in memory.
      Statement 3:   Caching reduces the time required to render cached page in future
      requests.
      (a)   Only statement 1 is correct.
      (b)   Statement 2 and 3 are correct.
      (c)   Only statement 3 is correct.
      (d)   All statements are correct.

62   How many types of parameter supported by OutputCache?
      (a)   VaryByParam
      (b)   VaryByControl
      (c)   VaryByHeader
      (d)   VaryByCustom
      (e)   All of the above

63   What types of data can you store in the Cache collection?
      (a)   Only String Type of Data
      (b)   You can store any type of data in the Cache collection.
      (c)   Only DataSet Object
      (d)   All of the above.

64   What code you will write for using the cache object?
      (a)
      // Storing the value.
      Cache["name"]="CareerRide";
      // Retrieving the value on any webpage within the application.
      if (Cache["name"] != null)
      Label1.Text= Cache["name"].ToString();
      (b)
      // Storing the value.
      Cache="CareerRide";
      // Retrieving the value on any webpage within the application.
      if (Cache != null)
      Label1.Text= Cache.getStringValue;
      (c)
      // Storing the value.

```
Cache["name"]="CareerRide";
// Retrieving the value on any webpage within the application.
if (Cache["name"] != null)
Label1.Text= Cache["name"].Text;
```

(d)   None of the above.

65   By default, when you use Page Output Caching, at what location page is cached?
(a)   Only on web server
(b)   Only on Client
(c)   Web server, any proxy servers, and browser
(d)   All of the above.

66   How many types of Cache Dependencies are available in ASP.NET?
        - Published on 27 Jul 15
(a)   File based dependencies
(b)   Key-based dependencies
(c)   Time-based dependencies
(d)   All of the above

67   You want to enable Page Output Caching in ASP.NET. What code you will write in
        ASPX page.
(a)   <%@ OutputCache Duration="30" VaryByParam="none" %>
(b)   <%@ OutputCache VaryByParam="none" %>
(c)   <%@ OutputCache Duration="30" %>
(d)   None of the above.

68   You need to programmatically configure page output caching. Which object would you
        use?
(a)   Request
(b)   Response
(c)   Application
(d)   Server

69   What is the use of VaryByParam attribute in OutputCache directive?
(a)   You can neglect VaryByParam attribute while using Page output caching.
(b)   The VaryByParam attribute determines which versions of the page output are
        actually cached.
(c)   The VaryByParam attribute determines which web page is cached in database.
(d)   None of the above.

70   How many types of caching ASP.NET supports?
(a)   Page Output Caching
(b)   Partial Page Caching
(c)   Data Caching
(d)   DataSource Caching
(e)   All of the above.

Ans. (1)(b), (2)(d), (3)(a), (4)(b), (5)(b), (6)(d), (7)(a), (8)(a), (9)(a), (10)(d), (11)(d), (12)(d), (13)(a), (14)(b), (15)(a), (16)(a), (17)(d), (18)(c), (19)(a), (20)(c), (21)(b), (22)(b), (23)(a), (24)(a), (25)(a), (26)(c), (27)(b), (28)(b), (29)(b), (30)(a), (31)(b), (32)(b), (33)(a), (34)(c), (35)(c), (36)(d), (37)(a), (38)(e), (39)(b), (40)(d), (41)(b), (42)(d), (43)(a), (44)(b), (45)(a), (46)(e), (47)(a), (48)(b), (49)(b), (50)(a), (51)(c), 52(b), (53)(c), (54)(b), (55)(d), (56)(b), (57)(a), (58)(d), (59)(c), (60)(a), (61)(d), (62)(e), (63)(b), (64)(b), (65)(c), (66)(d), (67)(a), (68)(b), (69)(b), (70)(e)

(b) Fill in the Blanks:

1 _____allows ASP.NET controls to retain their properties between postbacks.
2 _____are small files that are created on the client's hard drive.
3 _____ is the technique of storing an in-memory copy of some information that's expensive to create.
4 _____is a specialized type of output caching.
5 Windows authentication hands over the responsibility of authentication to _____.
6 _____are stored as individual records.
7 Cookies are represented with the _____class.
8 Windows authentication is _____by default.
9 _____option enables you to specify the amount of time in minutes before the authentication cookie expires.
10 All types of authentication are implemented with _____modules.

