

B.Tech II Year II Semester (R13) Supplementary Examinations May/June 2017

**DESIGN & ANALYSIS OF ALGORITHMS**

(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

- What is meant by Asymptotic notation?
- What is an articulation point in a graph?
- What is a comparison tree?
- What is an optimal solution?
- Explain 8-queens problem.
- What is bi-connected component?
- Define reduction source problem.
- How many spanning trees can be generated from a graph with 4 nodes?
- What is the difference between 0/1 knapsack and ordinary knapsack?
- What is the worst case complexity in quick sort, why?

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 The pre-order and post-order sequences of a binary tree do not uniquely define binary tree. Justify your answer.

**OR**

- 3 If matrices  $A = \begin{bmatrix} 9 & 4 & 6 & 7 \\ 7 & 8 & 1 & 4 \\ 4 & 3 & 2 & 6 \\ 5 & 3 & 0 & 2 \end{bmatrix}$   $B = \begin{bmatrix} 7 & 6 & 2 & 1 \\ 3 & 9 & 0 & 3 \\ 2 & 5 & 2 & 9 \\ 3 & 2 & 4 & 7 \end{bmatrix}$ . Implement Strassen's matrix multiplication on A and B.

**UNIT – II**

- 4 (a) Write an algorithm of Prim's minimum spanning tree.  
 (b) Find the optimal solution of the knapsack instance  $n = 7$ ,  $M = 15$ ,  $(p_1, p_2, \dots, p_7) = (10, 5, 15, 7, 6, 18, 3)$  and  $(w_1, w_2, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$ .

**OR**

- 5 (a) Define merging and purging rules in 0/1 knapsack problem.  
 (b) Write an algorithm for all pairs shortest path. Explain with an example.

**UNIT – III**

- 6 What is graph coloring? Write an algorithm for it and explain with an example.

**OR**

- 7 Write an algorithm to find articulation point in a graph.

**UNIT – IV**

- 8 What is bounding? Explain the following with an example.

- Job sequencing with deadlines.
- FIFO branch and bound.
- LC branch and bound.

**OR**

- 9 Write an algorithm for finding transitive closure with an example.

**UNIT – V**

- 10 Prove that chromatic number decision problem is NP-complete.

**OR**

- 11 State and prove Cook's theorem.

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