[4760] - 1189

M.E. (Computer Engineering) (Semester - I)
APPLIED ALGORITHMS
(2013 Pattern)

Time : 3 Hours]   *[Max. Marks : 50*

Instructions to the candidates:

   1)   *Q. No. 1 is compulsory. Solve any 5 from Q.No.2 to Q.No. 7.*

   2)   *Figures to the right indicate full marks.*

   3)   *Neat diagrams must be drawn wherever necessary.*

   4)   *Assume suitable data, if necessary.*

Q1) a)   Solve following recurrence by iteration: **[5]**

              $T(n) = T(n - 1) + n^4$

     b)   Explain with examples Time and space trade-offs in algorithms.   **[5]**

Q2) a)   Write pseudo code algorithm for quick sort also give its time analysis using recurrence.   **[4]**

     b)   Write Kruskal's minimum spanning tree algorithm and determine its time complexity.   **[4]**

Q3) a)   Write approximation algorithm to store programs and also Prove that the absolute approximate knapsack problem is NP-hard.   **[4]**

     b)   Write Heuristic algorithm for knapsack problem and also subalgorithm for function EpsilonApprox.   **[4]**

Q4) a)   Explain with examples segment Intersection and Orientation.   **[4]**

     b)   Explain convex hull problem- formulation using graham scan algorithm. What is its time complexity?   **[4]**

Q5) a) Solve the given problem by simplex method [4]

$$Max \ Z = 107 \, x_1 + x_2 + 2 \, x_3$$
STC
$$14 \, x_1 + x_2 - 6x_3 + 3x_4 = 7$$
$$16 \, x_1 + 1/2x_2 - 6x_3 \ < \ = 5$$
$$16 \, x_1 - 8x_2 - x_3 \ < \ = 0$$
$$x_1, x_2, x_3, x_4 \ > \ = 0$$

b) Explain problem formulation for single source shortest path. Also write algorithm. [4]

Q6) a) Explain moments and transforms of distributions with examples. [4]

b) Explain with examples expectations of functions of more than one random variable. [4]

Q7) a) Give and explain inequalities and limit theorems. [4]

b) Explain random variable with suitable example. [4]

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