Ans. (1)(View State), (2)(Cookies), (3)(Caching), (4)(Fragment caching), (5)(IIS), (6)(Profiles), (7)(Httpcookie), (8)(enabled), (9)(timeout), (10)(HTTP)

II Short Answer Type Questions:

1 What are cookies?
2 Define Page Output caching.
3 What is authentication?
4 What is web.config?
5 Difference between windows and Forms authentication.
6 What is .NET passport?
7 What are the different mechanisms for Windows authentication?
8 Define the term authorization.
9 What are profiles?
10 Define state management.
11 "HTTP is a Stateless protocol". What are the different ways to manage state in ASP.NET?
12 Write short notes on
    a. Caching in ASP.NET
    b. Error Handling in ASP.NET
    c. InProcess and OutProcess state mode

13   When should we use the InProc session mode?
14   Distinguish between Symmetric and Asymmetric Encryption.
15   How do you track user sessions in ASP.NET application.
16   How do you set authentication mode in the ASP.NET application?
17   What is the difference between login controls and Forms authentication?
18   What is scavenging?
19   What is the use of duration attribute of @OutputCache page directive?
20   Explain various types of asp.net authentication with focus on forms and windows authentications.
21   What is SessionID in ASP.NET?
22   By default where the Session IDs are stored?
23   Where does session is stored if cookies are disabled on client machine?
24   What are session events?
25   How we can disable sessions?
26   What are the advantages of caching ?
27   Explain various types of caching in ASP.NET.
28   Differentiate between Form based Authentication and Windows based Authentication.
29   How to secure data using ASP.NET ?
30   Explain Tracking User Sessions.

III   Long Answer Type Questions:

1   Discuss various methods of tracking user sessions in detail.
2   Explain various types of caching in detail.
3   Discuss the types of authentication supported by ASP.NET Framework.
4   Explain the Windows authentication process.
5   Difference between data caching and data source caching.
6   What are the various options for state management in ASP.NET? Explain.
7   Explain View State in detail.
8   Discuss Session architecture in detail.
9   Explain Application state in detail.
10   Give the differences between Session state and Application state.
11   What are the advantages and disadvantages of sessions?
12   Discuss the various session modes in ASP.NET.
13   Explain the .NET cryptography classes in detail.
14   Explain forms authentication in detail? Also write an example.
15   What is Fragment Caching in ASP.NET?
16   What are the Application_Start and Session_Start subroutines used for? Explain with the help of example.
17   What are the benefits and limitations of using hidden fields?
18   What are the benefits and limitations of using ViewState for state management?
19   Why we need State management to maintain state?
20   What are the performance implications of ViewState?
21   What are the disadvantages of using ViewState?
22   How do you enable or disable a ViewState for a control on the page?
23   What is the difference between Session Cookies and Persistent Cookies?
24   What are assemblies?
25   How can we use COM components in .Net?

26   What is Cross Page Posting? How is it done?
27   What's the difference between trace and debug in ASP.NET?
28   How to encrypt data over the Network?

UNIT - IV

I   Test Your Skills:

(a)   Multiple Choice Questions:

1   Which of the following is not the element of SOAP message?
(a)   Envelope
(b)   Header
(c)   Body
(d)   Default

2   Which of the following is a combination of both public and private clouds?
(a)   External clouds
(b)   Hybrid clouds
(c)   Public clouds
(d)   None of the above

3   Which of the following is not a model of Cloud computing?
(a)   Web as a Service(WaaS)
(b)   Software as a Service(SaaS)
(c)   Platform as a Service(PaaS)
(d)   Infrastructure as a Service(IaaS)

4   Which of the following is not the element of WSDL document?
(a)   <types>
(b)   <message>
(c)   <body>
(d)   <binding>

5   Which of the following element of SOAP contains call and response information?
(a)   Fault
(b)   Header
(c)   Body
(d)   None of the above

6   Which of the following is not the part of Service Oriented Architecture?
(a)   Service Provider
(b)   Service Handler
(c)   Service Implementation
(d)   Both (a) and (b)

7   In XML, a document is a hierarchy of
        (a)   Attributes
        (b)   Elements
        (c)   Tags
        (d)   All of the above

