

**OBJECT ORIENTED PROGRAMMING CONCEPT BY USING C++
(CSEN 3208)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one 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++ program?

```
#include <iostream>
using namespace std;
class A{
public:
    A(){
        cout<<"Constructor called\n";
    }
    ~A(){
        cout<<"Destructor called\n";
    }
};
int main(int argc, char const *argv[])
{
    A *a = new A[5];
    delete[] a;
    return 0;
}
```

- (a) Segmentation fault
- (b) "Constructor called" five times and then "Destructor called" five times
- (c) "Constructor called" five times and then "Destructor called" once
- (d) Error.

(ii) Which of the following relationship is known as inheritance relation?

- (a) Is-a-relationship
- (b) Has-a-relationship
- (c) Association relationship
- (d) Aggregation relationship.

(iii) Where should we initialize static data member?

- (a) In main()
- (b) Inside class
- (c) In member function
- (d) After class definition.

- (iv) Which operator(s) cannot be overloaded?
(a) :: (b) >> (c) + (d) →.
- (v) Which of the following statements are not true about destructor?
(a) It is invoked when object goes out of the scope
(b) Like constructor, it can also have parameters
(c) It can be virtual
(d) It can be declared in private section.
- (vi) An abstract class is
(a) which has virtual functions
(b) which has at least one pure virtual function
(c) in c++, concept of abstract class does not exist
(d) none of the mentioned.
- (vii) Assume class A. Which of the following statements is/are responsible to invoke copy constructor?
(a) A obj1(obj2) (b) A T2 = T1
(c) T2 = T1 (d) both (a) and (b).
- (viii) We use following keyword when we try to do Runtime Polymorphism
(a) const (b) inline
(c) virtual (d) namespace
- (ix) What is the difference between protected and private access specifier in inheritance?
(a) Private member is not inheritable and not accessible in derived class
(b) Protected member is inheritable and also accessible in derived class
(c) Both are inheritable but private is accessible in the derived class
(d) Both are inheritable but protected is not accessible in the derived class.
- (x) If inner catch handler is not able to handle the exception then
(a) Compiler will look for outer try handler
(b) Program terminates abnormally
(c) Compiler will check for appropriate catch handler of outer try block
(d) None of these.

Group- B

2. (a) What is reference variable? How is it defined? Write a swap function using call by reference. [[CO1,CO2](Remember/LOCQ)]
(b) What is inline function? Give an example to explain it. [[CO2](Understand/LOCQ)]
(c) Write a function **xstrcpy(str1, str2)**: copies string str2 into string str1. [[CO1](Understand/LOCQ)]
(1 + 1 + 2) + 3 + 5 = 12
3. (a) What are the characteristics of a constructor? [[CO2](Remember/LOCQ)]

- (b) Create a class, which keeps track of the member of its instances. Use static data member, constructor and destructor to maintain updated information about active objects. [[CO3](Understand/HOCQ)]
- (c) What is default argument? Write the rule of implementing default argument in a function. [[CO1,CO2](Remember/LOCQ)]
- 3 + 5 + 4 = 12**

Group - C

4. (a) Overload * operator to multiply two matrix objects. [[CO2](Apply/IOCQ)]
(b) State the difference between abstraction and encapsulation. [[CO2](Understand /LOCQ)]
(c) Explain the characteristics of static function member with suitable example. [[CO2](Understand/IOCQ)]
- 8 + 2 + 2 = 12**
5. (a) Write syntax of a function when it is a friend of a class.
Write syntax of a class when it is friend of another class.
Write syntax of a member function of a class, when it is friend of another class. [[CO1,CO3](Understand/IOCQ)]
(b) Write a C++ program to add 2 data members belongs to 2 different class using friend function. [[CO6](Analyze/IOCQ)]
(c) Write the syntax of defining a static data member. [[CO2,CO3](Remember/LOCQ)]
- 6 + 4 + 2 = 12**

Group - D

6. (a) What is the need of Virtual base class? Give a suitable example code to implement Virtual class. [[CO3](Understand/HOCQ)]
(b) A is inherited by B, B is inherited by C. With the parameterized constructor of class C initialize data member of class B and A and write corresponding show() function to display all the data members. [[CO2,CO3](Understand/HOCQ)]
(c) In case of multiple inheritance if there is a function with same name in both base classes, then how derived class handle this ambiguity? Explain with proper syntax. [[CO6](Analyze/IOCQ)]
- (2 + 4) + 4 + 2 = 12**
7. (a) What is the difference between public, private, and protected in C++? [[CO4](Understand/IOCQ)]
(b) Write a C++ program to create a class called **Number** with an integer (in decimal) data member and constructor to set the value for this data member. Derive two classes from this base class called **Hex** and **Oct**. Include a member function display () in all the derived classes to display the value of base class data member in hexadecimal and octal, respectively. Use the concept of pure virtual function (dynamic method dispatch). [[CO4](Evaluate/HOCQ)]
- 4 + 8 = 12**

Group - E

8. (a) Write a programme to implement array index out of bound exception, where exception is thrown as object. Write an example to catch all the exception raised in try block. [[CO1,CO5](Understand/IOCQ)]
- (b) What is namespace? Explain with example. [[CO1,CO2](Remember/LOCQ)]
(4 + 3) + (2 + 3) = 12
9. (a) Write a function template with an array of generic members. Perform bubble sort on different type of data. Consider integer and float value. [[CO2](Understand/LOCQ)]
- (b) How template function is overloaded? Give an example. [[CO2](Understand/LOCQ)]
- (c) Find maximum of two numbers using function template. [[CO1,CO2](Analyse/IOCQ)]
5 + 3 + 4 = 12
-

<i>Cognition Level</i>	<i>LOCQ</i>	<i>IOCQ</i>	<i>HOCQ</i>
<i>Percentage distribution</i>	<i>37.5</i>	<i>38.5</i>	<i>24</i>

Course Outcome (CO):

Students who complete the course will demonstrate the ability to do the following:

1. Learn object oriented concepts and various syntax and semantics using C++ and merits of object oriented approach over procedural approach.
2. Understand various properties of OOP for appropriate use in problem solving.
3. Analyze the real life problem to identify the related objects and abstract them to classes
4. Apply various object oriented properties and reusable components in solution building.
5. Evaluate for using standard patterns and for improving performance of solution using exception handling.
6. Develop the object oriented application using C++

**LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.*