

## IM.SC.(CS)(Old) Sem.-4 Examination

Data structure  
June-2025

Time : 3.00 Hours]

[Max.Marks : 70

- Q1(a) Give difference with examples of each. [10]
- Graph and tree
  - FIFO and LIFO
  - Overflow and underflow
  - Static and dynamic memory allocation
  - Linked list and structures

- Q1(b). [5]
- Give method for calculation of address of array element if base address is known
  - What is polish notation ? convert  $A*(B+C)/D$  to polish notation

- Q2. [08]
- Explain push pop operations of stack. Give applications of stack
  - Give limitations of linear queue. How it can be solved using circular queue

OR

- Q2. [08]
- Write algorithm for and demonstrate contents of stack for postfix evaluation
  - Write algorithms for insertion and deletion in linear queue

- Q3. [12]
- Write algorithms for (ANY FOUR):
- Insertion at end in a doubly linked list
  - Deletion of given element in singly linked list
  - Count number of even nodes (nodes with data part with even number) in singly linked list
  - Insertion at beginning in circular linked list
  - Insertion after given node in singly linked list
  - Insertion of given node in doubly linked list
  - Deletion of last node in singly linked list
  - Display every alternate node in singly linked list

- Q4.(a) [5]
- Which data structure is used in the following:
- LAN network in computer lab
  - Directory structure in OS
  - Calling nested functions
  - CPU scheduling (FCFS and Priority)
  - Cable operator while laying out cables in society

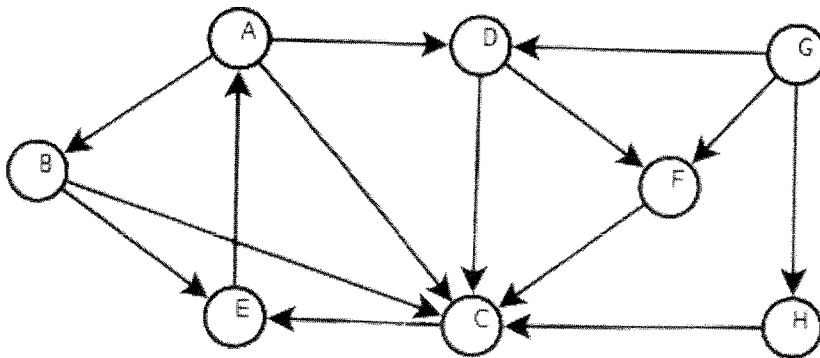
Q4.(b) What are two ways to represent tree in memory of computer? Give example using a suitable tree. What are drawbacks of array representation. [5]

Q5. Write recursive algorithms for preorder, inorder and postorder of a binary tree. Draw trees for following: [10]

- i. Expression tree for given expression:  $(a + b * c) + ((d * e + f) * g)$
- ii. Binary search tree for given data 8,1,2,14,12,9,21,6,10,4

OR

Q5. For given graph perform BFS and DFS. Show the contents of relevant data structure . [10]  
Take A as starting node



Q6. (a) Write algorithm for bubble sort algorithm. Write its best, average and worst case complexity [5]

Q6(b). What is use of spanning tree? For given graph find minimum spanning tree using Prim's algorithm and Kruskal's algorithm. Show the intermediate steps [10]

