JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION- JUNE -2016

M.Tech II Semester

COURSE CODE: 10M11CI211

MAX. MARKS: 35

COURSE NAME: ADVANCED ALGORITHMS

COURSE CREDITS: 03

MAX. TIME: 2 HRS

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. What is dynamic programming? Give any two example of dynamic programming?
   [2 Marks]

2. Write the algorithm of bubble sort and give its worst case complexity? [3 Marks]

3. Explain Dominating Set and Connected Dominating set with an example. [3 Marks]

4. Give an example of a game that has a pure strategy Nash equilibrium that cannot be found using iterated elimination of dominated strategies. [2 Marks]

5. What are the components of a strategic form game? [2 Marks]

6. Explain the Greedy Algorithm for Graph Coloring and Brook's Theorem? [4 Marks]

7. The questions in this problem refer to the following game.

		Player 2		
		L	M	R
	U	1,2	3,5	2,1
Player 1	M	0,4	2,1	3,0
	D	-1,1	4,3	0,2

a) Determine if either player has any dominated strategies. If so, identify them.
   [1 Marks]

b) Does either player have a dominant strategy? Why or why not? [1 Marks]

c) Use iterated elimination of dominated strategies to solve this game. Be clear about the order in which you are eliminating strategies. Also specify whether you are eliminating strictly or weakly dominated strategies. [2 Marks]

d) Is your solution Nash equilibrium? Why or why not? [2 Marks]

8. Graph the core for the 3-person game with characteristic function: $v(\emptyset) = 0$, $v(\{1\}) = 0$, $v(\{2\}) = -1$, $v(\{3\}) = 1$, $v(\{1, 2\}) = 3$, $v(\{1, 3\}) = 2$, $v(\{2, 3\}) = 4$, and $v(N) = 5$. [3 Marks]

9. Proof: The core of an essential constant-sum game is empty [2 Marks]

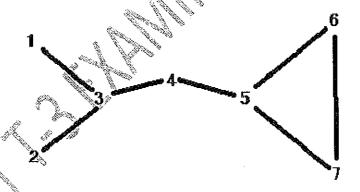10. Consider the game with characteristic function v given by [3 Marks]

$v(\{1\}) = 1$ $v(\{1, 2\}) = 4$
$v(\emptyset) = 0$ $v(\{2\}) = 0$ $v(\{1, 3\}) = 3$ $v(\{1, 2, 3\}) = 8$
$v(\{3\}) = 1$ $v(\{2, 3\}) = 5$.

Find the Shapleys Value of this game.

11. What do you Social Networks Algorithms? Explain Degree centrality, Closeness centrality and Betweenness centrality? [2 Marks]

12. Consider the graph [3 Marks]

Find the Degree centrality, Closeness centrality and Betweenness centrality of Node 3, 4 and 5.