JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION-2016

B.Tech IV Semester

COURSE CODE: 10B11CI411   MAX. MARKS: 25

COURSE NAME: Fundamentals of Algorithm

COURSE CREDITS: 04   MAX. TIME: 1Hr 30 Min

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

1) Prove that the height of red-black tree is **log(n).**   **[2 Marks]**

2) What is the complexity of skip list in case of Insertion and Searching?   **[2 Marks]**

3) Explain counting sort. Write its algorithm and derive its complexity.   **[3 Marks]**

4) Construct a red black tree in the order **2,1,4,5,9,3,6,7**.   **[4 Marks]**

5) Insert the keys **3, 7, 10, 8, 11, 5, 6, 7, 9, 4** into a hash table of size **m=10** with open addressing using the auxiliary hash function $h(k) = ((2x^3)\%3+(5x^2)\%7+(7x)\%9)\%m$. Illustrate the result of inserting these keys using quadratic probing with **c1=1** and **c2=3**.   **[4 Marks]**

6) a) Run BFS algorithm on the directed graph below, using vertex **S** as the source. Show all distances, queue and the BFS tree.   **[5 Marks]**

   b) Run DFS algorithm on the directed graph below, using vertex **S** as the source. Compute the start time and the finish time of each vertex, show the stack and draw the DFS tree .   **[5 Marks]**