

MCA Sem.-1 Examination**Data Structures****January-2025****Time : 3-00 Hours]****[Max. Marks : 50**

- Q1(a) Give difference with examples of each. [05]
- Graph and tree
 - FIFO and LIFO
 - Overflow and underflow
 - Static and dynamic memory allocation
 - Linked list and structures

- Q1(b). Justify (ANY TWO): [4]
- Base address of array can give address of any element in the array
 - Stacks are LIFO data structures
 - Adjacency matrix of undirected graph is symmetric

- Q2. [08]
- Write algorithm for and demonstrate contents of stack for postfix evaluation of given expression: $231*+9-$
 - 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 infix to postfix to postfix conversion $A+B*(C^D-E)$
 - What is the need of conversion of infix to postfix?

- Q3. Write algorithms for (ANY FOUR): [8]
- 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

(P.T.O)

SECTION-II

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

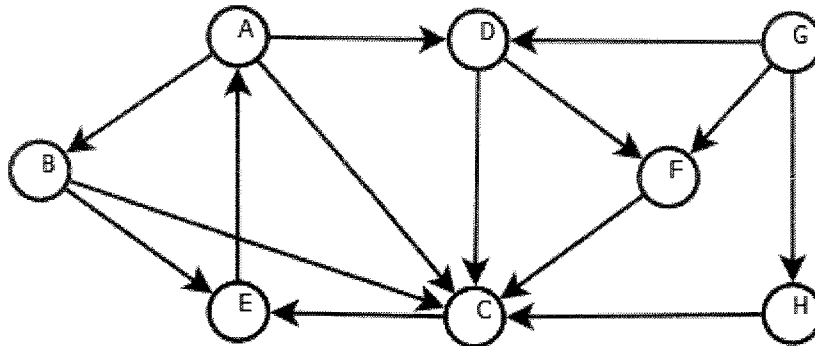
- Q4.(b) What are two ways to represent tree in memory of computer? Give example using a suitable tree. What are drawbacks of array representation. [4]

- Q5. Draw trees for following and perform Different traversals on it. Do u get any specific observations from tree traversals of given trees ? Comment [8]

- 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 digen graph perform BFS and DFS. Show the contents of relevant data structure [8]



- Q6. For given graph find minimum spanning tree using Prim's algorithm and Kruskal's algorithm. Show the intermediate steps [8]

