Printed Pages : 03 CS/IT-263

(Following Paper ID and Roll No. to be filled in your Answer Books)

PAPER ID : MC7

Roll No. | | | | | | | | | | |

M. TECH. (Sem.II)

THEORY EXAMINATION 2015-16

APPROXIMATION ALGORITHMS

Time : **3** Hours Total Marks : **100**

1. Attempt any two parts : [2×10=20]

   (a) What is Exact and Approximation algorithm? Explain Algorithm's Correctness and Efficiency of Approximation algorithms.

   (b) Briefly explain NP-Hard and NP-Completeness with examples.

   (c) What is a set cover problem? Design a greedy approximation algorithm for set cover problem and analyse it.

2. Attempt any two parts : [2×10=20]

   (a) What is Traveling Salesman problem? Discuss the hardness of approximation Travelling Salesman problem.

   (b) With an example, explain how the branch-bound technique is used to solve 0/1 knapsack problem

   (c) Write short notes on the following:

   (i) LP duality Theorem

   (ii) State space tree

3. Attempt any two parts : [2×10=20]

(a) Construct a minimum spanning tree using Kruskal's algorithm with your own example

(b) What is Primal-dual Schema? Obtain a factor f algorithm for the set cover problem using the primal dual schema. Also Discuss the dual fitting based analysis for the greedy set cover algorithm.

(c) Write short notes on the following:

(i) Bin packing

(ii) Metric TSP

4. Attempt any two parts : [2×10=20]

(a) Solve the all pair shortest path problem for the diagraph with the weighted matrix given below:-

	a	b	c	d
a	0	∞	3	∞
b	2	0	∞	∞
c	∞	7	0	1
d	6	∞	∞	0

(b) Explain in detail Dual-fitting -based analysis for the greedy set cover algorithm with the help of suitable examples.

(c) Write short notes on the following:

(i) Steiner tree

(ii) Multiway cut problem

5. Write short notes on any FOUR of the following : [4×5=20]

(a) Randomized rounding algorithm

(b) Half integrality of vertex cover

(c) Primal-Dual algorithms

(d) LP Duality Theorem

(e) Steiner tree

(f) k-Median Problem

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