8   Which of the following is an example of a cloud computing application?
        (a)   Twitter or RSS
        (b)   Salesforce.com or Google Apps
        (c)   Facebook apps
        (d)   Skype
        (e)   None of the above

9   The idea behind this technology is to use resources on an under-used server to provide more computing resources to the database. It works via many different servers, each with their own memory, CPUs and other resources.
        (a)   Load balancing
        (b)   File Sharing
        (c)   Grid Computing
        (d)   Parallel Processing

10   Web Applications were developed in order to interact _____
        (a)   Browsers
        (b)   Different platforms
        (c)   Server
        (d)   None of these

11   Web services use _____ to code and decode the data.
        (a)   UDDI
        (b)   XML
        (c)   SOAP
        (d)   None of these

12   Web services are used to
        (a)   Reuse application components
        (b)   Connect existing software
        (c)   Solve the interoperability problem
        (d)   All of the above

13   SOAP is an _____to let applications exchange information over HTTP.
        (a)   .NET based protocol
        (b)   XML based protocol
        (c)   Java based protocol
        (d)   PHP based protocol

14   SOAP is platform _____
      (a)   Dependent
      (b)   Independent

15   SOAP is a format for sending messages and is also called_____
      (a)   Communication protocol
      (b)   Data transfer protocol
      (c)   Network protocol
      (d)   None of these

16   _____is used to convert the user's application into web application.
      (a)   Struts service
      (b)   Browser action
      (c)   Java service
      (d)   Web service

17   Web services are_____
      (a)   Application components
      (b)   Application IDE
      (c)   Application designing tool
      (d)   None of the above

18   The basic web service platform is a combination of _____ and_____
      (a)   XML+HTML
      (b)   CSS+HTTP
      (c)   CSS+JAVA
      (d)   XML+HTTP

19   Web services communicate using_____
      (a)   Closed protocols
      (b)   Open protocols
      (c)   Open-close protocols
      (d)   None of these

20   Which cloud characteristic refers to the ability of a subscriber to increase or decrease its computing requirements as needed without having to contact a human representative of the cloud provider?
      (a)   Rapid elasticity
      (b)   On-demand self service
      (c)   Broad network access
      (d)   Resource pooling

21   In which category of SaaS services does customerrelationship management (CRM) software fall?
      (a)   Consumer services
      (b)   Communication services
      (c)   Infrastructure services

(d)   Business services

22   Which is considered the most widely used cloudcomputing service?
(a)   Infrastructure-as-a-Service (IaaS)
(b)   Platform-as-a-Service (PaaS)
(c)   Communication-as-a-Service (CaaS)
(d)   Software-as-a-Service (SaaS)

23   Interoperability is enabled by _____.
(a)   a cloud operating system
(b)   middleware
(c)   a community cloud
(d)   a composite cloud

24   Which refers to the practice of a primary cloud provider offering services that are distributed through another cloud provider?
(a)   Hybrid cloud
(b)   Composite cloud
(c)   Virtualization
(d)   Grid computing

25   Which of the following are the key drivers for Grid computing?
I.   Improved server utilization - Grid computing allows companies to lower costs through the efficient use of resources.
II.   Better agility and flexibility - Businesses experience constant change and the underlying IT Infrastructure should be agile enough to support that kind of change.
III.   OpEx model - Enterprises require pay-as-you-go services to reduce the dependency on capital expenditure and take advantage of the benefits of operational expenditure.
IV.   Lower Initial cost-There is a need to reduce the initial investment at the cost of an increased operational cost.
(a)   I,II and IV
(b)   I,II
(c)   I,II and III
(d)   All of the above

26   Why did virtualization boost the emergence of Cloud computing?
(a)   A virtual machine is more secure than a physical machine.
(b)   Virtualization made it easier and cheaper to share resources between users.
(c)   Virtual machines have greater performance than their physical counterparts.
(d)   Virtualization leads to better network utilization.

27   What can be done to make maximum use of the interoperability principle of Cloud computing?
(a)   Employ multiple system integrators to build your private cloud.
(b)   Only use cloud providers located in Europe.
(c)   Use hardware and software of a single vendor.
(d)   Use standard protocols.

28   Which service model allows the customer to choose more layers in the computing architecture?
(a)   Infrastructure as a Service (IaaS)
(b)   Platform as a Service (PaaS)
(c)   Software as a Service (SaaS)
(d)   There is no difference between the service models.

