Roll Number: 101918039

Thapar Institute of Engineering & Technology, Patiala

Department of Computer Science and Engineering

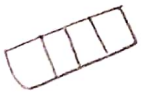
MID SEMESTER EXAMINATION

B. E. (First Year): Semester-II (2019/20) (CSBS)	Course Code: UCT203 Course Name: Data Structures and Algorithms
05 March, 2019	Time: 1:00 P.M. - 3:00 P.M.
M. Marks: 30	Name of Faculty: Dr. Rajendra Ku. Roul

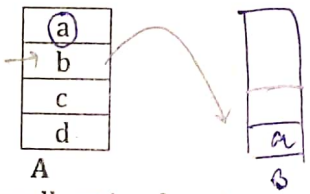
Note: **Attempt all questions in a proper sequence with justification. Assume missing data, if any, suitably. Draw the proper diagram to support your answers wherever required. Write only required function, not the entire program.**

Q1. Write a function in C which will insert integers to a circular array. Your code should have provision to check the *overflow condition* suitably. **[4]**

Q2. Write a recursive function to print all the elements of a single linked list in a reverse order. **[4]**



Q3. Stack **A** has the entries a, b, c, d (with **a** on the top). An entry popped out of stack **A** can be printed immediately or pushed to stack **B**. An entry popped out of stack **B** can only be printed. In this arrangement, how many permutations of a, b, c, d which are *not* possible and list them. **[3]**



Q4. a) Discuss different dynamic memory allocation functions used in C programming. What is the main difference between malloc( ) and calloc( )? **[4+2]**

b) Discuss different mathematical notations used to measure the time complexity of an algorithm. What is best case and worst case time complexity? **[3+2]**

Q5. Write a function in C to delete the first node of a double linked list. **[5]**

Q6. Assume the structure of a linked list as follows:

```
struct Node
{
  int data;
  struct Node *next;
};
```

What does the following function do for a given Linked List? **[3]**

```
void fun2(struct Node* head)
{
  if(head== NULL)
    return;
  printf("%d", head->data);
    if(head->next != NULL )
    fun2(head->next->next);
  printf("%d", head->data);
}
```