NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-15

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

II YEAR B.TECH , RETEST

CSPC32 DATA STRUCTURES

DATE: 23-11-2023 **ANSWER ALL QUESTIONS** **Max Marks: 20**

(3)

1. Consider the following code:

```
#define EOF -1
void push (int); /* push the argument on the stack */
int pop (void); /* pop the top of the stack */
void flagError ();
int main ()
{           int c, m, n, r;
            while ((c = getchar ()) != EOF)
            { if (isdigit (c) )
              push (c);
            else if ((c == '+') || (c == '*'))
             {    m = pop ();
                  n = pop ();
                  r = (c == '+') ? n + m : n*m;
                  push (r);
             }
             else if (c != ' ')
             flagError ();  }
        printf("% c", pop ());  }
```

What is the output of the program for the input: **5 2 * 3 3 2 + * +**

2. Consider the following function:

```
void f (queue Q) {
int i ;
if (!isEmpty(Q)) {
i = delete(Q);
f(Q);
insert(Q, i);  }
}
```

What operation is performed by the above function f ?

(2)

3. Write an algorithm /pseudocode to reverse alternate groups of k nodes in a linked list.
Example Input: List = 1->2->3->4->5->6->7->8->9->10->11 and k = 3
Output List: 3->2->1->4->5->6->9->8->7->10->11 (3)

4. Take your 9-digit roll number. Append it to the reverse of the double of your roll number. The resultant string of digits is grouped into pairs of 2. Each group is considered to be a number. Considering each of these numbers from left to right, perform insertion on an AVL Tree, showing all the proper steps and rotations. (3)

5. A binary tree T has 200 leaves. How many numbers of nodes in T having two children? (3)

6. The preorder traversal sequence of a binary search tree is 25, 15, 10, 4, 12, 22, 18, 24, 50, 35, 31, 44, 70, 66 and 90. What is the post order traversal of the same tree? (3)

7. An undirected graph G(V, E) contains n (n > 2) nodes named v1 , v2 ,…,vn. Two nodes vi , vj are connected if and only if 0 < |i - j| <= 2. Each edge (vi, vj) is assigned a weight i + j. The Minimum Spanning Tree (MST) of such a graph with 10 nodes is constructed. What is the length of the path from v5 to v3 in this MST? (3)