

Code : 051301

2012

OBJECT-ORIENTED PROGRAMMING

Time : 3 hours

Full Marks : 70

Instructions :

- (i) The marks are indicated in the right-hand margin.
- (ii) There are NINE questions in this paper.
- (iii) Attempt FIVE questions in all.
- (iv) Question No. 1 is compulsory.

1. Answer any seven MCQs : 2×7=14

(a) Which of the following is not a valid identifier in C++?

- (i) Return
- (ii) MyInt
- (iii) MyInteger
- (iv) Total3

(b) What is the value of x after the following statements?

```
int x; x = 0; x = x + 30;
```

- (i) 0
- (ii) 30
- (iii) 33
- (iv) Garbage

(c) What is the value of the following expression?

```
(true && (4/3 || !(6)))
```

- (i) True
- (ii) False
- (iii) 0
- (iv) Illegal syntax

(d) When defining a class, the class should be composed of the kind of values a variable of the class can contain, and

- ~~(i)~~ member functions for that class
- (ii) the keyword private
- (iii) other class definitions
- (iv) nothing else

(e) Data members or member functions of a class that are declared to be private may

- (i) only be accessed by the main program
- ~~(ii)~~ only be accessed by members of the class
- (iii) not be accessed by the class
- (iv) be considered as global variables

~~(f)~~ When overloading an operator, which of the following is true?

- (i) One of the arguments must be an object of the class
- ~~(ii)~~ The operator can be a friend or a member of the class
- (iii) The operator does not have to be a friend or a member of the class
- (iv) All of the above
- (v) None of the above

~~(g)~~ class derived : public base1, public base2 {} is an example of

- (i) polymorphic inheritance
- (ii) multilevel inheritance
- (iii) hierarchical inheritance
- ~~(iv)~~ multiple inheritance

~~(h)~~ In the derived class definition, you list from the base class

- ~~(i)~~ all the member functions every time
- (ii) only those member functions that need to be redefined
- (iii) only those member functions that were in the public section
- (iv) only those member functions you want to overload

~~(i)~~ Which of the following is not a valid reason for using exception handling?

- (i) Throw and catch can be used like goto
- (ii) The procedure for handling an error depends on the situation
- (iii) Need to handle built in exceptions
- ~~(iv)~~ none of the above

~~(j)~~ You should make a function a virtual function if

- ~~(i)~~ every class that is derived from this class uses all the member functions from this class
- (ii) every class that is derived from this class needs to redefine this function
- (iii) that function is an operator
- (iv) only in the derived classes

~~(3)~~ (a) Write five differences between Procedural and Object-Oriented Programming.

~~(b)~~ Differentiate between Private, Public and Protected data members of the class using examples.

8+6



3. (a) Mention the difference between C and C++. Why is it necessary to include header files in a program written in these languages?
- (b) Write a C++ program to find the sum of the series  $1+3+5+\dots+n$ .
- (c) Define copy constructor. Explain its significance. Under which condition is it invoked? Support your answer with an example. 6+4+4
4. (a) Discuss the basic data types of C++. Suggest appropriate data type for the following :
- (i) Someone's height in meters
  - (ii) An exclamation mark
  - (iii) The number of students in a university
- (b) Write a program, which will accept a string of maximum 10 characters from the keyboard, and count the occurrences of each of the 5 vowels in the string. The output should be in tabbed format as shown below :
- |   |   |   |   |   |
|---|---|---|---|---|
| A | E | I | O | U |
| 0 | 1 | 0 | 0 | 1 |
- (c) Explain branching statements used in C++ with example. 3+8+3

5. (a) What is operator overloading in C++? Explain with suitable example. Also list operators which cannot be overloaded.
- (b) Differentiate between Operator and Function overloading with the help of suitable example. 7+7
6. (a) Create a class **complex** and implement the following :
- (i) Define suitable constructors and destructors
  - (ii) Overload the operators + and -
  - (iii) Write a friend function sum which adds the real and imaginary parts of a complex object
- (b) With relevant examples, explain
- (i) multilevel inheritance
  - (ii) hybrid inheritance
- 10+4
7. (a) Explain the concept of a destructor in a class. What is its role in terms of cleanup of unwanted objects?
- (b) How is an exception handling performed in C++? Write a program that throws an arithmetic exception as and when a number input is greater than 9999. 7+7

8. (a) Design and implement a class `string` using an array, with a maximum size of 20 characters. The class should contain the necessary constructors, destructor, overloaded assignment operator and a friend function for concatenation of two strings. Make suitable assumptions if required. Also write `main()` for the above.

(b) What is an inline function? In which situations would you make a function inline? Give two examples of inline functions.

10+4

9. (a) Syntactically explain nested "if-else" statement in C++.

(b) Define the following :

(i) Polymorphism

(ii) Typecasting

(iii) Class and instance

(iv) Containership

(v) Abstract class

4+10