JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- March-April 2017

M-Tech/B.Tech II/VIII Semester

COURSE CODE: 10M11CI211   MAX. MARKS: 25

COURSE NAME: ADVANCED ALGORITHMS

COURSE CREDITS: 03   MAX. TIME: 1.5 Hrs

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

1. Write short answer: [12 Marks]
   a. What is duality in linear programming, explain it with an example?
   b. Two companies share a market, in which they currently make $5,000,000 each. Both need to determine whether they should advertise. For each company advertising costs $2,000,000 and captures $3,000,000 from the competitor provided the competitor doesn't advertise. Write its normal form and extensive form of the game ?
   c. Write the procedure to solve TSP using branch and bound (you can assume your graph)?
   d. What is the worst case complexity of code, give reason:

```
1.   for (int i = 1; i <=n; i *= c) {
2.          // some O(1) expressions
3.     }
4.     for (int i = n; i > 0; i /= c) {
5.          // some O(1) expressions
6.     }
```

2. Given 'n' points on the plane, with no 3 points are collinear. Find the subset of k points, such that k points are perimeter of 'n' points on the plane. Write the algorithm to compute the k points with space and time complexity?   [3 Marks]

3. Use simplex method to solve: Maximize $f(x) = x_1 + 2x_2$ subject to: $x_1 + 2x_2 \leq 3$, $x_1 + x_2 \leq 2$, $x_1 \leq 1$, $x_1 \geq 0, x_2 \geq 0$?   [5 Marks]

4. Consider the illustrated figure and Answer the following question.

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