

24/1158**B.C.A. (Third Semester)**
Examination, 2024**Second Paper****(Data Structure Using C & C++)****Time : Two Hours]** / Maximum Marks : 75**Note :** Attempt **all** sections as directed.**Section-A****(Very Short Answer Type Questions)****Note:** Attempt all the **05** (five) questions.

Each question carries **02** (two) marks
 and the answer of each question should
 not exceed 50 words. $5 \times 2 = 10$

1. (a) Define Array, Row major Representation and column major form of representation of arrays.

24/1158

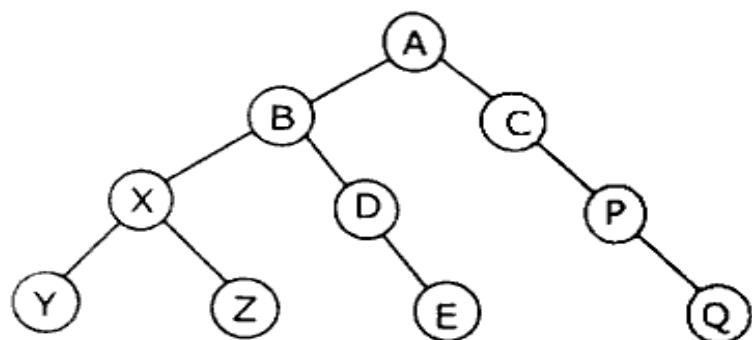
- (b) Illustrate with example. Space Array, Lower Triangular matrix.
- (c) Convert to postfix:
 $b^{**} 2 - 4 * a * c$ or $b^2 - 4 * a * c$
- (d) Illustrate Binary Search Tree with an example.
- (e) What do you mean by Deque (D-queue)? Illustrate with an example.

Section-B**(Short Answer Type Questions)**

Note : Attempt any **05** (five) questions out of total 08 (Eight) questions. Each question carries **05** (five) marks and answer of each question should not exceed 100 words. $5 \times 5 = 25$

2. (a) Define Stack and the primitive operations upon it. What do you understand by the 'overflow' and under flow condition?

- (b) Show with an example how a stack may be used for evaluation of a postfix expression.
- (c) What is a priority queue? Explain its use with an example.
- (d) What is the difference between a singly linked list and a doubly linked list? Show diagrammatically.
- (e) Write the inorder traversal of the following Binary tree:



- (f) What are the applications of B-trees?
- (g) What is a 'heap'? Explain with an example and state its properties.
- (h) What is hashing? Explain briefly.

24/1158

24/1158

Section-C

(Long Answer Type Questions)

Note : Attempt any **two (02)** questions out of total **04** (four) questions. Each question carries 20 (twenty) marks and the answer of each question should not exceed 400 words. $2 \times 20 = 40$

3. (a) (i) Illustrate the process/steps of insertion and deletion of nodes in a circular linked list.
(ii) What are the applications of the stack data structure?
- (b) Write the algorithm for merge sort, Trace it with an example data set of ten numbers. What is the Time Complexity of this algorithm?
- (c) Differentiate between the following:
(i) Prefix and Postfix expressions
(ii) Sorting and Indexing
(iii) LIFO and FIFO (with example)
(iv) Linear Search and Binary search
- (d) Write a short note on:
(i) Traversal of Binary Trees
(ii) Insertion sort