

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

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?

$$3+4+4+4$$