NEW

2017

BCA 3rd Semester Examination

DESIGN AND ANALYSIS OF ALGORITHM

PAPER—2101

Full Marks : 70

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions :   5×2

   (a) What is the time and space complexity of an algorithm ?

(b) What is an NP complete problem ?

(c) Define Big–O notation in complexity ?

(d) What are the basic characteristics of an algorithm ?

(e) What do mean by Dynamic Programming technique ?

(f) What is Order of Growth ?

(g) What do you mean by tail recursion ?

2. Explain the Quick Sort algorithm with an example. Analyze the time complexity of Quick sort algorithm. Explain why worst case time complexity of quick sort is higher than merge sort. 6+5+4

3. What is an Algorithm ? What is the need to study Algorithms ? Explain Euclid's Algorithm to find the GCD of two integers with an example. Find the second largest number of an array. What is complicity in best case ? (2+3)+5+5

4. What is Minimum Spanning Tree ? Describe Kruskal's

Algorithm for minimum spanning tree. Explain in detail the 8-Queen's problem with an example. 2+8+5

5. What is a graph coloring problem and Hamiltonian problem ? What are BFS and DFS algorithm in graph traversal ? Explain with example. Write binary search algorithm using divide and conquer approach. What are Approximation algorithms ? 2+2+8+3

6. (a) Explain matrix-chain multiplication problem.

(b) Explain travelling salesman problem (TSP) with example.

(c) What do you mean by NP-complete and NP-hard complexity classes.

(d) What do you mean by circuit satisfiability problem ?

3+4+4+4

(Turn Over)

7. (a) Write an algorithm to compute UNION of two disjoint sets.

   (b) What do you mean by clique decision problem ?

   (c) What do you mean by branch-and-bound technique ?

   (d) Write down the algorithm to find single-source shortest path of a given undirected graph.

   4+3+3+5

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