2024

COMPUTER SCIENCE

Paper : COM0300104

(Object-Oriented Programming in C++)

Full Marks : 45

Time : 2 hours

The figures in the margin indicate full marks for the questions

1. Choose the correct option from the following : 1×5=5

(a) Which feature of OOP indicates code reusability?

(i) Abstraction

(ii) Polymorphism

(iii) Encapsulation

(iv) Inheritance

(b) The symbol >> is called

(i) lesser than

(ii) insertion operator

(iii) extraction operator

(iv) None of the above

(c) Constructors should be a

(i) private member of the class

(ii) protected member of the class

(iii) public member of the class

(iv) None of the above

(d) When 'continue' statement is used inside a loop

(i) it will cause premature exit of the loop enclosing it

(ii) it will transfer the control to the statement following the loop

(iii) it causes skipping of the statements following it in the body of the loop

(iv) All of the above

(e) Which among the following base class members cannot be inherited in C++?

(i) Member data

(ii) Member function

(iii) Friend relationship

(iv) Virtual function

2. Answer any *five* of the following questions : 2×5=10

(a) Mention a few benefits of object-oriented programming paradigm.

(b) Mention the difference between a structure and a class.

(c) What is inline function?

(d) Write down the statements only, to print the elements of an $n \times n$ matrix of integers row-wise.

(e) What is an operator?

(f) List out logical operators in C++.

(g) Find out errors, if any, in the following and rewrite correctly :

```
if (a > b)
    g = a;
    cout << "g = " << g;
else
    g = b;
    cout << "g = " << g;
}
```

(h) What do you understand by multiple inheritance?

(i) What is the need of a function?

(j) List the operators, which cannot be overloaded.

3. Answer any *four* of the following questions : 5×4=20

(a) Explain the benefits of the object-oriented approach.

(b) Explain the general structure of a C++ program.

(c) Define a class cuboid having three data members length, breadth and height. Write a default constructor to set these values to zero. Write a member function to compute its volume and another to check if it is a cube, i.e., all three dimensions are equal.

(d) Define a class to represent points in the two-dimensional space using their coordinate values which are real numbers. Overload the unary operator "−" such that if p is the point (x, y), then $-p$ is the point $(-x, -y)$.

(e) Define a class. Write the general syntax of defining a class.

(f) What is a friend function? Why do we use it?

(g) What is a parameterized constructor? Exemplify.

(h) In inheritance relationship, what is the order of construction and destruction?

4. Answer any *one* of the following questions : 10

(a) Differentiate between the following terms with suitable examples : 2×5=10

(i) Abstraction and Encapsulation

(ii) Function overloading and Function overriding

(iii) Virtual function and Pure virtual function

(iv) New operator and Delete operator

(v) Multiple inheritance and Multilevel inheritance

(b) What is operator overloading? Why do we need it? Write the general form of operator overloading function. Mention the difference between overloading a unary operator and a binary operator. 2+1+3+4=10

(c) What is an exception? Explain the exception handling mechanism. Explain how a single-catch block can handle all exceptions. 2+6+2=10

(d) Write a C++ program to define a class "complex" with two data members "real" and "img" to represent real and imaginary part of a complex number. Write member functions :

(i) *rpart*( ): to return the real part of a complex number

(ii) *ipart*( ): to return the imaginary part of a complex number

(iii) *add*( ): to add two complex numbers

(iv) *mul*( ): to multiply two complex numbers

Write constructors with zero, one and two arguments to initialize the object. 1+(1½×4)+3=10

★★★