Convert following arithmetic infix expression into postfix by using stack :

$a*(b+c)+(b/d)*a+z*u$

(CO2, CO2)

5. (a) What is priority queue ? How is it different from deques ? Explain with an example. (CO2, CO2)

OR

(b) What is stack ? Write an algorithm for push and pop operations. (CO2, CO2)

H Roll No. .....

TBC–201/TBI–201/TBS–201

B. C. A./B. SC. (IT)/B. SC. (CS)
(SECOND SEMESTER)
MID SEMESTER
EXAMINATION, April, 2023

DATA STRUCTURES AND FILE ORGANIZATION

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) What is an algorithm ? Explain its characteristics. Write an algorithm to search a given element X in an array of N elements. (CO1, CO1)

OR

(b) What is data structure ? Explain primitive and non-primitive data structure with example. (CO1, CO1)

P. T. O.

2. (a) What are pointers in C ? Explain its use ? What is the output of the following code :

```
#include <stdio.h>
int main( )
{
 float arr[5] = {12.5, 10.0, 13.5, 90.5, 0.5};
 float *ptrl = &arr[0];
 float *ptr2 = ptrl + 3;
 printf("%f", *ptr2);
 printf("%f", *ptr2 - *ptr1);
 return 0;
}
```

(CO1, CO1)

OR

(b) Explain time and space complexity. Find the time complexity of the following code :

```
Void fun(int n)
{
    if (n < 5)
        printf("Hello world");
    else {
        for (int i = 0; i < n; i++) {
            printf("%d", i);
        }
    }
}
```

(CO1, CO1)

3. (a) Given an array, arr[1.....10] [1.....15] with base value 100 and the size of each element is 2 Byte in memory. Find the address of arr[8][8] with the help of row-major order. (CO1, CO2)

OR

(b) Enlist the differences between stack and queue.

Consider the following sequence of operations on an empty stack.

push(54); push(52); pop(); push(55); push(62); s = pop();

Consider the following sequence of operations on an empty queue.

enqueue(21); enqueue(24); dequeue(); enqueue(28); enqueue(32); q = dequeue();

Find the value of s+q. (CO1, CO2)

4. (a) What is sparse matrix ? Write an algorithm to insert and delete an element from an array. (CO2, CO2)

OR

(b) Write an algorithm to convert infix expression into postfix by using stack.