H.T.No. | | | | | | | | | | |

Code No: CT1515 **GEC-R14**

II B. Tech II Semester Supplementary Examinations, June 2017

DESIGN AND ANALYSIS OF ALGORITHMS

(Information Technology)

Time: 3 Hours **Max. Marks: 60**

Note: All Questions from **PART-A** are to be answered at one place.
Answer any **FOUR** questions from **PART-B.** All Questions carry equal Marks.

PART-A

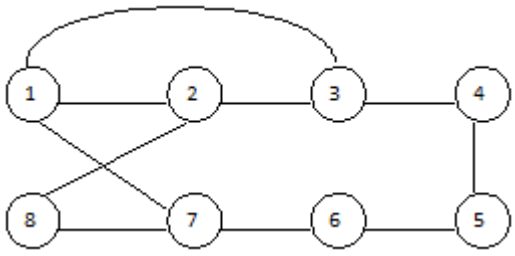
6 × 2 = 12M

1. a) Define time complexity.
   b) Define space complexity.
2. Define bi-connected component.
3. How does prim's algorithm work?
4. Define optimal binary search tree.
5. Define criterion function.
6. Name two search methods used in branch and bound.

PART-B

4 × 12 = 48M

1. a) Design an algorithm for finding maximum element of an array. (6M)
   b) Write an algorithm to find sum of n natural numbers. (6M)
2. a) Give a detailed note on divide and conquer technique. (6M)
   b) Describe union algorithm with weighting rule. (6M)
3. a) Explain minimum cost spanning tree. (4M)
   b) Write an algorithm for greedy knapsack problem. Compute the time complexity of greedy knapsack algorithm. (8M)
4. Construct an optimal binary search tree for n=4 identifiers with (a1,a2,a3,a4) = (do, if, int , while) P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1). Calculate w_{ij}, c_{ij}, r_{ij}. Use dynamic programming. (12M)



5. Develop an algorithm to find Hamiltonian cycles of a graph. Find the Hamiltonian cycles for the above given graph using backtracking. (12M)

6. Explain travelling sales person problem LCBB procedure with the following instance and draw the portion of the state space tree and find an optimal tour. (12M)

$$\begin{pmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{pmatrix}$$

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