Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 18

MCA (2015 & Onward) (Sem.–5)

DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : MCA-502

M.Code : 74382

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students have to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. Define Data structures. What is the difference between linear and non-linear data structures? What are the operations that can be performed on data structures?

2. What are Binary search trees? How they are different from binary trees? Explain insertion of a node in binary search tree with an example.

SECTION-B

3. (a) What is an Algorithm? Discuss the role of algorithms in computing.

   (b) What are the methodologies for analysing algorithms? Compare.

4. What are the methods for performance evaluation of algorithms? What is order of growth? Explain the concept of asymptotic notations with examples.

SECTION-C

5. Differentiate between Greedy and dynamic programming algorithms. Solve the 0-1 knapsack problem by greedy strategy. Prove the correctness of the method as well.

6. Explain the general method of Backtracking and 8-queens problem.

SECTION-D

7. What are the methods of graph traversal? Discuss and compare between them. Also explain the applications of each.

8. Explain the basic concepts of NP, P, NP-hard and NP-complete problems with examples.

SECTION-E

9. What do you mean by optimal binary search tree?

10. Compare Stack and Queue.

11. Differentiate between deterministic and nondeterministic polynomial time algorithms.

12. What do you mean by Randomization?

13. Briefly discuss the Merge Sort technique. Give its complexity.

14. What is shortest path in a graph? Discuss any method to find shortest path.

15. What is Binary search technique? Discuss its working with an example.

16. What is the effect of backtracking on the time complexity of an algorithm?

17. Explain Branch and Bound approach with an example.

18. How NP completeness of the problem can be established?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.