B.TECH/ECE/6ᵀᴴ SEM/CSEN 3004 (BACKLOG)/2022

OBJECT ORIENTED PROGRAMMING USING C++
(CSEN 3004)

Time Allotted : 3 hrs   **Full Marks : 70**

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

    (i)   What will be the output of the following C++ code?

```cpp
#include <iostream>
#include <string>
using namespace std;
int main(int argc, char const *argv[])
{
char s1[6] = "Hello";
char s2[6] = "World";
char s3[12] = s1 + " " + s2;
cout<<s3;
return 0;
}
```

                (a) Hello   (b) World   (c) Error   (d) Hello World.

    (ii)   Which of the following type is provided by C++ but not C?
                (a) Double   (b) Float   (c) Int   (d) Bool

    (iii)   Which of the following constructors are provided by the C++ compiler if not defined in a class?
                (a) Copy constructor   (b) Default constructor
                (c) Assignment constructor   (d) All of the mentioned.

    (iv)   What is the output of below program?

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

int main()
{
 if(0)
```

```
{
  cout<<"Hi";
}
else
{
  cout<<"Bye";
}
return 0;
}
```
    (a) Hi   (b) Bye   (c) HiBye   (d) Compilation Error.

(v)   Where should we initialize static data member?
         (a) In main()   (b) Inside class
         (c) In member function   (d) After class definition.

(vi)   Which of the following features must be supported by any programming language to become a pure object-oriented programming language?
         (a) Encapsulation   (b) Inheritance
         (c) Polymorphism   (d) All of the above.

(vii)   Student s[30];
         Student();
         Student is the name of a class. How many times destructor will be invoked?
         (a) 1   (b) 30   (c) 29   (d) 31.

(viii)   Which is more effective while calling the C++ functions?
         (a) Call by object   (b) Call by pointer
         (c) Call by value   (d) Call by reference.

(ix)   Ambiguity problem occurs in which type of inheritance?
         (a) Multilevel   (b) Multiple   (c) Multipath   (d) Hierarchical.

(x)   Which operator cannot be overloaded?
         (a) + operator   (b) * operator   (c) >> operator   (d) . operator.

Group- B

2. (a)   What are the key properties of OOP? Explain each of the properties.
    (b)   Write advantages of OOP over POP (Procedural Oriented Programming). What are the advantages of call by reference over call by address? What is the use of scope resolution operator?

5 + (3 + 2 + 2) = 12

3. (a)   Write the syntax of defining a member function outside the class. Create a function pointer to the function with prototype void fun(int). Define the function and call the function via function pointer. What is nameless object?
    (b)   Write a program to reverse a string. Use **string** data type.

(2 + 3 + 2) + 5 = 12

Group - C

4. (a)   Overload * operator to multiply two Matrix .
   (b)   Write a program to calculate volume of a CUBE and CUBOID using constructor overloading.

   8 + 4 = 12

5. (a)   How to write constructor using initializer list? Give an example. When do we need to define an explicit destructor in a class?
   (b)   Write a program as follows:
   Create a class employee with two instance variables name and salary. Write one parameterized constructor (use initializer list) and one show method.
   Create a class manager, which will have one method name *enhance*, which will increase the salary of a particular employee, i.e. employee reference should be passed as an argument to *enhance* function. Now make this *enhance* method of manager class a friend function of employee class.
   Create multiple employee objects and call *enhances* method. Provide output.
   ***Consider all important instance variables, functions and constructor of class manager.

   (2 + 3) + 7 = 12

Group - D

6. (a)   What is dynamic method despatch? Explain the concept using a sample programs along with probable output.
   (b)   What is pure virtual function? Write an example.

   8 + (2 + 2) = 12

7. (a)   When do we need to write virtual base class in C++ ? Explain with examples.
   (b)   What is abstract class? What is the prerequisite to implement an abstract class in C++?
   (c)   Differentiate private and protected access specifiers.

   6 + (1 + 2) + 3 = 12

Group - E

8. (a)   What is the use of a namespace?
   (b)   What is function template? Explain with example.
   (c)   What is class template? Give an example. Explain with example, how to define a method outside class using class template.

   2+ (2 + 1) + (2 + 2 + 3) = 12

9. (a)   What is exception handling and what is the construction of exception handling in C++?
   (b)   Write a C++ program for factorial calculation with prototype long *fact* (int). Now handle the exception if programmer gives negative value or a value which is more than 20.

   (2 + 4) + 6 = 12