

BCA / D-16
DATA STRUCTURE
Paper-BCA-232

*Time allowed : 3 hours]**[Maximum marks : 80*

Note : *Attempt five questions, selecting one question from each section. Question No. 1 is compulsory. All questions carry equal marks.*

(Compulsory Question)

1. (a) How a two dimensional array is represented in memory? 2
- (b) Convert the infix expression $(A - B) * (D | E)$ into prefix expression and postfix expression. 3
- (c) Why a queue structure is called a First Come and First Serve (FCFS) structure? 3
- (d) Define space and time complexity of an algorithm? 3
- (e) Linked list structures are called dynamic memory allocating structures. How? 3
- (f) Differentiate a strictly binary tree and a binary tree? 2

Section-A

2. (a) Define an array of strings. How is it stored in memory?
- (b) Explain BiG O Notation for computing time and space complexity of an algorithm? 8,8

(2)

3. Write notes on the following operations on a data structure :

- (a) Traversing a structure
- (b) Sorting
- (c) Indexing
- (d) Updating.

4×4

Section-B

4. (a) 'Arrays are static memory allocating data structures'.
How ?

- (b) Write an algorithm to calculate average of a one dimensional array A [15] Containing numeric values.

8,8

5. (a) Differentiate a single linked list and a double linked list ?

- (b) Write an algorithm to insert a node in a single linked list.

8,8

Section-C

6. (a) When a stack is called full and empty ? Write basic operations performed on a stack.

- (b) Discuss two application areas of a stack data structure.

8,8

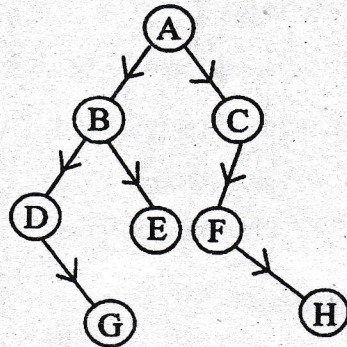
7. (a) Differentiate a queue from a dequeue with representation in memory.

- (b) Develop algorithms to insert and delete a data element in a queue.

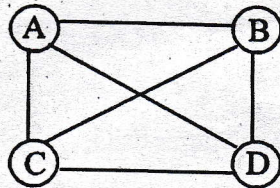
8,8

Section-D

8. Give a binary tree, define the following :



- | | |
|---|---|
| (a) Terminal nodes | 2 |
| (b) Non-terminal nodes | 2 |
| (c) Level and height of each node | 2 |
| (d) Sequential representation in memory | 5 |
| (e) Linked representation in memory. | 5 |
9. Consider the graph (G) with four vertices :
Given below :



Explain the following of the above graph :

- | | |
|--|---------|
| (a) Degree of each vertex | |
| (b) A path matrix | |
| (c) An Adjacency matrix representation | |
| (d) An Adjacency list representations. | 3,3,5,5 |