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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. 5×2=10

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

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- (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

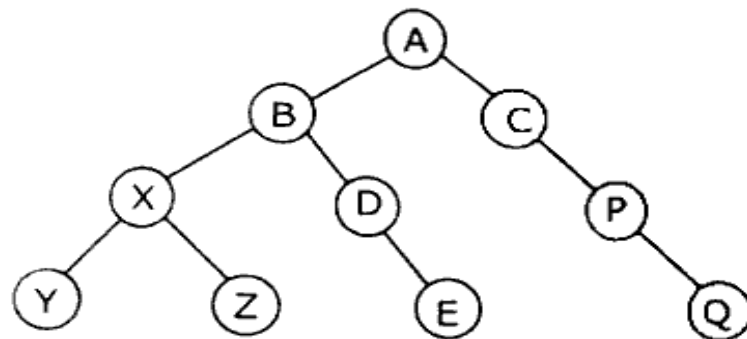
(Short Answer Type Questions)

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. 5×5=25

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

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- (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 diagram matically.
- (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.

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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 application 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