CS1131 (Data Structure and Algorithms)
Quiz-2

B

5/10

Time - 30 Minutes

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Q1. What will be the error/output of the following C code? **2 Marks**

```
The queue, q: 10 20 30

//peek: returns top of the stack
void fun(queue * q, stack * s){
      if(isEmpty(q)){
            return s;
      }
      int ele = dequeue(q);
      fun(q,s);
      printf("%d ", ele);
      push(s, ele);
      printf("%d ", peek(s));
}
```

Answer: 30 30

```
The linked list is: 11->12->13->14->15

void fun(struct node * start){
   if (start->next == NULL)
            return;
   else{
      printf("%d ", start->next->data);
      fun(start->next);
      printf("%d ", start->next->data);
   }
}
```

Answer: 12 14 15, ~~14 13 12 11~~, 14 13 12

Q2. What is the complexity of the following? **1 Mark**

```
void fun(int n, int m) {
    for (int i = n/2; i <= n; i++)
      printf("Hello");
    for (int i = 1; i <= m; i++)
      printf("Hello");
}
```

Answer: O(n+m)

```
void fun(int n) {
      for (int i = n/2; i < n; i++)
         for (int j = 1;j<n ;j= j*2)
            printf("Hello");
}
```

Answer: O(N/2)

Q3. **Show the output for the following:** **1 Mark**

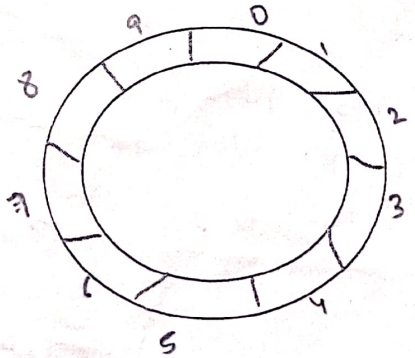
Given a circular array-based queue Q capable of holding 10 objects. Show the **final contents of the array with front and rear** after the following code is executed:

```
for (int k = 1; k ≤ 6; k++)
   Q.enqueue(k);
for (int k = 1; k ≤ 2; k++)
   Q.enqueue(Q.dequeue());
```

Initialization
front= 4
rear = 3

the final queue

4 5 6 1 2 3



Q4. Assume that you have to create a stack of characters.

A. Create a structure to represent the stack

B. Write a function for **pop** assuming the stack is created using a linked list.

1.5 Mark

sol:-

A)
```
typedef struct{
    int top;
    char arr[size];
} stack;
```
through array

B)
```
char Pop( Node * top ){
  if (top==NULL){
    Printf( " stack is empty");
  }
  Else{
    Node * temp = top;
    char c = temp -> data;
    temp = temp -> next;
    top = temp
    free(temp);
    return c;
  }
}
```

Q5. Assume that you have to create a queue of non-negative integers.

A) Create a structure to represent the queue

B) Write a function to **enqueue** an integer element in a queue. Assume the queue is implemented on an array

1.5 Mark

sol:-

A)
```
typedef struct{
    int f;
    int r;
    int arr[size];
    int size;
} queue;
```

B)
```
void enqueue ( queue * q , int ele){
  if ( q->r == q->size-1 ){
    Printf (" queue is full")
    return;
  }
  Else {
    q->r++;
    q->arr[q->r] = ele;
  }
}
```

Q6. Fill in the complexity and

1.5 Mark

a) Complete the table

	Array (fixed size)	Linked List
Deletion (At beginning)	O(N)	O(1)

b) The worst case complexity of **Selection sort** is O(N²)

Q7. Evaluate the postfix expression 15 3 - 3 / 5 + **using a stack that can store non-negative integers.** Show the changes in the stack

1.5 Mark

15 3 - / 3 5 +