

MAR/APR 2024

Total No. of Questions : 5]

SEAT No. :

PB828

[Total No. of Pages : 2

[6204]-12

First Year M.C.A. (Management)

IT-12 : DATA STRUCTURE & ALGORITHMS

(Revised 2020 Pattern) (Semester-I)



Time : 2½ Hours]

[Max. Marks : 50]

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) a) Write an algorithm to print the node values of doubly linked list in reverse order. **[6]**

b) Write an algorithm push and pop operation of Stack. **[4]**

OR

c) Write an algorithm to traverse and print node values of singly linked list. **[6]**

d) Write an application of priority queue. **[4]**

Q2) a) Explain Graph traversals [DFS & BFS] with suitable example. **[6]**

b) Construct Binary search Tree (BST) for following data & Find height of tree. 5, 7, 9, 2, 6, 11, 17. **[4]**

OR

c) Construct AVL Tree for the following data **[6]**

MON, TUE, WED, THU, FRI, SAT, SUN.

d) Explain collision resolution techniques any two. **[4]**

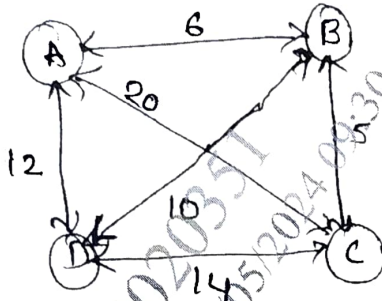
Q3) a) Apply the rain terrace algorithm to the following problem [3, 4, 0, 2, 3, 1] Draw the figure & step by step solution. **[6]**

b) Describe the rules for solving N-queen Problem. **[4]**

OR

P.T.O.

- c) Find shortest Path using travelling salesman problem for following graph. [6]



- d) Discuss knight tour problem with suitable example. [4]
- Q4) a) Apply Binary search algorithm on following data [Step by steps] [6]
 23, 56, 91, 72, 12, 08, 05, 02, 16, 38
 Search Key = 72
- b) Apply Euclidean algorithm to find GCD [4]
 A=10 B=15.

OR

- c) Sort the following data using quick sort step by step. [6]
 [10, 80, 30, 90, 40, 50, 70]
- d) Explain fast powering with suitable example [4]
- Q5) a) Consider the given instance of 0/1 Knapsack problem [10]
 $N=4$ $M=8$ $P=(3, 4, 6, 5)$
 $W=(2, 3, 1, 4)$
 Using dynamic Programming the optimal profit & solution vector.

OR

- b) Find the longest common sub-sequence for the following string using dynamic programming. [10]
 $X=\text{conference}$ $Y=\text{Reference}$
 Also calculate the length longest common sub-sequence.

