

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2016

M.Tech II Semester

COURSE CODE: 10M11CI211

MAX. MARKS: 15

COURSE NAME: ADVANCED ALGORITHMS

COURSE CREDITS: 3

MAX. TIME: 1 HR

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

1. Discuss: N, NP, NP complete and NP hard. What does it mean when we say that an algorithm X is asymptotically more efficient than Y? [2+1 Marks]
2. What is the time complexity of the below function? [2 Marks]

```

a. void fun(int n, int arr[])
b. {
c.     int i = 0, j = 0;
d.     for(; i < n; ++i)
e.         while(j < n && arr[i] < arr[j])
f.             j++;
g. }

```

3. Write 0-1Knapsack algorithm using dynamic programming and solve :

[2 + 4 Marks]

No of items n=4 items

Capacity of knapsack M=8

Item i	Value v_i	Weight w_i
1	15	1
2	10	5
3	9	3
4	5	4

4. Use Simplex method to maximize

[4 Marks]

$$f(x) = x_1 + 2x_2$$

subject to:

$$x_1 + 2x_2 \leq 5$$

$$x_1 + x_2 \leq 4$$

$$2x_1 + x_2 \leq 6$$

$$x_1 \geq 0$$

$$x_2 \geq 0$$