Total No. of Questions : 6]

SEAT No. :

P5179

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B.E./Insem. - 581

B.E. (Computer Engineering) (Semester - I)

DESIGN & ANALYSIS OF ALGORITHMS

(2012 Pattern)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Draw neat diagram wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Using Master theorem, solve the following recurrences: **[6]**

i) $T(n) = 4T(n/2) + n$.

ii) $T(n) = 4T(n/2) + n^2$.

b) Explain Amortized Time Complexity. **[4]**

OR

Q2) a) What are the general characteristics of divide and conquer strategy? State various applications where this strategy is applicable. **[6]**

b) Define asymptotic notations. Explain their significance in analyzing algorithms. **[4]**

Q3) a) Consider the following instances of the Knapsack Problem: **[6]**

n = 3, m = 20, (p1, p2, p3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10). Find the Feasible and Optimal Solution.

b) Explain use of dynamic programming to compute a binomial coefficient. State its time complexity. **[4]**

OR

P.T.O.

Q4) a) What is optimal binary search tree (OBST)? Write an algorithm to obtain OBST using dynamic programming. **[6]**

b) Write control abstraction for greedy strategy. **[4]**

Q5) a) Give the Definition of Implicit Constraint and Explicit Constraint. State and explain both the constraint using 8 Queen Example. **[6]**

b) State the control abstraction for FIFO based Branch and Bound method. **[4]**

OR

Q6) a) Write an algorithm to solve N-Queens problem. **[8]**

b) Define the following terms with respect to branch and bound strategy (any 2): **[2]**

i) State space tree,

ii) Live node,

iii) E-node,

iv) Answer node.