29   What is an important requirement for applications to be accessible in the Cloud?
(a)   The application should be compatible with the browser of the user's computer.
(b)   The application should use the same programming language as the clients.
(c)   The user should know on which server the application is located.
(d)   The users identity should be known by the application.

30   What is benefit of storage availability in the Cloud?
(a)   Additional storage does not require budget for new large storage devices.
(b)   Storage in the Cloud has a higher availability than storage devices in the local area network.
(c)   Storage in the Cloud has shorter access times than storage in the local area network.
(d)   Storage in the Cloud is easier to protect against intrusion

31   Web services:
(a)   are modular.
(b)   are Internet applications.
(c)   perform specific functions or tasks.
(d)   all of the above.

32   Which of the following is a Web service protocol for invoking remote Web services?
(a)   WML
(b)   XML
(c)   SOAP
(d)   UDDI
(e)   WSD

33   Which of the following is a public directory service that describes individual Web services?
(a)   WML
(b)   XML
(c)   SOAP
(d)   UDDI
(e)   WSDI

34   This is a data structure representing a service type in a Universal Description, Discovery, and Integration registry.
(a)   model-view-controller

(b)   tModel

(c)   Venn diagram

(d)   exploratory model

35   What type of cloud rents the capability and they pay for what they use on-demand?

(a)   Private cloud.

(b)   Public cloud.

(c)   Hybrid cloud.

(d)   Community cloud.

36   What does the term public does not mean?

(a)   Free.

(b)   Expensive.

(c)   User data not visible.

(d)   No security.

37   _____ clouds are deployments made inside the company's firewall.

(a)   Private

(b)   Public

(c)   Hybrid

(d)   Community

38   Choose an application that does not fit in public cloud.

(a)   Public facing web pages.

(b)   Data intensive workloads.

(c)   Health care record.

(d)   Public wiki's, blogs.

39   Business benefits for using grid computing include:

(a)   Improved productivity and collaboration of virtual organizations and respective computing and data resources

(b)   Allowing widely dispersed departments and businesses to create virtual organizations to share data and resources

(c)   Robust and infinitely flexible and resilient operational architectures

(d)   All the above

40   What is often referred to as being the world's single and most powerful computer solution?

(a)   Virtualization

(b)   Interoperability

(c)   Loose Coupling

(d)   Grid Computing

41   What is the correct way of describing XML data?

(a)   XML uses a DTD to describe data

(b)   XML uses a description node to describe data

(c)   XML uses XSL to describe the data
(d)   XML uses a validator to describe the data

42   Comments in XML document are given by:
(a)   <?– _ _–>
(b)   <!_ _ _ _!>
(c)   <!_ _ _ _>
(d)   </_ _ _ _>

43   Which statement is true?
(a)   An XML document can have one root element
(b)   An XML document can have one child element
(c)   XML elements have to be in lower case
(d)   All of the above

44   UDDI stands for
(a)   Universal Description, Discovery, and Interation
(b)   Uniform Description Discovery and Integration.
(c)   Unicode Discovery Discovery and Integration.
(d)   Universal Description, Discovery, and Integration

45   UDDI is an
(a)   HTML based standard
(b)   XML based standard
(c)   UML based standard
(d)   SGML based standard

46   Which of the following regarding WDSL is true
(a)   WSDL stands for Web Services Description Language
(b)   WSDL is used to describe web services
(c)   WSDL is written in XML
(d)   WSDL is a W3C recommendation from 26. June 2007
(e)   All the above

47   UDDI can communicate via
(a)   SOAP,
(b)   CORBA,
(c)   Java RMI Protocol.
(d)   All the above

48   Which of the following is not a WSDL element
(a)   types
(b)   messages
(c)   portType
(d)   caption

49   Which of the following is an acronym for SOAP
        (a)   Simple Object Attribute Protocol
        (b)   Simple Object Access Protocol
        (c)   Simple Ontime Access Protocol
        (d)   Single Object Access Protocol

50   Which of the following related to SOAP is incorrect
        (a)   SOAP works on linux and windows
        (b)   SOAP is faster than other protocols like CORBA
        (c)   SOAP is analogous to RPCs(Remote procedure calls)
        (d)   SOAP calls can work through firewall services

