

(Please write your Roll No. immediately)

Roll No.

End-Term Examination

Second Semester [MCA] – MAY-JUNE 2006

Paper Code: MCA-110
Paper ID : 44110

Subject: Object Oriented Programming

Time: 3 Hours

Maximum Marks: 60

Note: Question 1 is compulsory. Attempt any one from the rest of the units.

- Q. 1 (a) What do you understand by virtual base class? (10 x 2 = 20)
(b) Define polymorphism by parameter?
(c) Explain the term 'Persistent objects'?
(d) When do we declare a method or class abstract?
(e) Discuss the different levels of access protection available in C++.
(f) What do you understand by genetic functions?
(g) Explain the terms 'name spaces'.
(h) Explain UML.
(i) What do you understand by STL?
(j) When do we declare a member of a class static?
- Q. 2 Design a class to represent a bank account. Include the following members: (10)
Data members:
-Name of depositor
- Account Number
-Type of Account
-Balance Amount in the account

Methods
- To assign initial values
- To deposit an amount
- To withdraw an amount after checking balance
- To display the name & balance
- Q. 3 (a) What do you understand by polymorphisms? What are different types of polymorphism supported by C++. (6)
(b) What do you understand by Constructor and Destructor? Give the different types of constructors. (4)
- Q. 4 (a) Write a program to overload the new operator. (6)
(b) Differentiate between function overloading and function overriding. (4)

- Q. 5 (a) What do you understand by inheritance? What are the different types of inheritance? (5)
- (b) Differentiate between aggregation and generalization. (5)
- Q. 6 (a) Write a program to implement the exception handling while pushing an element in the stack [MAXSIZE]. (5)
- (b) Write a program to add two complex numbers by overloading (+) sum operator? (5)
- Q. 7 Write short notes on any two: (5 x 2 = 10)
- (a) Vectors
 - (b) Containers
 - (c) Class Templates
 - (d) Parametric Polymorphism
 - (e) C++ garbage collection.
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Note: Question 1 is compulsory. Attempt any one from the rest of the units.

- Q. 1 (a) What are generic pointers? Where they can be used? (8 x 2.5=20)
(b) Differentiate between data encapsulation and data hiding.
(c) Explain the different usage of Scope Resolution operator.
(d) Differentiate between function overloading and function overriding.
(e) Explain virtual classes. Where this concept is used?
(f) What are namespaces? What is the purpose of it?
(g) What are persistent objects? Explain.
(h) What are destructors? Explain their usage.

Unit – I

- Q. 2 (a) Explain each of the operators that are available in C++ but not in C. 5
(b) How object oriented paradigm differ from procedural programming paradigm? Explain. 5
- Q. 3 (a) How inputs and outputs are taken/ displayed in C++? Differentiate between the input/output operators in C++ and the input/output functions used in C. 5
(b) Write a program in C++ to create and sort an array using insertion sort method. The array should be created dynamically. 5

Unit – II

- Q. 4 (a) What are constructors? Can they be overloaded? Explain with an example. 5
(b) Write a program in C++ to copy one string into another using copy constructor. 5
- Q. 5 (a) Write a program in C++ to calculate "n" to the power "p" using default value parameter for "p". 5
(b) How garbage collection is done in C++? Explain the role of delete operator for the purpose. 5

Unit – III

- Q. 6 (a) What are the different types of inheritance? Explain each of them. 3
(b) Write a program of your choice to show the implementation of multiple inheritance. 7
- Q. 7 (a) Explain the rules of operator overloading? What operators you cannot overload? 3
(b) Write a program to overload binary + and += operators using friend functions. 7

Unit – IV

- Q. 8 (a) What are streams? Explain different stream objects? 3
(b) Write a program to read the contents from a file and then copy the contents to another file. 7
- Q. 9 (a) How exception handling is done in C++? Explain with an example. 5
(b) What are templates classes? Explain with an example. 5

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End-Term Examination

Third Semester [MCA] – December 2004

Paper Code: MCA-203

Subject: Object Oriented Programming

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any five questions. All questions carry equal marks.

- Q. 1 (a) Explain the following features of OOPS :- 8
(i) Message Passing
(ii) Extensibility
(iii) Delegation
(iv) Genericity
- (b) Explain overloading of new and delete operators by giving examples. 4
- Q. 2 (a) Write a program that illustrates the mechanism for handling exceptions in the vector class, while creating its objects and accessing its elements for reading or writing. The program should overload the operator [] to simulate the operations on the user defined data types. 6
- (b) Write a program that reads a sequence of names, one per line, and then sorts and prints them. 6
- Q. 3 (a) Implement a vector class with a default constructor, a destructor, overloaded assignment operator, subscript operator, stream insertion operator and stream extraction operator. 6
- (b) Explain the concept of friend function and friend class by giving examples. 6
- Q. 4 (a) Write a program of an examination database using inheritance which has three classes namely person, student and exam. The student class inherits the properties of person class and exam class inherits the properties of student class directly and properties of person class indirectly. 6
- (b) What is polymorphism and how is it achieved by means of virtual functions? Give an example. 6
- Q. 5 (a) Do derivation and friendship mean the same? What are the similarities and dissimilarities between the two? 4
- (b) Describe how an object of a class that contains objects of other classes are created. 3

(c) Briefly explain the working of inline functions. Also discuss their merits and demerits. When Should functions be declared inline? 3

Q. 6 (a) What is a container class? Explain homogenous, heterogeneous and vector classes. Write a program to implement a vector class template. 6

(b) Implement a string class. Each object of this class will represent a character string. Data members are the length of the string and the actual character string. In addition to constructors, destructor, access functions, and a print function, include a “subscript” function. 6

Q. 7 Define the following:- 6
(i) Wild pointers
(ii) Garbage
(iii) Dangling Reference

Consider the following program:

```
#include<iostream.h>
void main()
{
    int * a;
    const int * b;
    int * const p;
    int c=2, d=3;
    cout<<a; b= &c; p= &d;
    *b=10;
    b=new int;
    *b=10;
    delete b;
    cout<< *b;
    a= new int [10];
    a[9] = 20;
    a[10]= 30;
    a= new int[5];
    a++;
    ++b;
    cout<< *a;
}
```

In the above program find out where all garbage, dangling reference and wild pointers exist. Identify statements which are treated as erroneous by the compiler.

