

Question 3 [5 + 5 + 5 + 10 = 25 Marks]

a) (5 Marks) For the code given below, do the following:

1. Identify errors
2. Correct errors
3. Make sure there is no shallow copy
4. Write the output

```
class myClass{
```

```
private:
```

```
char* x;
```

```
int y;
```

```
const int z;
```

```
public:
```

```
static int a;
```

```
myClass(char* = NULL, int = 0, int = 0);
```

```
myClass(const myClass&);
```

```
~myClass();
```

```
static int getA() {
```

```
    y++;
```

```
    return a;
```

```
}
```

```
};
```

```
myClass::myClass(char* xPtr, int yVal, int zVal)
```

```
{
```

```
    x = xPtr; y
```

```
    = yVal; z
```

```
    = zVal;
```

```
    ++a;
```

```
}
```

```
myClass::myClass(const myClass& c)
```

```
{
```

```
    x = c.x;
```

```
    y = c.y;
```

```
    z = c.z;
```

```
}
```

```
myClass::~~myClass(){
```

```
    --a;
```

```
}
```

```
int main()
```

```
{
```

```
    cout << myClass::a << endl;
```

```
    myClass c1, c2;
```

```
}
```

```
//output:
```

The member variable z is declared as 'const', but it is assigned a value in the constructor.

The constructor is declared with default arguments but not defined properly.

delete x.
or delete[]

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```
myClass c3(c1);
cout << c1.a << endl;
```

//output:

```
if (c1.a == c2.a) {
    char arr[] = "new string";
    myClass c4(arr, 5, 6);
```

```
    cout << myClass::getA() << endl;
```

```
}
```

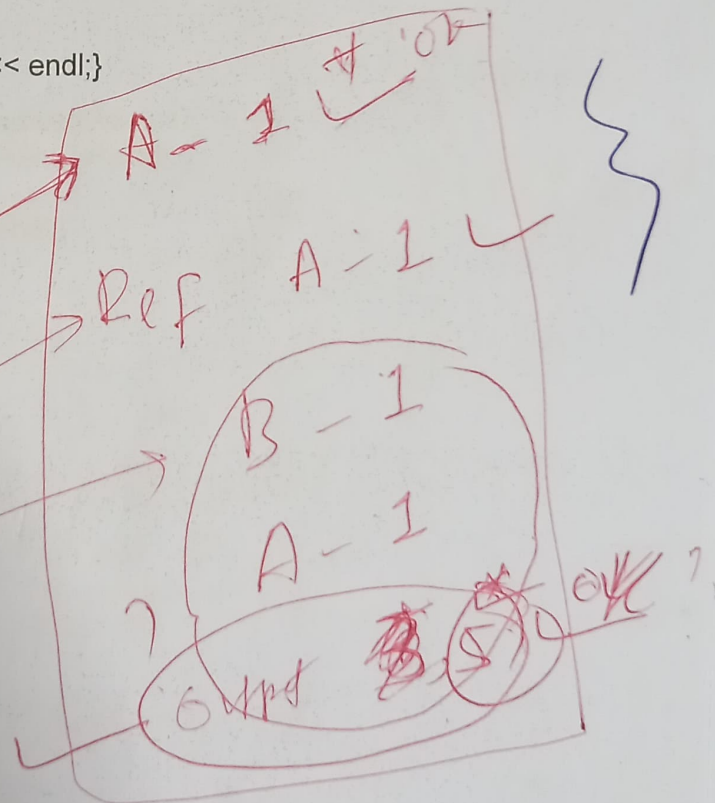
```
cout << c3.getA() << endl;
```

```
return 0;
```

```
}
```

b) (5 Marks) What would be the output produced by executing the following C++ code? Explain the error(s) or bug(s) if there is/are any.

```
1) #include<iostream>
2) using namespace std;
3) class A {
4) int x;
5) public:
6) A (int val = 0) : x(val) {cout << "A " << x << endl;}
7) A (const A& a) {
8) x = a.x - 1;
9) cout << "B " << x << endl;
10) }
11) void operator= (const A& a){
12) x = a.x - 2;
13) cout << "D " << x << endl;
14) }
15) void SetX (int x) {this->x = x;}
16) int GetX() { return this->x;}
17) };
18) void Out(A a) {
19) cout << "Out " << a.GetX() << endl;
20) }
21) A In(A &x) {
22) cout << "Ref A " << x.GetX() << endl;
23) x.SetX(x.GetX() + 4);
24) return x;
25) }
26) int main() {
27) A a(1), b=In(a);
28) Out(b);
29) return 0;
30) }
```



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c) (5 Marks) What would be the output produced by executing the following C++ code? Explain the error(s) or bug(s) if there is/are any.

```

1) #include <iostream>
2) #include <string>
3) using namespace std;
4) class Point{
5) int x, y;
6) public:
7) Point(int x=0, int y=0):x(x),y(y){}
8) Point(const Point p):x(p.x),y(p.y){}
9) cout<<"The copied point";
10) cout<<" ("<<x<<","<<y<<") " <<endl;
11) }
12) string getPoint() {return "("+to_string(x)+","+to_string(y)+")";}
13) ~Point(){cout<<"Point is destroyed"<<endl;}
14) };
15) class Circle{
16) Point center;
17) float radius;
18) public:
19) Circle():center(0,0),radius(0){}
20) Circle(Point p):center(p){}
21) Circle(const Circle c):center(c.center), radius(c.radius){}
22) cout<<"The copied circle "<<center.getPoint()<<endl;
23) }
24) ~Circle(){cout<<"Circle is destroyed"<<endl;}
25) };
26) int main() {
27) Point p2;
28) Circle c2(p1);
29) Circle c3(c2);
30) return 0;
31) }
    
```

← Point (const point & p) {}

Circle (const Circle &c)

→ P1 is not declared.
If we take P2?

1 → The copied point (0,0) → 0
 2 → The point is destroyed → 1
 3 → The copied circle (0,0) → 2
 4 → Circle is destroyed → 1

5 → point is destroyed.

6 → Circle is destroyed.

7 → Point is destroyed.

8 → point is destroyed.