**24225**

**3 Hours / 70 Marks**          Seat No.

*Instructions :*    (1)    All Questions are *compulsory.*

(2)    Answer each next main Question on a new page.

(3)    Illustrate your answers with neat sketches wherever necessary.

(4)    Figures to the right indicate full marks.

(5)    Assume suitable data, if necessary.

(6)    Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1.    **Attempt any FIVE of the following :**          **10**

(a)    State any four applications of OOP.

(b)    Define class and object with proper syntax.

(c)    Give the syntax for constructor in derived classes.

(d)    Define virtual base class with suitable example.

(e)    Define pure virtual function with syntax.

(f)    Define multilevel inheritance with diagram.

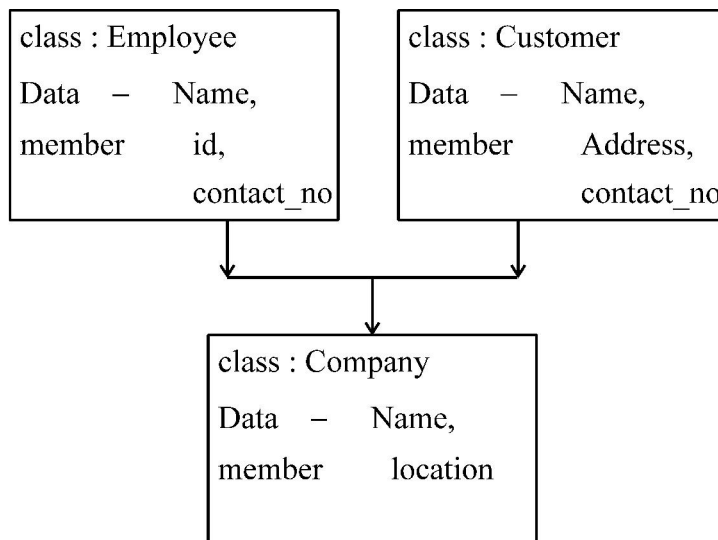(g)    Define destructor, state any two features of destructor.

2.    **Attempt any THREE of the following :**          **12**

(a)    Describe concept of type casting using suitable example.

(b)    Write C++ program to declare a class mobile having data members price and model number. Accept & display data for 10 objects.

(c) Write a C++ program to implement inheritance shown in following figure :

```
┌─────────────────────────┐     ┌─────────────────────────┐
│ class : Employee        │     │ class : Customer        │
│                         │     │                         │
│ Data   –   Name,        │     │ Data   –   Name,        │
│ member     id,          │     │ member     Address,     │
│            contact_no   │     │            contact_no   │
└─────────────────────────┘     └─────────────────────────┘
              │                           │
              └─────────────┬─────────────┘
                            ▼
              ┌─────────────────────────┐
              │ class : Company         │
              │                         │
              │ Data   –   Name,        │
              │ member     location     │
              └─────────────────────────┘
```

(d) Write a C++ program to overload add function to add two integer numbers & two float numbers.

**3.** **Attempt any THREE of the following :**      **12**

(a) Develop a C++ program to check detection of end of file.

(b) Write a C++ program, to declare a class distance having data members km, meter, cm, mm. Accept and display data for one object using constructor concept.

(c) Define static member function with syntax & state the properties of static member function (any two).

(d) State the four rules for virtual function.

**4.** **Attempt any THREE of the following :**      **12**
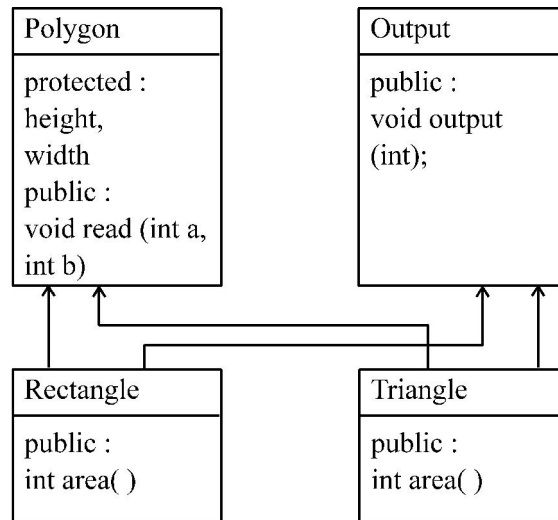
(a) Explain friend function with suitable example.

(b) Explain different unformatted input/output functions in file.

(c) Explain runtime polymorphism with suitable example.

(d) Define hybrid inheritance. Explain with example.

**5.** **Attempt any TWO of the following :** **12**

(a) Write a program to define the following relationship using multiple inheritance :

| Polygon | Output |
|---|---|
| protected : height, width public : void read (int a, int b) | public : void output (int); |

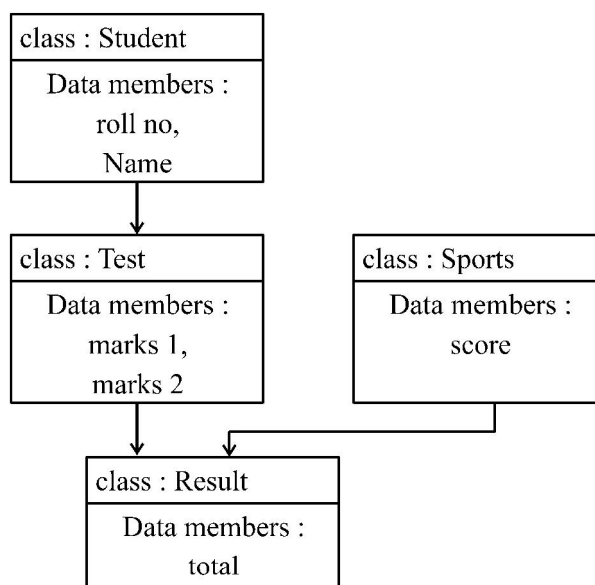| Rectangle | Triangle |
|---|---|
| public : int area( ) | public : int area( ) |

(b) Write a program that copies contents of one file into another file.

(c) Write a program to overload the '—' unary operator to negate the value.

**6.** **Attempt any TWO of the following :** **12**

(a) Write a program to implement the following hierarchy using suitable member function :

| class : Student |
|---|
| Data members : roll no, Name |

| class : Test | class : Sports |
|---|---|
| Data members : marks 1, marks 2 | Data members : score |

| class : Result |
|---|
| Data members : total |

(b)   Write a program to declare class book containing data member as 'title', 'author name', 'publication', 'price'. Accept & display the information for one object using pointer to that object.

(c)   Write a program to declare a class 'staff' having data member as name and department. Accept this data for 10 staff and display names of staff that are CM department.

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