BE INSEM AUG 2015

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SEAT No. :

P4872

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B.E./Insem. - 73
B.E. (Computer Engineering)
DESIGN & ANALYSIS OF ALGORITHMS
(2012 Pattern)

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

Instructions to the candidates:

1) *Figures to the right indicate full marks.*
2) *Draw neat diagram wherever necessary.*
3) *Make suitable assumptions wherever necessary.*

Q1) a) Solve following recurrence equation using Master Theorem. **[6]**

$T(n) = 16\ T(n/4) + n^2$.

b) Prove the following theorem:

If $f(n) = a_m n^m + \ldots\ldots\ldots\ldots + a_1 n + a_0$ and $a_m > 0$,

then $f(n) = O(n^m)$ **[4]**

OR

Q2) a) Write quick sort algorithm with time complexity of this algorithm. **[6]**

b) Explain time and space complexity with suitable examples. **[4]**

Q3) a) Let No. of keys, n = 3 and Keys $\{k_1, k_2, k_3\}$ = {do, if, while}

Let Probability of successful search, p(1:3) = {0.5, 0.1, 0.05}

Let Probability of unsuccessful search, q(0:3) = {0.15, 0.1, 0.05, 0.05}

Compute & construct OBST for above values. **[8]**

b) State and explain the principle of dynamic programming. Name the elements of dynamic programming. **[2]**

P.T.O.

OR

Q4) a) Find an optimal solution for following greedy knapsack problem:

Number of objects n = 3, Knapsack capacity m = 20, Profits (P_1, P_2, P_3) = (25, 24, 15) and Weights (W_1, W_2, W_3) = (18, 15, 10). **[6]**

b) Write control abstraction (General Strategy Algorithm) of dynamic programming. **[4]**

Q5) a) Write an algorithm to solve 4 queen's problem using backtracking method. Use mathematical modelling to support your answer. **[6]**

b) Explain how Travelling Salesperson problem is solved using branch and bound method with suitable example. **[4]**

OR

Q6) a) Write an algorithm for graph coloring problem using backtracking Method. **[6]**

b) Explain in detail sum of subset problem using backtracking method with suitable example. **[4]**

OR

Q7) a) Explain all three asymptotic notations with 2 examples of each. **[6]**

b) Derive worst case time complexity of following series: n(n-1). **[4]**