

Total No. of Questions : 10]

SEAT No. :

P3006

[Total No. of Pages : 3

[5669]-598

**T.E. (Information Technology)**  
**DESIGN & ANALYSIS OF ALGORITHMS**  
**(2015 Pattern) (Semester - II)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7, or Q.8, Q.9, or Q.10.
- 2) Neat diagrams must be drawn whenever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

- Q1)** a) List the properties of various asymptotic notations. [5]  
b) Describe the strategy to analyse the non-recursive algorithm with suitable example. [5]

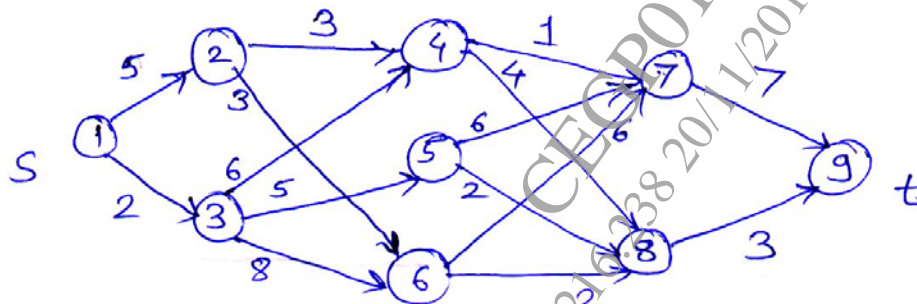
OR

- Q2)** a) Compare a priori & posterior analysis of algorithms. [4]  
b) Write an algorithm for binary search and write its recurrence relation. Give its time complexity. [6]

- Q3)** a) State the principle of optimality. Explain its significance in brief. [5]  
b) Compare Dijkstra's Algorithm & Bellman ford algorithm to find single source shortest path. [5]

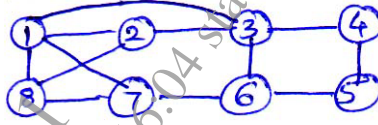
OR

- Q4)** Solve the following instance of Multistage graph by dynamic programming backward approach. [10]



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- Q5) a)** Find Hamiltonian cycle for given graph using backtracking method. Draw a state - space tree for the same. [8]



- b) Write an algorithm for graph colouring problem using backtracking method. [8]

OR

- Q6) a)** Write an iterative and a recursive backtracking algorithm for N-Queens problem. [8]

- b) Let  $W = \{5, 10, 12, 13, 15, 18\}$  &  $M = 30$  Find all possible subsets of  $W$  that sum to  $M$ . [8]

- Q7) a)** Explain 8-Queens problem & explain the following with respect to 8-Queens problem. [10]

- |                     |                         |
|---------------------|-------------------------|
| i) State space tree | ii) Solution State      |
| iii) State space    | iv) Answer state        |
| v) Static tree      | vi) Dynamic tree        |
| vii) Live node      | viii) Bounding function |

- b) Differentiate between Backtracking & branch and bound. Illustrate with example of knapsack problem. [8]

OR

- Q8) a)** Solve the following instance of the knapsack problem by branch & bound algorithm. [8]

$n = 4$ ,  $W(1:4) = \{10, 7, 8, 4\}$ ,  $P(1:4) = \{100, 63, 56, 12\}$ , knapsack capacity  $M = 16$

- b) Explain branch & bound technique and different strategies used in it like LCBB, FIFOB, compare LCBB & FIFOB. [10]

**Q9) a)** Write an algorithm for pointer doubling problem. What is its time complexity? [8]

b) Show that 3-SAT problem is NP-Complete. [8]

OR

**Q10) a)** Explain NP-Hard, NP-Complete, Decision problem & Polynomial time algorithm. [8]

b) Explain in detail models for parallel computing. [8]

