



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A. DEGREE EXAMINATION – COMPUTER APPLICATIONS

FIRST SEMESTER – NOVEMBER 2016

16PCA1MC04 - DATA STRUCTURES AND ALGORITHMS

Date: 09-11-2016
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

PART A

Answer ALL Questions

(10 X 2 = 20 Marks)

1. Define queue.
2. Change the following from infix to prefix and postfix expressions:
 $(A + (B * C)) / (C - (D * B))$
3. What is a heap?
4. State True or False the following:
 - i. In a complete binary tree, if the height is 3, then the number of nodes is 8.
 - ii. In a AVL tree, the height balancing factor is either -1, 0, or 1.
5. What is degree of a Vertex?
6. What is Depth – first Search in a graph?
7. Define Knapsack Problem.
8. What is Merge sort?
9. Define Bellman’s Principle of Optimality.
10. What is Traveling Salesman Problem?

PART B

Answer ALL Questions

(5 X 8 = 40 Marks)

- 11a. Bring out the differences between Arrays and Linked lists.
(or)
- 11b. Write a C++ program to get SUBJECT1, and SUBJECT2 marks, find the TOTAL and display the same for two students using Structures.
- 12a. i. Construct the binary tree whose inorder and preorder traversals are as follows:
Inorder: EACIFHDBG Preorder: FAEICDHGB
ii. Find the value of the prefix expression: + - 32 23 / 8 - 42
(or)
- 12b. Describe the insertion sort method with an example.
- 13a. Write Prim’s algorithm to find minimum spanning tree. Illustrate the algorithm with an example.
(or)
- 13b. Explain Depth-first Search and Breadth-first Search on a graph.
- 14a. Describe the role of primitive operations in the analysis of algorithm.
(or)
- 14b. Discuss the Divide and Conquer algorithm design strategy.
- 15a. Explain the sum of subsets problem in detail.
(or)
- 15b. Describe the algorithm to solve 8-Queen Problem.

PART C

Answer any TWO Questions

(2 x 20 = 40 Marks)

16a. Write a C++ program to create a queue and perform add and delete operations and explain the same.

16b. What is collision resolution? Explain open addressing method in detail.

17a. Write a C++ program for selection sort .

17b. Write Warshall's algorithm and explain with an example.

18a. Explain how Strassen's matrix multiplication improves computational efficiency.

18b. How can the Traveling Salesman problem be solved using branch and bound method? Explain.
