Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/MCA/SEM-2/MCA-205/2013

2013

OBJECT ORIENTED PROGRAMMING WITH C++

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

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

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) What will be the output of the following ?

```
#include<iostream.h>
int main ( ) {
int x = (10, 013);
cout<<"x="<<x
return 0;
}
```

a) $x = 10$ b) $x = 12$

c) $x = 13$ d) $x = 11$.

ii) `int * ptr = 0x45671233;` The statement causes compilation error. To rectify it

a) use & before 0x45671233

b) remove the 0x

c) use (int*) before 0x45671233

d) none of the above works correctly.

iii) What will be the output of the following ?

```
#include<iostream.h>
int val = 30;
int & f ( ) {return val;}
int main ( ) {
    cout <<"Val="<<val<<;
    f ( ) = 40;
    cout <<"Val="<<val<<"\n";
    return 0;
}
```

a) Val = 30 Val = 30 b) Val = 30 Val = 40

c) Compilation error d) It throws exception.

iv) What happens when a class with parameterized constructors and having no default constructor is used in a program and we create an object that needs a zero-argument constructor ?

a) Compile-time error b) Preprocessing error

c) Runtime error d) Runtime exception.

v) Which of the following operators cannot be overloaded ?

a) Scope resolution operator

b) Arrow operator

c) Equality operator

d) Assignment operator.

vi) To hide a data member from the program, you must declare the data member in the ..... section of the class.

a) concealed b) confidential

c) hidden d) private.

vii) Which of the following correctly describes overloading of functions ?

a) Virtual polymorphism

b) Ad-hoc polymorphism

c) Pseudo polymorphism

d) Transient polymorphism.

viii) Which of the following is a mechanism of static polymorphism ?

a) Operator overloading b) Function overloading

c) Templates d) All of these.

ix) Which one of the following is the correct way to declare a pure virtual function ?

a) `virtual void Display (void) { 0 };`

b) `virtual void Display = 0;`

c) `virtual void Display (void) = 0;`

d) `void Display (void) = 0;`

x) Which of the following statements is correct ?

a) Destructors have a default value

b) Destructors can take arguments

c) Destructors deallocate memory allocated for the object by the constructor

d) None of these.

xi) Private member of the super-class

a) is both extended as well as accessed inside sub-class

b) is extended but cannot be accessed inside sub-class

c) is not extended but can be accessed inside sub-class

d) is not both extended as well as accessed inside sub-class.

xii) A friend function can be called

a) by using object of the class

b) directly

c) should not be called

d) like a standard function.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following $3 \times 5 = 15$

2. What is the difference between the function overloading and function overriding ? Illustrate with an example.

3. What is the difference between static and dynamic binding ? Illustrate with an example.

4. What is operator overloading ? Write a program to overload unary '–' operator. 1 + 4

5. a) What do you mean by copy constructor ? Illustrate with proper example.

   b) What is manipulator in C++ ? 3 + 2

6. Write down the differences between object-oriented programming languages and earlier (non-object-oriented) programming languages.

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Write a class to represent complex numbers with necessary constructors. Overload the '+', '–', '*' operators using the member functions. A complex number is of the form $a + ib$, where a and b are real numbers. Two complex number $a + ib$ and $c + id$ are added to obtain the sum : $(a + c) + i (b + d)$. Two complex numbers are multiplied to obtain the product $(ac - bd) + i (bc + ad)$. Also write a main function to demonstrate all operations involving complex numbers.

8. a) Create a base class called Vehicle that stores of wheels and speed. Create the derived classes :
   - Car that inherits Vehicle and also stores number of passengers
   - Truck that inherits Vehicle and also stores the load limit.

   Write a main ( ) function to create objects of these classes and display all the information about the car and truck. Also compare the speed of the two vehicles, car and truck and display "faster" or "slower" if the car is faster or slower than truck.

b) What is virtual class ? What does it mean that friends are not virtual ? 10 + 3 + 2

9. a) What is template class ? How is it different from class template ? Give example.

b) Write a program to create a template function for selection sort.

c) What do you mean by exception handling ?

d) Write down the purpose of the keywords — try, catch, throw and finally. 3 + 6 + 2 + 4

10. a) What is late binding ?

b) Write a program in C++ to implement a class called "String" for string manipulation. Overload + and = operator with constructor, for string concatenation and assignment respectively.

c) Can destructor be virtual ? Give reasons and explain your answer. 2 + 10 + 3

11. a) What are the uses of mutable and explicit keywords ?

b) Write a program in C++ to pass arguments to the constructor of a base class from the constructor of the derived class.

c) What are the advantages of using 'new' operator over malloc ( ) ?

d) Differentiate between friend function and member function. 3 + 6 + 3 + 3

12. Write short notes on any *three* of the following :

a) Data abstraction and data encapsulation

b) STL

c) Types of inheritance

d) Static class and member

e) Constructor call in inheritance.

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