

Day : Tuesday  
Date : 05/06/2018

S-2018-2297

Time : 10.00 AM TO 01.00 PM  
Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Assume suitable data if necessary.

**Q.1** What is an algorithm? What is the difference between algorithm and efficient algorithm? Write an essential properties of algorithm with suitable example. [10]

**OR**

What are asymptotic notations? Explain Big-oh(O), Theta ( $\theta$ ) and Omega ( $\Omega$ ) notation with suitable example.

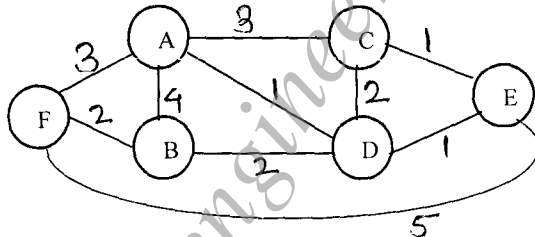
**Q.2** What is use of Threaded Binary Tree? Give the node structure required for a Threaded Binary Tree. Write a pseudo 'c' algorithm for inorder threading of binary tree. [10]

**OR**

What is B-tree? Write the properties of B-tree. Draw the B-tree of order 3 created by inserting data arriving in the following sequence:

82, 14, 7, 8, 12, 9, 23, 5, 6, 16, 19, 20, 78.

**Q.3** Find the minimum spanning tree using Prim's algorithm for given graph. [10]



**OR**

What is the minimal spanning tree? How is it different than the shortest path sequence of a given graph? Justify your answer with an example.

**Q.4** What is the problem with Naïve algorithm and how it is addressed in Knuth-Morris-Pratt (KMP) algorithm? [10]

**OR**

Write down KMP algorithm for string matching. Compute the prefix function for the pattern:

a b a b b a b b a b b a b b a b b.

**Q.5** What is Priority Queue? Explain Enqueue and Dequeue operations of priority queue. [10]

**OR**

What is Priority Queue? How to implement priority queue using a heap?

**Q.6** What is Dynamic Programming? Explain with example the Travelling Salesman Problem using Dynamic Programming. [10]

**OR**

Explain with example 0/1 Knapsack problem using Dynamic Programming? What are the limitations of Dynamic Programming?

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