

**Part A. (5 marks)**

What are the outputs of the following codes?

(1)

```
#include <iostream>
using namespace std;
int b(int i)
{
    int k,s=0;
    for (k=1;k<=i;k++)
        s=s+k*k;
    return s;
};
int main()
{
    cout<<b(4);
    return 0;
}
```

Answer: 30

(2)

```
#include <iostream>
using namespace std;
int f(int);
int main()
{
    cout<<f(4);
    return 0;
}
int f(int n)
{
    if (n>1)
        return n*f(n-1);
    else
        return 1;}

```

Answer: 24

(3)

```
#include <iostream>
using namespace std;
void e(int,int);
int main()
{
    e(3,5);
    return 0;
}
void e(int a,int b)
{
    int c;
    c=a; a=b;b=c;
    cout<<a<<" "<<b;
}

```

Answer: 5,3

(4)

```
#include <iostream>
using namespace std;
int a(int,int);
int main()
{
    cout<<a(4,-5);
    return 0;
}
int a(int m,int n)
{
    int s=m+n;
    if (s>=0)
        return s;
    else
        return (-s);
}

```

Answer: 1

(5)

```
#include <iostream>
using namespace std;
int sum(int n1)
{
    int p=0;
    while(n1>0)
    {
        p=p+(n1%10);
        n1=n1/10;
    }
    return p;
}
int main()
{
    cout<<sum(568);
    return 0;
}

```

Answer: 19



**Part B. (5+10 marks)**

(1) Write a program in C++ using functions that give addition and maximum of two integers.

Hint: void add(int,int);  
int max(int,int);

**Sample output:**

```
Enter first number:10
Enter second number : -15
The sum of 10 and -15 is :-5
The largest number is: 10
```

**Answer**

```
#include<iostream>
using namespace std;
void add(int,int);
int max(int,int);
int main()
{
int a,b;
cout <<"Enter first number:";
cin>>a;
cout<<"Enter second number : ";
cin>>b;
cout<<"The sum of "<<a<<" and "<<b<<" is :";
add(a,b);
cout <<" \n The largest number is: "<<max(a,b)<<endl;
return 0;
}
void add(int x,int y)
{
int s;
s=x+y;
cout<<s;
}
int max(int u,int v)
{ if(u>v)
return u;
else
return v;
}
```

(2) Write a program on C++ to create a Point using **structure** and give abscissa and ordinate of a point. Create two objects p1 and p2 and **3 functions** one to **read point** :give the abscissa and ordinate of a point, one to **print point** and a function that give the coordinates of **middle point** between of these two points in the plane. (Hint: the coordinates of middle point

$$\text{is} \left( \frac{x_{p1} + x_{p2}}{2}, \frac{y_{p1} + y_{p2}}{2} \right)$$

**Sample output:**

```
Enter x=5
Enter y=8
Enter x=3
Enter y=6
The middle point between (5,8) and (3,6) is: (4,7)
```

**Answer**

```
#include<iostream>
using namespace std;
struct Point
{
double x;
double y;
};
Point read_point()
{
Point p;

cout<<"Enter x=";
cin>>p.x;
cout<<"Enter y=";
cin>>p.y;
return p;
}
void print_point(Point p)
{
cout<<"("<<p.x<<","<<p.y<<")\n";
}
void middle (Point p1,Point p2)
{
double X,Y;
X=(p1.x+p2.x)/2;
Y=(p1.y+p2.y)/2;
cout<<"("<<X<<","<<Y<<")";
}
int main()
{
Point a1,a2;
a1=read_point();
a2=read_point();
cout<<"The middle point between\n";
print_point(a1);

cout<<"and\n";
print_point(a2);
cout<<"is:";
middle(a1,a2);
return 0;
}
```