

**BACHELOR OF COMPUTER APPLICATIONS
(Revised)**

02063 Term-End Examination

June, 2015

BCS-042 : INTRODUCTION TO ALGORITHM DESIGN

Time : 2 hours

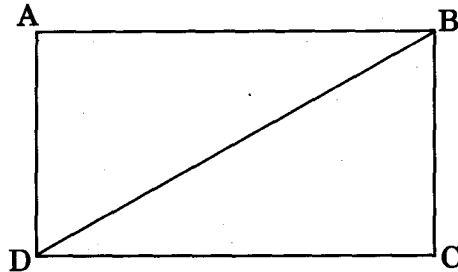
Maximum Marks : 50

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

1. (a) Write an algorithm to compute a^n by left to right binary exponentiation method and illustrate through an example. 6
- (b) Do the complexity analysis of the above algorithm. 4
- (c) Put the following classes of algorithm in the increasing order of growth : 2
 $O(2^n)$, $O(n \log_2 n)$, $O(\log_2 n)$, $O(n)$.
- (d) Using the definition of Big Oh, show that 4
 $6n^2 + 20n = O(n^3)$.

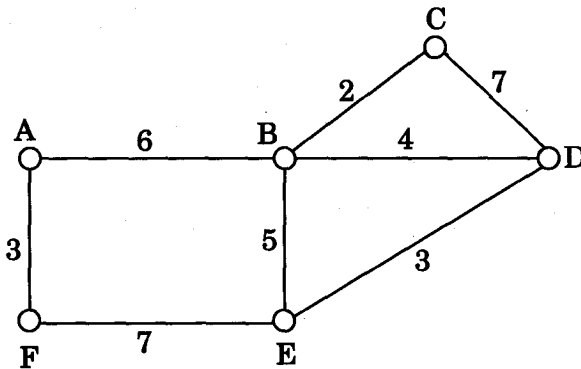
- (e) What is the difference between a graph and a tree? Draw four spanning trees of the following graph :

4



2. Apply Kruskal's algorithm to find a minimum cost spanning tree of the following graph :

10



3. (a) Apply the Merge Sort algorithm to sort the following list :

6

15 5 8 7 4 20 25

- (b) Describe any two methods of solving the recurrence relation.

4

4. Explain the following terms with examples : 10

- (a) Complete graph
- (b) Combinatorial problems
- (c) Branch and bound technique
- (d) Loose bound
- (e) Average case

5. (a) Find the optimal solution to the knapsack instance (fractional) : 6

$$n = 5, M = 10$$

$$(P_1, P_2, P_3, P_4, P_5) = (14, 24, 32, 18, 20)$$

$$(W_1, W_2, W_3, W_4, W_5) = (7, 8, 4, 3, 5)$$

(b) What is a single source shortest path problem? What are the proposed solutions?

4
