Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 40376

M.E./M.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

First Semester

Biometrics and Cyber Security

CP 5151 — ADVANCED DATA STRUCTURES AND ALGORITHMS

(Common to M.E. Computer Science and Engineering/M.E. Computer Science and Engineering (with Specialization in Networks)/M.E. Multimedia Technology/M.E. Software Engineering/M.Tech. Information Technology)

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   What is the function of an algorithm?

2.   What is Big O notation in algorithm?

3.   Differentiate binary tree and binary search tree.

4.   Give an example for Fibonacci heap.

5.   What is a graph data structure?

6.   Name the most important Minimum Spanning-Tree Algorithm.

7.   What are the elements of dynamic programming?

8.   What is the time complexity of Huffman coding?

9.   How do you prove NP completeness?

10. Define polynomial time reduction.

PART B — (5 × 13 = 65 marks)

11. (a)   How insertion sort works? Illustrate with example.

Or

(b)   Explain Substitution method and Recurrence Tree Method for solving recurrence.

12. (a) Explain the basic Operations of a binary search tree with example.

Or

(b) Why is Red-Black Trees? Show its properties.

13. (a) Discuss Bellman-Ford Algorithm with example.

Or

(b) What is minimum spanning tree? Give a steps for finding MST using Kruskal's algorithm with example.

14. (a) Give a series of n arrays (of appropriate sizes) to multiply:

$A1 \times A2 \times A3 \times A4$

Determine where to place parentheses to minimize the number of multiplications.
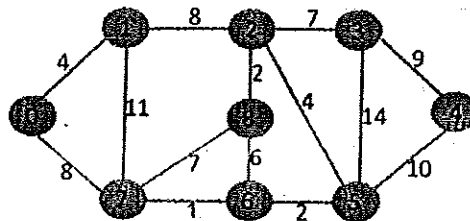
Or

(b) Summarize the Elements of the Greedy strategy.

15. (a) Prove that TSP is NP-Complete.

Or

(b) Interpret the techniques applied to solve NP-complete problems.

PART C — (1 × 15 = 15 marks)

16. (a) Given a graph

Find shortest paths from source to all vertices in the given graph using Dijkstra's shortest path algorithm.

Or

(b) How do you analyze algorithms? Give a detailed study.

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2   40376