Total No. of Questions : 7]

SEAT No. :

P4338

[Total No. of Pages : 2

[4860]-1306

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

30

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 daigrams must be drawn wherever necessary.*
4) *Assume Suitable data if necessary.*

Q1) a) State whether following equalities are correct or incorrect and prove it.

   i) $4n^4 - 6n = \Theta(n^2)$

   ii) $1000n^3 + 6 = O(n^2)$ [5]

   b) Explain in detail Empirical measurement of performance of algorithms.[5]

Q2) a) Write Prim's minimum spanning tree algorithm and determine its time complexity. [4]

   b) Give and explain single source shortest path algorithm and all pair shortest paths in Graph. [4]

Q3) a) Explain with suitable examples Epsilon approximations. [4]

   b) Explain in details probabilistically good algorithms. [4]

Q4) a) Give divide and conquer algorithm for solving closest pair of points problem. [4]

   b) Give and explain Jarvis March Algorithm. [4]

P.T.O.

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

Max $Z = 107X_1 + X_2 + 2X_3$

STC

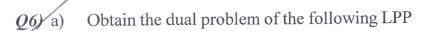$14X_1 + X_2 - 6X_3 + 3X_4 = 7$

$16X_1 + 1/2X_2 - 6X_3 <= 5$

$16X_1 - 8X_2 - X_3 <= 0$

$X_1, X_2, X_3, X_4 >= 0$

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

Q6) a) Obtain the dual problem of the following LPP [4]

Max $Z = 2X_1 + 5X_2 + 6X_3$

STC

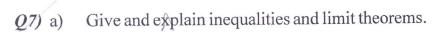$5X_1 + 6X_2 - 4X_3 <= 3$

$-2X_1 + X_2 + 4X_3 <= 4$

$X_1 - 5X_2 + 3X_3 <= 1$

$-3X_1 - 3X_2 + 7X_3 <= 6$

$X_1, X_2, X_3 >= 0$

b) Explain problem formulation for vertex cover problem. Also Write algorithm. [4]

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

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

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