Data Structures using C++

1. What will be the output of the below program?

```
class Num{
    int a;
};
void main()
{
    Num n;
    cout << n.a;
}
```

   a. Compile error
   b. n.a
   c. n
   d. Garbage value

2. Create a class named 'Employee' with an integer variable 'Employee_ID' and a string variable 'Employee_name'. Create an object of the class employee and assign values to Employee_ID and Employee_name.

3. Which of the following is used to define the class member externally?
   a. :
   b. ;
   c. #
   d. ::

4. What is the value of the test(12,13)?

```
int test(int a, int b)

{

if (a == 0)

return 0;

return test(a+test(a,b-1));

}
```

a. 1
b. 26
c. 0
d. 156

5. What will be the output of the following program?

```
#include <iostream>

using namespace std;

int main()

{

int a = 32, *ptr = &a;

char ch = 'P', &cho = ch;

cho += a;

*ptr += ch;

cout << a << ", " << ch << endl;

return 0;

}
```

a. 32, P

b. 32, p

c. 144, p

d. 144, P

6. What will be the output of the following program?

```cpp
#include <iostream>
using namespace std;

int main()
{
const int i = 15;
const int* const ptr = &i;
(*ptr)++;
int j = 20;
ptr = &j;
cout << i;
return 0;
}
```

a. 20

b. 21

c. 15

d. Compile error

Solutions

1. What will be the output of the below program?

```
class Num{

   int a;

};

void main()

{

 Num n;

 cout << n.a;

}
```

    a) Compile error
    b) n.a
    c) n
    d) Garbage value

Answer: a

Since the default access is private in c++, a is a private member of Num and so it causes a compiler error to access it outside the class.

2. Create a class named 'Employee' with an integer variable 'Employee_ID' and a string variable 'Employee_name'. Create an object of the class employee and assign values to Employee_ID and Employee_name.

Answer:

class Employee

{

public:

int Employee_ID;

string Employe_name;

};

int main()

```
{
 Employee e;
e.Employee_ID=43;
e.Employee_name="Jey";
cout<< e.Employee_ID << e.Employee_name<<endl;
return 0;
}
```

3. Which of the following is used to define the class member externally?
   a. :
   b. ;
   c. #
   d. ::

Answer: d

:: is used to define members of the class globally.

4. What is the value of the test(12,13)?

```
int test(int a, int b)

{
 if (a == 0)

  return 0;

 return test(a+test(a,b-1));

}
```
   a. 1
   b. 26
   c. 0
   d. 156

Answer: d

It's recursive multiplication and test(a+test(a,b-1)) iteratively calculates b times sum of a.

5. What will be the output of the following program?

```cpp
#include <iostream>
using namespace std;
int main()
{
        int a = 32, *ptr = &a;
        char ch = 'P', &cho = ch;

        cho += a;
        *ptr += ch;
        cout << a << ", " << ch << endl;
        return 0;
}
```

a. 32, P

b. 32, p

c. 144, p

d. 144, P

Answer: c. 144, p

Explanation: The "ptr" variable is a pointer which holds the address of variable "p". And "*ptr" returns the value of "p" variable. "cho" is a reference variable to "ch". So any change made to "cho" will be reflected in "ch". As such, when "cho" is increased by 32, it adds to the ASCII value of "P"(which is 80), and this results in 112 which is the ASCII value of "p"(from the alphabet). So this "p" gets stored in "ch". As for when "*ptr" is incremented by "ch", it gives value 112+32=144.

6. What will be the output of the following program?

```
#include <iostream>
using namespace std;

int main()
{
        const int i = 15;
        const int* const ptr = &i;
        (*ptr)++;
        int j = 20;
        ptr = &j;
        cout << i;
        return 0;
}
```

a. 20

b. 21

c. 15

d. Compile error

Answer: d. Compile error

Explanation: Here "ptr" has been defined as a constant pointer that holds the address of a constant integer "i". So, neither can the value of "ptr" be changed, nor can the value held by it can be changed. Thus the lines "(*ptr)++" and "ptr=&j" are invalid, as they are trying to modify the variable i's content and the value of the pointer respectively. This gives an error.