51   What is the purpose of XML in a web service?
        (a)   A web service takes the help of XML to tag the data, format the data.
        (b)   A web service takes the help of XML to transfer a message.
        (c)   A web service takes the help of XML to describe the availability of service.
        (d)   None of the above

52   Which of the following role of web service architecture implements the service and
        makes it available on the Internet?
        (a)   Service Provider
        (b)   Service Requestor
        (c)   Service Registry
        (d)   None of the above

53   Which of the following is correct about XML Messaging layer in Web Service Protocol
        Stack?
        (a)   This layer is responsible for encoding messages in a common XML format so that
                messages can be understood at either end.
        (b)   Currently, this layer includes XML-RPC and SOAP.
        (c)   Both of the above.
        (d)   None of the above

54   What BEEP stands for?
        (a)   Blocks Exchange Extensible Protocol
        (b)   Blocks Exchange Exchange Protocol
        (c)   Blocks Extensible External Protocol
        (d)   Big Extensible Exchange Protocol

55   Which of the following layer in Web Service Protocol Stack is responsible for
        centralizing services into a common registry and providing easy publish/find
        functionality?
        (a)   Service Transport
        (b)   XML Messaging
        (c)   Service Description
        (d)   Service Discovery

56 SOAP is used to transfer
    (a)   Control
    (b)   Output
    (c)   Data
    (d)   None of these

57 The web services cannot offer the application components like:
    (a)   The currency conversion
    (b)   Weather reports
    (c)   The language translation
    (d)   Web browsers

58 UDDI is used for listing what _____ are available.
    (a)   Data
    (b)   Control
    (c)   Programs
    (d)   Services

59 A _____ are the new breed of web application.
    (a)   Web pages
    (b)   Web services
    (c)   Web controls
    (d)   Web contents

60 A web service can be created regardless of the
    (a)   Systems
    (b)   Programming language
    (c)   Services
    (d)   Internet

61 _____ is used to convert your application into Web-Application.
    (a)   Struts Services
    (b)   Web Services
    (c)   Java Service
    (d)   Browser Action

62 Web Services are _____.
    (a)   None of these
    (b)   Application Designing Tool
    (c)   Application IDE
    (d)   Application Components

63 The basic Web Services platform is combination of _____ and _____.
    (a)   CSS + HTTP
    (b)   XML + HTML

(c)   XML + HTTP

(d)   CSS + JAVA

64   Web services communicate using _____.

(a)   Open protocols

(b)   None of these

(c)   Close protocols

(d)   Open-Close protocols

65   Web services are self-contained and self-describing ! (True / False)

(a)   False

(b)   True

66   Web services can be discovered using _____.

(a)   UDDII

(b)   UDDI

(c)   UDDDI

(d)   UDII

67   _____ is the basis for Web services.

(a)   PHP

(b)   XML

(c)   CGI

(d)   CSS

68   Which of the following is considered as Web Service Platform Elements?

(a)   All of these

(b)   UDDI

(c)   WSDL

(d)   SOAP

69   WSDL Stands for _____.

(a)   Web Services Development Language

(b)   Web Services Design Language

(c)   None of these

(d)   Web Services Description Language

70   UDDI Stands for _____.

(a)   None of these

(b)   Universal Description, Development and Integration

(c)   Universal Description, Discovery and Integration

(d)   Universal Development, Design and Integration

Ans.   (1)(d), (2)(b), (3)(a), (4)(c), (5)(c), (6)(b), (7)(b), (8)(b), (9)(c), (10)(b), (11)(b), (12)(d), (13)(b), (14)(b), (15)(a), (16)(d), (17)(a), (18)(d), (19)(b), (20)(b), (21)(d), (22)(d), (23)(b), (24)(b), (25)(a), (26)(b), (27)(d), (28)(a), (29)(a), (30)(a), (31)(d), (32)(c),

(33)(d), (34)(b), (35)(b), (36)(a), (37)(a), (38)(c), (39)(d), (40)(d), (41)(c), (42)(c), (43)(a), (44)(d), (45)(b), (46)(e), (47)(d), (48)(d), (49)(b), (50)(b), (51)(a), (52)(a), (53)(c), (54)(b), (55)(d), (56)(c), (57)(d), (58)(d), (59)(b), (60)(b), (61)(b), (62)(d), (63)(c), (64)(a), (65)(b), (66)(b), (67)(b), (68)(a), (69)(d), (70)(c)

