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)
  (a)   What is meant by Asymptotic notation?
  (b)   What is an articulation point in a graph?
  (c)   What is a comparison tree?
  (d)   What is an optimal solution?
  (e)   Explain 8-queens problem.
  (f)   What is bi-connected component?
  (g)   Define reduction source problem.
  (h)   How many spanning trees can be generated from a graph with 4 nodes?
  (i)   What is the difference between 0/1 knapsack and ordinary knapsack?
  (j)   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, (p1, p2, …p7) = (10, 5, 15, 7, 6, 18, 3) and (w1, w2, ……w7) = (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.
  (a)   Job sequencing with deadlines.
  (b)   FIFO branch and bound.
  (c)   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.