

**BACHELOR OF COMPUTER APPLICATIONS
(Revised)****Term-End Examination**

01144

December, 2014**BCS-042 : INTRODUCTION TO ALGORITHM DESIGN***Time : 2 hours**Maximum Marks : 50*

Note : Question number 1 is compulsory. Answer any three from the rest. Pseudo code should be nearer to C-programming language notation.

SECTION A

1. (i) Given a list of integers (shown below), determine the number of comparisons and assignment operation used by bubble sort to sort the list. Show the process of sorting.

35	8	7	15	25	30	10	12
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Perform worst case analysis.

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- (ii) Prove or disprove the following using the basic definition of O (big Oh) :

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$$5n^2 + 8n + 15 = O(n^2)$$

- (iii) Group the following function by complexity category : 2

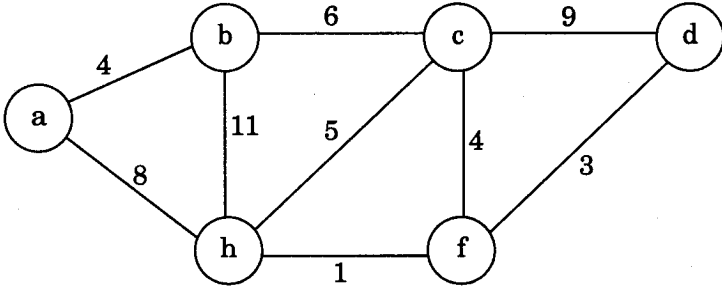
$$2^n, n, n!, \sqrt{n}, 4n + 12$$

- (iv) Apply DFS and BFS to the complete graph on four vertices. List the vertices in the order they would be visited. 6

SECTION B

2. Write Prim's algorithm and apply to find minimum cost spanning tree for the following graph :

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3. Illustrate the working of binary search tree while searching for the element 14 in the following sorted array :

8	14	20	25	35	45	50	85	95	100
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Also analyze the algorithm for best and worst cases.

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4. (i) What is recurrence relation ? Write a recurrence equation for any algorithm which follows Divide and Conquer strategy and explain it.

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- (ii) Define the following terms : 5
- Backtracking
 - Dynamic Programming
 - Time Complexity
 - Asymptotic Analysis
 - Upper Bound
5. (i) Suppose you are given currency notes of all denominations, e.g. (2, 5, 10, 15, 20, 100, 500). Further it is assumed that currency notes of each denomination are available in sufficient numbers for the purpose of using the minimum number of notes. The problem is to find the minimum number of currency notes to make the amount of 437 using the Greedy approach. Show the sequence of steps for selection and rejection of notes. 6
- (ii) Define the following terms : 4
- Connected Graphs
 - Path
 - Cycle
 - Tree
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