

Roll No. : .....

Total No. of Questions : 16 ]

[ Total No. of Printed Pages : 3

# SCOM-316

M.Sc. (IIIrd Semester) Examination, 2021

## COMPUTER SCIENCE

Paper - MCS-301

(Data Structure)

Time : 1½ Hours ]

[ Maximum Marks : 40

### Section-A

(Marks : 1 × 10 = 10)

**Note :-** Answer all *ten* questions (Answer limit **50** words). Each question carries 1 mark.

### Section-B

(Marks : 3 × 5 = 15)

**Note :-** Answer any *five* questions by selecting at least *one* question from each Unit (Answer limit **200** words). Each question carries **3** marks.

### Section-C

(Marks : 5 × 3 = 15)

**Note :-** Answer any *three* questions by selecting *one* question from each Unit (Answer limit **500** words). Each question carries **5** marks.

### Section-A

1 each

1. (i) Define ADI.
- (ii) What is the minimum number of nodes in an AVL tree of Height 5 ?
- (iii) Define Recursion.
- (iv) What is Postfix Expression of  $A + B * C$  ?
- (v) What is Strictly Binary Tree ?

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- (vi) What are Linear Data Structures ?
- (vii) What is Circular Queue ?
- (viii) What do you mean by Time Complexity ?
- (ix) Define Graph.
- (x) Draw an expression tree for the following expression and write the post order for the same :

$$(a + b * C) ^ ((d * e - f)/g)$$

**Section-B**

3 each

**Unit-I**

- 2. Explain space complexity of an algorithm.
- 3. Explain the process of polynomial division in linked lists.
- 4. Why time complexity of an algorithm is expressed as a function of input size ?  
What are polynomial time algorithm ? Give an example.

**Unit-II**

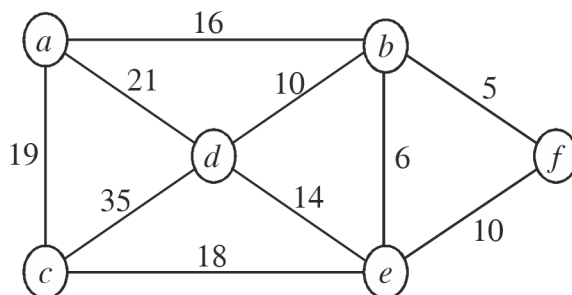
- 5. Convert the following infix expression into postfix (reverse polish) format showing stack status after every step in tabular form :

$$(a + b ^ c ^ d) * (e + f/d)$$

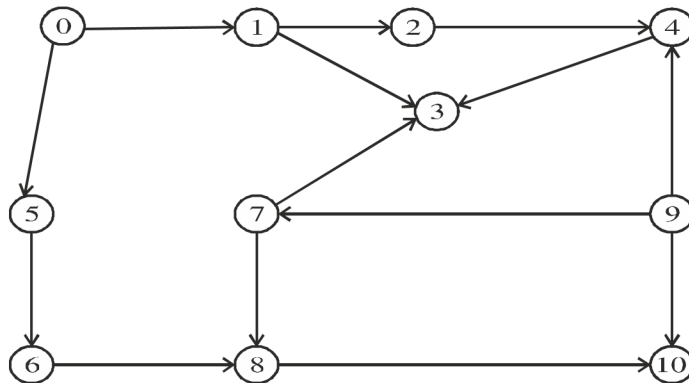
- 6. Explain the difference between stack and queue with suitable example.
- 7. Explain the double ended queue with the help of suitable example.

**Unit-III**

- 8. Explain the following with example :
  - (a) Strictly binary tree
  - (b) Complete binary tree
- 9. Using Kruskal algorithm find minimum spanning tree for the following graph :



10. Find the BFS topological sorting of the following graph :



**Section-C**

5 each

**Unit-I**

- 11. Write a function for deletion of a node from double linked list.
- 12. Discuss the advantages and disadvantages of linked list over array.

**Unit-II**

- 13. What is FIFO ? Explain insert and delete operation in simple queue.
- 14. Explain how to convert infix expression to postfix expression and write all the rules.

**Unit-III**

- 15. Create a Binary Search Tree for the following data and do in-order, preorder and post-order traversal of the tree :  
40, 60, 15, 4, 30, 70, 65, 10, 95, 25
- 16. Compare BFS and DFS traversal methods for Graph with suitable example.