COURSE CODE(CREDITS): **18B11CI211 (4)**   MAX. MARKS: **15**

COURSE NAME: **DATA STRUCTURES AND ALGORITHMS**

COURSE INSTRUCTORS: **PKG, EGA, VKL, KLK, FSL**   MAX. TIME: **1 Hour**

Note: (a) Attempt all questions in sequential order.

(b)Marks are indicated against each question in square brackets.

(c) There is no syntax error. In case, if you found the same then ignore it and go ahead with the given problem.

Q1. Find the value of $O(f(n))$ for following given function, justify your answer: [CO2] [3]

$$f(n) = 8 + \sum_{i=3}^{n} i(i+1)$$

Q2. Find the worst case time complexity of following given code segment, justify your answer:

[CO2] [3]

```
int T1(int n){
int i, j, k, p, q =0;
p=0;
for(j=n; j>1; j=j/2)
++p;
for(k=1; k<p; k=k*2)
++q;
}
return q;
```

Q3. Answer the following questions in short: [CO1] [1+1+1]

    a)   What is the meaning of the statement: Int(*(*f[5])())[6]

    b)   Write an expression representing the following given terminology?

    " x is a pointer to array which is containing 5 integer pointers."

    c)   Consider the following code and find the value of x+y:

    int a[10], *x, *y;

    x = &a[5];

    y = &a[7];

Q4. Find the output of following program codes and justify your answers: [CO1][1.5+1.5]

```
\**********Program 1**********\
#include < stdio.h >
    void mystery(int *ptra, int *ptrb)
{
    int *temp;
    temp = ptrb;
    ptrb = ptra;
    ptra = temp;
}
int main() {
    int a=2016, b=0, c=4, d=42;
    mystery(&a, &b);
    if (a < c)
        mystery(&c, &a);
    mystery(&a, &d);
    printf("%d\n", a);
}
```

```
\***********Program 2***************\
#include< stdio.h >
struct Ournode{
 char x,y,z;
};
int main(){
 struct Ournode p = {'1', '0', 'a'+2};
 struct Ournode *q = &p;
 printf ("%c, %c", *((char*)q+1),
*((char*)q+2));
 return 0;
}
```

Q5. Write a function (in C) or pseudo code to insert an element at the end of a doubly linked list. Assume the presence of a **head** pointer pointing to the first node and a **tail** pointer pointing to the last node. Also discuss the time complexity for this insertion operation.   [CO4] [3]