Atal Bihari Vajpayee
Indian Institute of Information Technology and Management (ABV-IIITM), Gwalior

(An Institute of National Importance, Ministry of Education, Government of India)

MINOR THEORY EXAMINATION-2024

Course Code: CS/IT-103
Course Name: Object Oriented Programming Systems
Program & Sem: Batch-A (First Year)

Date: 01-03-2024 (Fri)
Time: 10:00-12:00 PM
Max Marks: 25

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) This Question paper contains Ten questions.

Part A: Objective Based Questions

Answer all the Questions. Each question carries one mark. **(5Q x 1M = 5M)**

Q.NO. 1. Which of the following statements of a program is not valid?

(a) Class X{ }; X s[5]; (b) Class X{ }; s; (c) Class X{ }; X s; (d) Class X{ } X s[ ];

Q.NO. 2. Which of the following OOPS concept is not true for C++ language?

(a) A class must have member function (b) C++ can be easily written without classes.

(c) At least one instance should be declared within C++ program

(d) C++ program at least contain one class

Q.NO. 3. What is "cout" in a C++ program?

(a) Class (b) Object (c) Operator (d) None

Q.NO. 4. What is the output of this program?

```
#include <iostream>
 using namespace std;
 class A {
          int a;
          void modify_a(int x ) {
             a=x;
             }
 };
 int main () {
        A a;
         a.modify_a(10);
         cout<<a.a<<endl;
         return 0;
}
```

Q. No. 5. Which statement is true?
(a) Memory space for object is created when it is declared
(b) when a function is declared "inline", function body should be small.

P.T.O

Part B: Descriptive Questions

Answer all the Questions. Each question carries four marks. **(5Q x 4M = 20M)**

Q.NO.6 (a) What is a friend's function and how it differs from member function. (2M)
(b) Write a C++ program to create a class Student with private members' name and marks. Implement a friend function named calculateGrade() outside the class that takes a student object as a parameter and calculates and prints the grade based on marks. (2M)

Q.NO.7 (a) what is the significance of using **"using namespace std;"** in C++ program. (2M)
(b) Write a C++ program to print pascals triangle (4 rows) using class and objects. (2M)

Q.NO.8 (a) Explain the characteristics/features of OOPS in two points. (2M)
(b) Write a C++ program to find out factorial of a number using recursion without OOPS approach. (2M)

Q. NO. 9 (a) What is the advantage of using static data member. (1M)
(b) what will be the output of the following program? Explain the output also in your own words. (3M)

```
#include <iostream>
using namespace std;
class A
{
        public:
        static int a;
        void increment( ) {
           a++;
           }
       int get( ) {
             return a;
            }
};
 int A :: a = 10;
int main( )
 {
       A obj1, obj2, obj3;
       obj1.increment();
       obj2.increment();
       obj3.increment();
       cout <<obj3.get()<<obj2.get()<<obj1.get()<<endl;
       return 0;
   }
```

Q.NO.10 Imagine you're designing a system for managing a library. Discuss how you would apply the concepts of classes and objects in the context of this real-life scenario. Provide a detailed explanation of how you would represent various entities such as books, library members, and transactions using classes and objects. Additionally, explain how encapsulation and abstraction play a role in modeling these entities, and discuss the potential benefits of using classes and objects in such a system. (4M)