MCA (Revised) / BCA (Revised)

Term-End Examination

February, 2021

MCS-021 : DATA AND FILE STRUCTURES

Time : 3 hours *Maximum Marks : 100*

(Weightage : 75%)

Note : *Question number **1** is **compulsory**. Attempt any **three** questions from the rest. All algorithms should be written nearer to 'C' language.*

---

1. (a) Write 'C' program to implement queue using array. *10*

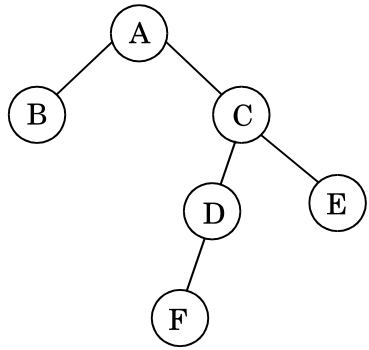
(b) Write binary search algorithm. Find its time complexity. Explain the process of finding 10 in the following list using binary search. *10*

2 6 8 10 12 15

(c) Write quick sort algorithm and sort the following list using quick sort algorithm. Show intermediate steps of sorting. *10*

16, 8, 12, 9, 6, 2, 5

(d) Traverse the following tree in Preorder and Postorder. *10*



2. (a) Write Dijkstra's Algorithm for finding shortest path. *10*

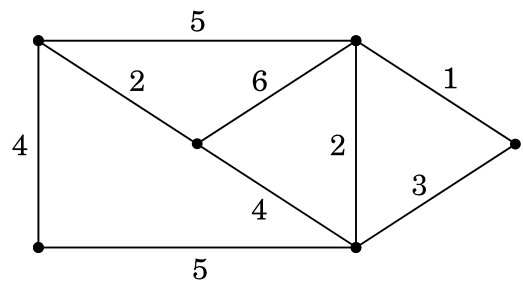
(b) Write push and pop functions for stack data structure using linked list. *10*

3. (a) Write an algorithm to add two polynomials. *10*

(b) Convert the following infix expression into postfix expression : *10*

(A + B) * (C / D) – E

4. (a) Find Minimum cost spanning tree for the following graph using Prim's Algorithm. *10*



(b) What is sequential file organization ? What are its disadvantages ? Explain how indexed sequential file organization is better than sequential file organization. *10*

5. (a) Write an algorithm for inserting a node in a Red-Black tree and explain it with the help of an example. *10*

(b) Explain the structure of a binary tree. Write an algorithm for implementation of a binary tree. *10*