Mahindra University Hyderabad
École Centrale School of Engineering
Minor–II

Program: B. Tech. **Branch: CSE, AI, ECM, CM** **Year: I** **Semester: II**
Subject: Data Structures (CS1203)

Date: 02/05/2023 **Start Time: 10:00 am**
Time Duration: 1.5 Hours **Max. Marks: 50**

Instructions:
1) All questions are compulsory.
2) Solve questions in the order in the answer script.

Q.1(Marks:5+5)

(i) Convert the following infix expression into a postfix expression.

A * (B + D) / E / F * (G + H / K)

(ii) Evaluate the following postfix expression.

12, 7, 3, -, / , 2, 1, 5 , + , * , +

Q.2(Marks:10) A function f defined on stacks of integers satisfies the following properties.
f(NULL) = 0 and f (push (S, i)) = max (f(S), 0) + i for all stacks S and integers i.
If a stack S contains the integers 2, -3, 2, -1, 2 in order from bottom to top, what is f(S)? → 3

Q.3(Marks:5+5) Let a and b denotes positive integers. Suppose a function Q is defined recursively as follows:

$$Q(a,b) = \begin{cases} 0 & \text{if } a < b \\ Q(a-b, b) + 1 & \text{if } b \le a \end{cases}$$

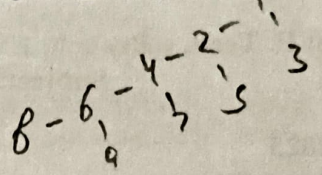
(a) Find the value of Q (2,3) and Q(14,3) → 4
(b) Find the value of Q (7345,8) → 916

Q.4 (Marks:5+2.5+2.5) The postorder traversal of the binary tree is 8,9,6,7,4,5,2,3,1. The inorder traversal of the same tree is 8,6,9,4,7,2,5,1,3. Using the given information do the following.

(i) Draw the tree.

(ii) Find the depth of the tree.

(iii) Find the pre-order traversal of the tree.



Q.5 (Marks:5+5) Write algorithms for enqueue and de-queue operarion of circular queue. (Only write algorithm or pseudo code, don't write any example).