## 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:

 $2 \times 5 = 10$ 

- (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++.

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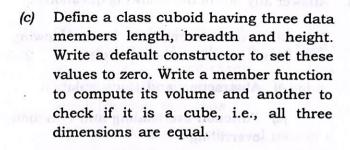
(Turn Over)

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

- (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:

(Continued)

- (a) Explain the benefits of the objectoriented approach.
- (b) Explain the general structure of a C++ program.



(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).

of Virtual function and Pure v

- (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



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(Continued)