

Roll No.

MCA–12/M.Sc.IT–12

Design and Analysis of Algorithm

Master of Computer Application/Master of Science
in Information Technology

(MCA–16/MCA–11/M.Sc.IT–16/M.Sc.IT–12)

Third Semester, Examination, 2017

Time : 3 Hours

Max. Marks : 60

Note : This paper is of **sixty (60)** marks containing **three (03)** sections A, B and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section–A

(Long Answer Type Questions)

Note : Section ‘A’ contains four (04) long answer type questions of fifteen (15) marks each. Learners are required to answer *two* (02) questions only.

1. Write briefly about Knapsack problem. Explain with an example that Greedy algorithm does not work for 0-1 Knapsack problem.
2. Describe the method of solving travelling salesman problem using dynamic programming.
3. Explain asymptotic notations in detail.
4. Discuss the branch and bound technique. In which situations we use this technique ?

Section-B**(Short Answer Type Questions)**

Note : Section 'B' contains eight (08) short answer type questions of five (05) marks each. Learners are required to answer *four* (04) questions only.

1. Explain the need of analysis of algorithm.
2. What is divide and conquer strategy ? Compute 3^7 using divide and conquer method.
3. What are the difference between quick sort and merge sort algorithm ?
4. What is the average case complexity of linear search algorithm ?
5. Define Greedy algorithm. Write any *two* characteristics of Greedy algorithm.
6. Define backtracking.
7. What is non-deterministic algorithm ? How does it work ?
8. What is optimal solution ?

Section-C**(Objective Type Questions)**

Note : Section 'C' contains ten (10) objective type questions of one (01) mark each. All the questions of this section are compulsory.

1. Which of the following properties are necessary for an Algorithm ?
 - (a) Definiteness
 - (b) Correctness
 - (c) Effectiveness
 - (d) Both (a) and (c)

2. The total running time of Huffman on the set of n characters is :
 - (a) $O(n)$
 - (b) $O(n \log n)$
 - (c) $O(n^2)$
 - (d) $O(\log n)$
3. Which of the following is true ?
 - (a) P is subset of NP
 - (b) NP is subset of P
 - (c) P and NP are equal
 - (d) NP is subset of NP hard
4. The Sorting method which is used for external sort is :
 - (a) Bubble sort
 - (b) Quick sort
 - (c) Merge sort
 - (d) Radix sort
5. If every square of the board is visited, then the total number of knight moves of n -queen problem is :
 - (a) $n^2 - 1$
 - (b) $n - 1$
 - (c) $n^3 - 1$
 - (d) $\log n - 1$
6. The Knapsack problem where the objective function is to minimize the profit is _____.
 - (a) Greedy
 - (b) Dynamic 0 / 1
 - (c) Backtracking
 - (d) Branch and Bound 0/1

7. Sorting is not possible by using which of the following methods ?
- (a) Insertion
 - (b) Selection
 - (c) Deletion
 - (d) Exchange
8. The method will choosing when sub-problems share sub-problems :
- (a) Divide and conquer
 - (b) Greedy method
 - (c) Dynamic programming
 - (d) Backtracking
9. The amount of time needs to run to completion is known as_____ .
- (a) Time complexity
 - (b) Worst case
 - (c) Space complexity
 - (d) Best case
10. Name the node which has been generated but none of its children nodes have been generated in state space tree of backtracking method :
- (a) Dead node
 - (b) Live node
 - (c) E-Node
 - (d) State Node