

Code: AC55/AT55/ AC105/AT105  
Subject: OBJECT ORIENTED PROGRAMMING WITH C++

**AMIETE – CS/IT (Current & New Scheme)**

Time: 3 Hours

**DECEMBER 2015**

Max. Marks: 100

*PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.*

**NOTE:** There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

- a. What will be the values of x, m, and n after execution of the following statements.

```
int x, m, n;  
m = 10;  
n = 15;  
x = ++m + n++;
```

- (A) x = 25, m = 10, n = 15                      (B) x = 27, m = 10, n = 15  
(C) x = 26, m = 11, n = 16;                    (D) x = 27, m = 11, n = 16

- b. In a protected derivation, accessibility of the base members undergo the following changes in the derived class.

- (A) public becomes protected, protected becomes protected and private is not inherited  
(B) public becomes protected, protected becomes public and private becomes protected  
(C) public becomes private, protected is not inherited and private is not inherited  
(D) None of these

- c. When you overload an arithmetic assignment operator, the result

- (A) goes in the object to the right of the operator  
(B) goes in the object to the left of the operator  
(C) goes in the object of which the operator is a member  
(D) must be returned

- d. We can make a class abstract by

- (A) Declaring it abstract using the static keyword  
(B) Declaring it abstract using the virtual keyword  
(C) Making at least one member function as virtual function  
(D) Making at least one member function as pure virtual function

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- e. A \_\_\_\_\_ is a constructor that creates a new object using an existing object of the same class and initializes each data member of the newly created object with its corresponding data members of an existing object passed as argument.
- (A) Copy constructor                      (B) Overloaded constructor  
(C) Parameterized constructor        (D) Default constructor
- f. Which of the following way is legal to access a class data member using the 'this' pointer.
- (A) this.x                                  (B) \*this.x  
(C) \*(this.x)                              (D) (\*this).x
- g. How many constructors can a class have?
- (A) 0                                        (B) 1  
(C) 2                                        (D) any number
- h. A struct is the same as a class except that
- (A) there are no member functions  
(B) all members are *public*  
(C) cannot be used in inheritance hierarchy  
(D) it does have a *this* pointer
- i. RunTime Polymorphism is achieved by \_\_\_\_\_
- (A) friend function                      (B) virtual function  
(C) operator overloading                (D) function overloading
- j. Exception handling is targeted at
- (A) Run-time error                        (B) Compile time error  
(C) Logical error                          (D) All of these

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**Answer any FIVE Questions out of EIGHT Questions.**  
**Each question carries 16 marks.**

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- Q.2** a. Explain various fundamental features of the object oriented programming? (6)
- b. With the help of an example describe size of C++ operator? (5)
- c. Explain the difference between 'A' and "A" with suitable example. (3+2)

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- Q.3** a. Explain the use of *break* statement in *switch-case* statement? (4)
- b. Write the syntax for *initialization at definition* of two-dimensional array. Give one example also. (4)
- c. Write the syntax for accessing structure members in C++. Also construct a structure called "*Student*" whose members are roll\_no, name, branch and marks. Use this structure in your program that will read student information and then display that information? (8)
- Q.4** a. Define *Inline function*? What are the guidelines that need to be followed for deciding whether to the member function inline or not?. (6)
- b. What are the conditions that must be satisfied for function calling? (4)
- c. What is function overloading? Write overloading functions for swapping two characters, two integers and two float parameters. (2+4)
- Q.5** a. What is the use of constructor in C++? List any four properties of constructor? (2+4)
- b. Write a complete C++ program to do the following :
- (i) 'Student' is a base class, having two data members: entryno and name; entryno is integer and name of 20 characters long. The value of entryno is 1 for Science student and 2 for Arts student, otherwise it is an error.
- (ii) 'Science' and 'Arts' are two derived classes, having respectively data items marks for Physics, Chemistry, Mathematics and marks for English, History, Economics.
- (iii) Read appropriate data from the screen for 3 science and 2 arts students.
- (iv) Display entryno, name, marks for science students first and then for arts students. (10)
- Q.6** a. Give the syntax for overloading a unary and binary operator. Is it possible to overload the ternary (? :) operator? Support your answer with proper reason. (2+2+3)
- b. Write a program to illustrate the overloading of new and delete operators. (5)
- c. What are the restrictions for overloading operators? (4)
- Q.7** a. What is Inheritance? What are the rules must be kept in mind while deciding whether to define members as private, protected, or public? (5)

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- b. What would be the output of the following code: (4)

```
#include <iostream.h>

class BC {

    public:

        BC(int a){
            cout<<"\nOne-argument constructor in base class\n";
        }
};

class DC : public BC {

    public:
        DC(int d) : BC(d){
            cout<<"\nOne-argument constructor exists in derived Class\n";
        }

};

void main(){
    DC objD(3);
}
```

- c. Explain the term Polymorphism? What are the different forms of polymorphism? What are the rules that need to be kept in mind while deciding virtual functions? (2+2+3)

- Q.8** a. What is Class Template? Explain the syntax of a class template with suitable examples. (8)

- b. Create a class number to store an integer number and the member function read() to read a number from console and the member function div() to perform division operations. It raises exception if an attempt is made to perform *divide-by-zero* operation. It has an empty class name DIVIDE used as the throw's expression-id. Write a C++ program to use these classes to illustrate the mechanism for detecting errors, raising exceptions, and handling such exceptions. (8)

- Q.9** a. Explain the following: (3×3)
- (i) ifstream
  - (ii) ofstream
  - (iii) fstream

- b. Write a program to open a file whose name is passed as command line argument. (7)