



Date : 15/01/2009

Time : 9.30am – 12.00 noon

Answer **four** questions **only**.

Q1. Define a class to represent employee information. Include following members.

Data members

- i) Name of the employee.
- ii) ID of the employee
- iii) Hours worked

Member functions

- i) A default constructor and a destructor
- ii) A user defined constructor to initialize the data members of the class.
- iii) A function to display the employee details.
- iv) A function to calculate the gross pay of the employee. It should be done according to the following rules.
 - For the first 40 hours he is paid Rs 200/- per hour.
 - For each hour exceeding 40 hours he is paid Rs 300/-.

Write a main program to test your class.

- Q2). i) What are the underlying concepts of the Object Oriented Programming?
ii) What do you mean by the terms *class* and *object*?
iii) Distinguish between *private*, *public* and *protected* access regions briefly.
iv) Explain the roles of *new* and *delete* keywords briefly.
v) What do you mean by *inheritance* and *polymorphism* in the context of Object Oriented Programming?

- Q3). i) What do you mean by *friend classes* and *friend functions*?
ii) Write a C++ program to multiply two integers using a friend function.
iii) Write a C++ program to demonstrate the friend class concept.

Q4). i). a). What are the types of *method polymorphism*? Explain each of them briefly.

ii) Define a class to represent a complex number. Include following members.

Data members

- i) Real part.
- ii) Imaginary part.

Member functions

- i) A constructor and a destructor.
- ii) A user defined constructor to initialize data members of the class.
- iii) Overload + operator for adding two complex numbers.
- iv) To display the data members of the complex number.

Write a main program to test your class.

Q5). i)a) Explain *aggregation* briefly.

b) How do you explain the aggregation of a car with wheels, engine and body?

ii) Define three classes 'Wheel', 'Engine' and 'Car'. The Car class should be aggregated with Wheel and Engine.

Q6). i). a) What is meant by the terms *base class* and *abstract class*?

b) What is meant by the terms *single inheritance* and *multiple inheritance*?

ii) An Institution consists of Administrative and Minor staff. An information system for the Institution is sought to be set up. For all the staff members their name, age, department attached to, and date of the appointment are stored. The Administrative staff has information on whether they are language proficient or not. Minor staff category has his or her employment history and the number of hours each employee worked as overtime.

a) Give a suitable classification (i.e. inheritance) hierarchy to represent the above information.

b) Write down suitable class definitions for the classification hierarchy defined in part a). The classes should consist of methods to initialize and display information.

c) Write a driver program to initialize, and test the classes you have defined in part b).

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