(2½ Hours)   **[Total Marks: 75]**

N. B.: (1) **All** questions are **compulsory**.
      (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
      (3) Answers to the **same question** must be **written together**.
      (4) Numbers to the **right** indicate **marks**.
      (5) Draw **neat labeled diagrams** wherever **necessary**.
      (6) Use of **Non-programmable** calculators is **allowed**.

1.   **Attempt _any three_ of the following:**   **15**
a.   Discuss procedure oriented programming paradigm. Also discuss its characteristics.
b.   What is object oriented programming paradigm? Discuss its characteristics.
c.   Define any two of the following
        (i)   Classes   (ii) Objects   (iii)Data abstraction
d.   Discuss benefits and applications of oops.
e.   Explain static and dynamic binding.
f.   Write a short note on data abstraction and data encapsulation.

2.   **Attempt _any three_ of the following:**   **15**
a.   What is a class? How a class can be defined? Discuss various ways of defining
      member functions of a class.
b.   What are objects? How they can be declared? Also discuss memory allocation for
      objects in object oriented programming.
c.   How data members and member functions of a class can be accessed. Write a program
      to demonstrate the concept of accessing public members of a class.
d.   What is a constructor? List various types of constructors. Explain copy constructor
      with programming example.
e.   Declare a class rectangle with data members as length and breadth, and member
      functions as getdata() to read data and display() to find and display area and perimeter
      of a rectangle. Also write main method to implement the class.
f.   What is a friend function? How it can be declared? What are its characteristics?

3.   **Attempt _any three_ of the following:**   **15**
a.   Define function overloading and operator overloading. Write down the rules for
      overloading operators.
b.   Write a C++ program to add two complex numbers by overloading binary + operator.
c.   What do you understand from data conversion between objects and basic types? List
      various type conversions.
d.   Write a C++ program to demonstrate conversion from user defined to basic data type.
e.   What is this pointer? Write a C++ program to demonstrate use of this pointer.
f.   What are virtual functions? What are the rules for writing virtual functions?

4.   **Attempt _any three_ of the following:**   **15**
a.   What is inheritance? Discuss different forms of inheritance.
b.   Discuss public, private and protected data members and member functions. When to
      declare which type of data members/member functions.
c.   Write a C++ program to demonstrate use of hybrid inheritance.
d.   What is an exception? Explain exception handling mechanism in detail.

[TURN OVER]

e. What happens when raised exception is not caught by catch block? Explain with suitable example.

f. Write a C++ program to show use of multiple catch statements.

5. **Attempt _any three_ of the following:** **15**

a. Explain various methods to detect end of file.

b. Write a program to open two files country and capital simultaneously and print the nameof the capital in front of the country.

c. Explain the use and purpose of following functions
    (i)   seekg() and seekp()
    (ii)   tellg() and tellp()

d. What are class templates? Explain their use. How they can be declared?

e. Define a class named vector. Illustrate the use of vector class template for performing the scalar product of int type vectors as well as float type vectors.

f. What is a function template? Write a C++ program to demonstrate the use of function templates?

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2