

2019

COMPUTER SCIENCE

(Major)

Paper : 5.1

(Object-Oriented Programming)

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Answer the following as directed : $1 \times 7 = 7$

- (a) Define 'Object' in OOP.
- (b) What is the default access specifier applied to the variables and member functions of a class if not specified explicitly?
- (c) Which of the following is not a member of a class?
 - (i) Static function
 - (ii) Friend function
 - (iii) Const function
 - (iv) Virtual function

(Choose the correct option)

- (d) _____ is the keyword used in C++ to make program elements constant.

(Fill in the blank)

- (e) **cout** is an object of the class

(i) **iostream**

(ii) **istream**

(iii) **ostream**

(iv) **ifstream**

(Choose the correct option)

- (f) Function overriding is compile time polymorphism.

(Write True or False)

- (g) Define abstraction.

2. Answer the following questions (any four):

$$2 \times 4 = 8$$

- (a) Write a C++ program to open a file 'abc.txt' and show its content to the terminal.

- (b) Differentiate between run-time and compile-time polymorphism.

- (c) Define inheritance. Explain briefly.

- (d) What is the use of "protected" access specifier?

- (e) Write short note on "new" operator in C++.

3. Answer the following questions (any three):

$$5 \times 3 = 15$$

- (a) Define a class "Rev" in C++. Object of this class accepts an integer as input. The class contains a method named "reverseNum" which returns the reverse of the input integer. Write the complete program including the main() function.

- (b) What is a constructor? Mention its features.

- (c) What is virtual function? How are they defined? Give proper programming example.

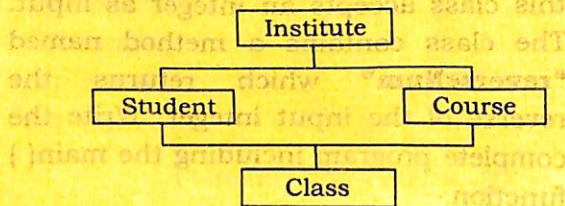
- (d) Write a program to find the area of rectangle, triangle and sphere by using function overloading.

- (e) What do you mean by static member function of a class? Write a program in C++ to count the number of objects created for a particular class.

4. Answer the following questions (any three):

$$10 \times 3 = 30$$

- (a) Implement the following hierarchy using C++. Please take proper measures to avoid multiple inheritance :



- (b) Explain operator overloading. How is it different from function overloading? Write a program in C++ to overload the '+' operator so that it can be used to combine two or more strings.
- (c) Differentiate between :
- Copy constructor and default constructor
 - Call by reference and return by reference
 - Inline function and macro
- (d) Define 'exception'. What are different exception handling mechanisms available in C++? Explain briefly. Write a program in C++ to take two numbers as input from the user and divide the first input by the second input. Perform proper exception handling to prevent "division by zero".

- (e) Create a class "SimpleCalc" in C++ which contains the methods—"add()", "sub()", "mul()" and "div()". Each object of the class should be created with three integer parameters, namely "num1", "num2" and "choice". The value of the "choice" parameter decides the operation to be performed. If it contains "1" then addition of "num1" and "num2" is to be performed by invoking the method add(). Similarly, sub (), mul() and div() will be invoked if "choice" contains "2", "3" and "4" respectively, performing the operations subtraction, multiplication and division on "num1" and "num2". If "choice" contains any other value then all the four methods should be invoked.
- (f) Define a template class to represent a list of elements. Functionalities to be provided are :
- Constructors
 - Get the elements of the list
 - Display the elements of the list
 - Sort the elements in ascending order

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