

67008-N

MCA 1st Semester (MCA 2 Year Programme)
w.e.f. 2020-21 Examination,
December-2022

ADVANCED DATA STRUCTURES USING C++/JAVA
Paper-20MCA21C5

Time allowed : 3 hours] [Maximum marks : 80

Note : *Question No. 1 is compulsory. Attempt four more questions, selecting one question from each unit.*

1. Answer the following questions briefly : 8×2=16
- (a) What is Big-Oh notation ?
 - (b) Describe pre-order traversal of a binary tree.
 - (c) What do you mean by spanning tree ?
 - (d) What is travelling salesperson problem ?
 - (e) Explain NP complete class and problem.
 - (f) Describe Euler graph and its one use.
 - (g) What is topological sort ?
 - (h) Explain splay tree with an example.

Unit-I

2. (a) What is Recurrence tree method ? How is it useful and used ? Discuss its advantages with suitable examples. 10

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- (b) Explain best and worst case analysis of an algorithm and its uses with examples briefly. 6
3. Explain the following briefly with suitable examples : 8,8
- (i) Theta notations and asymptotic notations and their uses
- (i) Substitution method and its advantages.

Unit-II

4. (a) What is threaded binary tree ? How is it useful and used ? Explain its applications with examples. 6
- (b) How many rotations are required during construction of an AVL tree if the following elements are added in the given order ? 10
35, 50, 40, 25, 30, 60, 78, 20, 28
5. (a) What is binary search tree ? How is it useful and used ? Explain its applications and drawbacks with examples. 6
- (b) Create B-tree of order 3 of the following list of elements : 10
1, 2, 3, 4, 5, 6, 7, 8, 9, 10

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6. (a) What is graph coloring ? How is it used and useful ? Explain its applications with suitable examples.
- (b) Explain Kruskal's algorithm and its advantages and applications with examples. 6,10

Unit-III

7. Explain the following with suitable examples : 8,8
- (i) Depth and Breadth-first traversals and their applications.
- (ii) Floyd-Warshall algorithm and its applications.

Unit-IV

8. (a) What is 0/1 Knapsack problem ? How is it used ? Explain its applications and advantages with an example.
- (b) Explain Rabin-Karp algorithm and its applications with an example. 9,7
9. Explain the following briefly with examples : 7,9
- (i) Backtracking algorithm and its uses and advantages
- (ii) Knuth-Morris-Pratt algorithm and its uses and applications.

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