(c) Fill in the Blanks:

1   _____are application components.
2   SOAP is an _____based protocol.
3   WSDL stands for_____
4   _____ is a directory service where companies can register and search for Web services.
5   A_____is contractually defined behavior that can be implemented and provided by any component for use by any component, based solely on a contract.
6   _____ is an architecture where independent systems and applications communicate with each other by exposing and using services.
7   The SOAP _____element is used to indicate error messages.
8   _____is a model of software deployment where an application is hosted as a service provided to customers across the Internet.

9   Cloud computing architecture is divided in to _____and _____.

10   _____computing is the act of sharing tasks over multiple computers.

Ans.   (1)(Web Services), (2)(XML), (3)(Web Services Description Language), (4)(UDDI), (5)(service), (6)(Service oriented architecture), (7)(Fault), (8)(SaaS), (9)(front end, back end), (10)(Grid)

II   Short Answer Type Questions:

1   What are web services?
2   What is UDDI?
3   Define SOAP.
4   What is WSDL?
5   What is SaaS?
6   What are hybrid clouds?
7   Explain conceptual view of cloud computing.
8   What are the benefits of cloud computing?
9   What is XML?
10   What are the advantages of web services?
11   What is DISCO standard?
12   What are hybrid clouds?
13   What is a service?
14   What are green pages?
15   Define virtualization.
16   Write short notes on:

       a. Cloud computing
       b. Future trends in web development

17   How does cloud computing provides on-demand functionality?
18   What is middleware?
19   Give examples where SOAP is used.
20   Name browser that allows access to web service.
21   What are the two major uses of web services?
22   What is RDF?
23   Write short note on web technologies.
24   What are the benefits of cloud computing?
25   What is a cloud?
26   What are the different data types used in cloud computing?
27   What are the platforms used for large scale cloud computing?
28   What is on-demand functionality? How is it provided in cloud computing?
29   Why soap is used as a protocol for accessing a Web service?
30   What is meant by JSON Web services?
31   What is the difference between a Web service and an API?
32   What is SOAP and REST Web services?
33   How to secure web service?

III   Long Answer Type Questions:

1   What are the different types of uses of web services?
2   Explain the web services platform elements in detail.
3   Write a short note on XML.
4   Explain grid computing in detail.
5   What are the different types of clouds? Discuss.
6   Explain Service Oriented Architecture in detail.
7   Explain various SOAP elements in detail.
8   Discuss cloud computing models in detail.
9   Discuss the structure of WSDL document with example.
10   Explain the message structure of SOAP.
11   How to use ASP.NET to create a simple web service that converts the temperature from Fahrenheit to Celsius and vice versa.
12   What is a web service and what are the uses of web services?
13   Differentiate between grid computing and cloud computing.
14   Discuss the various layers in cloud computing in detail.
15   Discuss grid protocol architecture in detail.
16   Discuss the various grid computing technologies in detail.
17   What is XML? What is the difference between XML and C? Does XML replace HTML?
18   What are the advantages of cloud services? Discuss in detail.
19   Explain the steps with an example how a web service is created in ASP.NET.
20   Explain the benefits of using XML on web.
21   A wholesale book seller wishes to provide a web service permitting customers to browse order and pay for books. When a customer places an order they will receive an order

number. At the end of each month customers must pay for orders they have placed during that month. When a customer wishes to make a payment they must provide their bank account number and the amount they wish to pay.

The service must provide the following functions:

- Discovery of books(by words in their title)
- Ordering of books(by ISBN number)
- Payment on account(against order number)

For each of these functions, specify the WSDL inputs, outputs and operations you would expect for this web service.

22 What are the different models for deployment in cloud computing?
23 What is the difference between cloud computing and mobile computing?
24 What are the security benefits of cloud computing?
25 What is "EUCALYPTUS" in cloud computing? Why is it used?
26 Explain System integrators in cloud computing.
27 What is XML and JSON?
28 What is a Web service API?
29 Explain web service protocols.
30 Explain web service Architecture.
31 Explain the database model for cloud computing.