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.

                                      P. T. O.