(b) Briefly explain the exception handling constructs. Write a program which binds a pointer to base class' object to base or derived objects at runtime and invoking respective members if they are virtual. 6

Q. 8 Write a class template container to do binary tree operations (Create, print, traverse and search). The traverse should be in inorder, preorder and postorder.

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End-Term Examination

Third Semester [MCA] – December 2003

Paper Code: MCA-203

Subject: Object Oriented Programming

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any five questions.

Q. 1 (a) Define and explain the following terms with examples 12
(i) Encapsulation
(ii) Polymorphism
(iii) Inheritance

Q. 2 Compare and contrast the following:- 12
(i) Private and Public methods.
(ii) Protected and friends function
(iii) Static classes and structures
(iv) Pointer and reference variables.

Q. 3 (a) Implement a integer class that checks for range (of value) violation. 8
(b) Is the following fragment valid? If not, why not? 4
int &f ();
. . .
int *x;
x = f ();

Q. 4 (a) What does the following program? 8

```
#include <iostream.h>
class A {
public :
A () { cout << "Constructing A\n "; }
~A () {cout << "Destructing A\n "; }
};

class B {
public:
B() {cout << "Constructing B \n "; }
~B () {cout << "Destructing B \n "; }
};
```

```

class C: public A, public B {
public:
C () {cout<<"Constructing C \n "; }
~C () {cout << "Destructing C \n "; }
};

```

```

void main()
{
C ob;
Return 0;
}

```

- (b) What is the role of virtual base class? Explain. 2
- (c) What is the utility of a virtual function in a class? Explain. 2

Q. 5 Design a template class for implementation of a stack of any object. Implement the template as a linked list. 12

Q. 6 (a) Demonstrate the overloading of the following operators or functions. 10

- (i) new (ii) <<
- (iii) (binary) (iv) #
- (v) * (Multiplication)

(b) Which operators cannot be overloaded in C++. 2

Q. 7 Write short notes on ANY TWO of the following : - 6+ 6

- (a) Standard Template Library.
- (b) Namespace and Namespace mangling
- (c) "Since C++ provides procedural programming constructs, C++ is not an object oriented language". Comment.
- (d) Late binding.

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End-Term Examination

Third Semester [MCA] – January 2001

Paper Code: MCA-203

Subject: Object Oriented Programming Using C++

Time: 3 Hours

Maximum Marks: 70

Note: Attempt any three questions from Section - A. Section – B and Section – C are compulsory

- Q. 1 (a) Briefly explain the working of inline functions. Also discuss their merits and demerits. When should functions be declared inline? 5
(b) Write a program to swap the private data values of two classes. Use a common friend function for this task. 5
- Q. 2 (a) Discuss the various situations when a copy constructor is automatically invoked. 5
(b) How does function overloading implement polymorphism? 3
(c) What are the similarities between constructor overloading and function overloading? 2
- Q. 3 (a) When should one derive a class publically or privately. 3
(b) Do derivation and friendship mean the same? What are the similarities and dissimilarities between the two? 4
(c) Describe how an object of a class that contains objects of other classes are created. 3
- Q. 4 (a) What are the advantages of function prototypes in C++. 3
(b) What is the main advantage of passing arguments by reference? 3
(c) Write a macro that obtains the largest of three numbers. 4

SECTION-B

- Q. 5 Find error in the following
- (a) void display (int A[][], int m, int n) 5
- ```
{
for (i = 0; i < m; i++)
for (j = 0; j < n; j++)
cout << " " << A[i][j];
cout<< "\n";
}
```
- (b) float a [ ] = {10.50, 10.75, 16.258, 25.15}; 5  
float \*j, \*k;

```

j=a;
k = a + b;
i = j * 2;
k=k/2;
cout<< " *j= " << * j << " *k = " << k << "\n" ;

```

- (c) (i) float average(x , y) 5  
(ii) int mult (int a, b);  
(iii) int display(...);  
(iv) void vect ( int \* &V, int &size);  
(v) void print (float data [ ], size = 20);
- (d) State whether of the following statements are true or false 5  
(i) Virtual functions are used to create pointers to base classes.  
(ii) A pointer to a base class cannot be made to point to objects of derived class.  
(iii) This pointer points to the object that is currently used to invoke a function.  
(iv) This pointer can be made to point to any object by assigning the address of the object.  
(v) Pure virtual functions force the programmer to redefine the virtual functions inside the derived classes.

### SECTION C

- Q. 6 Define a class to represent a bank account. Include the following members: 20  
Data members  
(a) Name of the depositor  
(b) Account number  
(c) Types of account  
(d) Balance amount in the account

#### Member functions

- (a) To assign initial values.  
(b) To deposit an amount  
(c) To withdraw an amount after checking the balance.  
(d) To display name and balance.

Write a main program to test the program.

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