

# COSEM-350

M.Sc. (IIIrd Semester) Examination, Dec., 2023

## COMPUTER SCIENCE

Paper - FS-COMP-MSC-CS-CC-301

(Data Structure)

Time : 3 Hours ]

प्री जैव (पी.जी.) कॉलेज, बोकारो

[ Maximum Marks : 40

The question paper contains three Sections.

### Section-A

(Marks :  $1 \times 10 = 10$ )

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

### Section-B

(Marks :  $3 \times 5 = 15$ )

**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 :  $5 \times 3 = 15$ )

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

### Section-A

1. (i) Define Algorithm.
- (ii) How can we say an algorithm is efficient or not ?

BB-106

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- (iii) List basic operations of Linked Lists.
- (iv) Differentiate LIFO and FIFO.
- (v) What do you understand by a Priority Queue ?
- (vi) Define Recursion Array.
- (vii) What is Binary Tree ?
- (viii) Define AVL Tree.
- (ix) What is Weight in a Graph ?
- (x) List different types of Graphs.

### **Section-B**

#### **Unit-I**

- 2. Explain various methods of Algorithm Analysis.
- 3. Write applications of Linked Lists.
- 4. Write an algorithm to insert a node at the end of a linear linked list.

#### **Unit-II**

- 5. Differentiate Stack and Queue.
- 6. How stack is useful for Recursion ? Explain.
- 7. Write algorithms to insert an element in a stack and a queue. Use linked representation.

#### **Unit-III**

- 8. Explain Array Representation of a Tree.
- 9. Differentiate :
  - (i) Directed and Undirected Graphs
  - (ii) B-tree and AVL-tree
- 10. What is Hight Balancing ? How is it achieved when a node is inserted in an AVL-tree ?

## Section-C

### Unit-I

11. Explain Algorithm Analysis in detail.
12. Explain a Circular Linked List.

### Unit-II

13. (i) Differentiate Infix, Postfix and Prefix.  
(ii) Convert the following expressions in Prefix and Postfix :
  - (a)  $A \mid D * F \wedge B - A + Z \mid C$
  - (b)  $2^4 * 3^4 + 5 \mid 2^2$
14. Explain insertion in a circular queue with a suitable example.

### Unit-III

15. Explain Depth first Traversal in a graph with suitable example.
16. (i) Write applications of Binary Tree.  
(ii) Give Pre-order, Post-order and In-order traversals of the following tree :

