

No. of Printed Pages : 4

**MCS-021**

**M. C. A. (REVISED)/B. C. A. (REVISED)**  
**(MCA/BCA)**

**Term-End Examination**

**June, 2021**

**MCS-021 : DATA AND FILE STRUCTURES**

*Time : 3 Hours*

*Maximum Marks : 100*

*Weightage : 75%*

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**Note :** (i) *Question No. 1 is compulsory.*

(ii) *Attempt any **three** questions from the rest.*

(iii) *All algorithms should be written near to 'C' language.*

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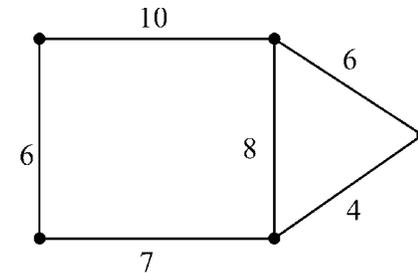
1. (a) Write algorithm for push and pop operations of a stack. Also write algorithm to check whether stack is empty or not. 10

**P. T. O.**

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- (b) What is circular queue ? Write algorithms for adding element to and deleting element from circular queue. 10
- (c) Describe Big O and  $\Omega$  notations in detail. 10
- (d) Find minimum cost spanning tree for the graph given below using Kruskal's algorithm : 10



2. (a) What is AVL tree ? Explain how a node is inserted into an AVL tree and how a node is deleted from an AVL tree. 10

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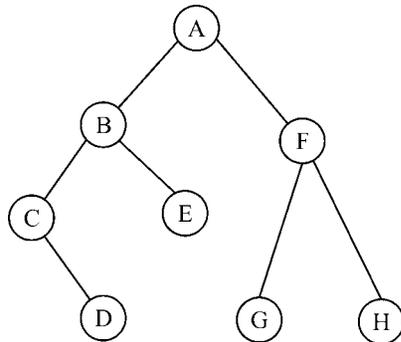
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- (b) Write any *five* differences between arrays and pointers in 'C' Programming Language. 5
- (c) Write linear search algorithm and find its time complexity. 5
3. (a) What is a Red-Black Tree ? Explain its properties. 6
- (b) Explain Direct-File organisation. 6
- (c) Sort the following list using bubble sort in ascending order : 8

25, 29, 8, 68, 92, 30, 40

Show intermediate steps of the process.

4. (a) Traverse the following Binary tree in : 10
- (i) Pre-order
- (ii) Post-order



P. T. O.

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- (b) Write an algorithm to implement singly linked list using pointers. 10
5. (a) Explain the difference between row-major representation of an array and column major representation of an array with the help of a suitable example. 10
- (b) Write short notes on the following : 5 each
- (i) Adjacency matrix representation of graph
- (ii) Binary search

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