Mahindra University Hyderabad
École Centrale School of Engineering
Minor–I

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

Date: 09/03/2023 **Start Time: 10:00 am**
Time Duration: 1.5 Hours **Max. Marks: 50**

Instructions:
1) All questions are compulsory.
2) Solve questions order-wise in the answer script.
3) Ignore compilation errors in code-related questions.

Q.1(Marks:10) Write an algorithm to insert a node in the last of **singly linked list.** (Please don't write C code. Only write an algorithm in terms of variables and nodes).

Q.2 (Marks: 2+4+4] Write why we need linked list over array? Also write any 4 real life applications of linked list. Explain how polynomial expression are respresnted using linked list with example.

Q.3 (Marks:10). The following c function takes a singly linked list as input argument. It modified the list by moving the last element to the front of the list and returns the modified list. Some part of the code is left blank. ~~Identify the appropriate code from the following options.~~

```
typedef struct node{
int value;
struct node *next;
}node;
node *move_to_front(node *head)
{
   node *p , *q;
   if(head==NULL)||(head->next ==NULL))
      return head;
   q = NULL;
   p = head;
   while(p->next !=NULL)
   {
      q = p;
      p=p->next;
   }
   _____
   return head;
}
```

Q.4 (Marks:10). Consider the following pseudocode. Write value of x and i after termination of while loop.

```
x:=1;
i:=1;
while (x ≤ 500)
begin
    x:=2^x ;
    i:=i+1;
end
```

Q.5 (Marks:10) Find complexity of following function. (No marks will be given for direct answer, solve the problem step by step)

```
void fun (int n, int x)

{
a=5, b=1;
   for (int i = 1; i < n; i = i * x)
      {
       b=a;
      }
}
```