BCS-042

00624

BACHELOR OF COMPUTER APPLICATIONS (Revised)

Term-End Examination

December, 2013

BCS-042 : INTRODUCTION TO ALGORITHM DESIGN

Time : 2 hours   *Maximum Marks : 50*

*Note :   Question number 1 is **compulsory**. Answer **any three** from the rest.*

### SECTION - A

1. (a) Put the following classes of algorithms in increasing order of growth.   2
     (i) $O(n \log^n)$
     (ii) $O(\log^n)$
     (iii) $O(n^2)$
     (iv) $O(\sqrt{n})$

    (b) Define three most common asymptotic notations and its meanings.   3

    (c) Write the values of the followings   3
     (i)   [3.3]

     (ii) $log_3 \frac{27}{9}$

     (iii) [- 3.3]

(d) Write binary search algorithm and analyze **8** its time complexity is best and worst case. Apply Binary search algorithm to find the number of comparisions made by the algorithm to search a key value (Say Key $= 32$), in the following list : 5, 10, 15, 20, 25, 30, 32, 35.

(e) Define O (Big-'oh') Notation. By using basic **4** definition show that $(3x^2 + 4x + 1) = O(x^2)$
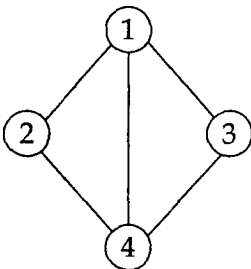
SECTION - B

2. Write a Pseudo - code for prim's Algorithm to find **10** Minimum cost spanning tree. Apply prim's Algorithm and find minimum spanning tree for the following graph (Starting vertex is 1).
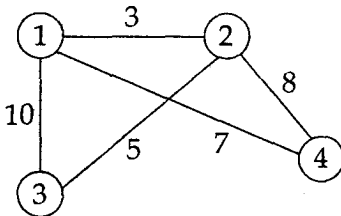
Also write its Running time of the algorithm used.

3. Write pseudo - code for DFS. Find DFS for the **10** following graph.

What is the running time of the algorithm.

4. (a) Write a Recurrence Relation for the 5
following Recursive function :
Fib (int n)
{
        if(n = = 0) return 0
        if(n = = 1) return 1
        else
        return (Fib(n − 1) + Fib(n − 2))
}

   (b) Find the time complexity of the following 5
loop :
        for (i = 1; i ≤ n ; i + +)
            i = i * 3

5. (a) What is Greedy technique ? What type of 5
problems can be solved by using greedy
techniques ?

   (b) Apply the Quicksort algorithm to sort the 5
given elements. 5, 8, 2, 7, 9, 15, 4 units its
time complexity in worst case.