EASTERN UNIVERSITY, SRI LANKA
DEPARTMENT OF MATHEMATICS
FIRST YEAR EXAMINATION IN SCIENCE - 2016/2017
SECOND SEMESTER (MARCH, 2019)
CS 104 - OBJECT ORIENTED PROGRAMMING TECHNIQUES
REPEAT

Answer all questions   Time allowed: Two Hours

Q1. a. Define the following terms regarding to the *Object Oriented Programming(OOP)*:

   i. *class*;

   ii. *object*;

   iii. *constructor*;

   iv. *destructor*.

   b. List down the types of constructors used in C++ programming.

   c. Give the C++ syntax for the following:

   i. *a constructor*;

   ii. *a function*;

   iii. *a class*.

   d. Describe the *friend function* in C++ programming.

   e. Write a C++ program to input and display the name, *Labour_number* and *salary* for 10 Laborers by using the concept of *class* and *functions*.

Q2. a. State clearly the role of the keyword *'protected'* in C++ programming.

   b. Define the following terms:

   i. *operator overloading*;

   ii. *function overloading*.

c. Write a C++ code for overloading the binary '+' operator to add two g
numbers.

d. Consider the definition of the following class:

```cpp
class testClass {
    public:
        int sum();
            //Returns the sum of the private member variables
        void print();
            //Prints the values of the private member variables
        testClass();
            //Default constructor
            //Initializes the private member variables to 0
        testClass(int a, int b);
            //Constructors with parameters
            //initializes the private member variables to the values
            //specified by the parameters
    private:
        int x;
        int y;
};
```

i. Write the definitions of the member functions as described in the defin
of the class testClass.

ii. Write a test program to test the various operations of the class test

Q3. a. Explain the term *inheritance* in OOP with the aid of an example.

b. List down the types of *inheritance*.

c. Write short notes to explain their meaning of the following terms:

i. *abstract class*;

ii. *virtual function*.

d. Answer the following questions based on the given C++ code:

```cpp
class Student{
    char name[20];
    int registrationno;
    float marks;
```

```cpp
    protected:
        void result();
    public:
        Student();
        void register();
        void display();
};
class Faculty {
    char facultyName[20];
    long facultyCode;
    protected:
        float pay;
    public:
        Faculty();
        void enter();
        void show();
};
class Course: public Student, private Faculty {
    long courseCode;
    char courseName[20], startDate[8], endDate[8];
    public:
        Course();
        void commence();
        void courseDetail();
};
```

i. Which type of inheritance is illustrated in the above C++ code?

ii. Write the names of all data members, which is/are accessible from member function 'courseDetail' of class *Course*.

iii. Write the names of member functions, which are accessible from objects of class *Course*.

iv. Write the names of all the members, which are accessible from objects of class *Faculty*.

Q4.   a. Define the following OOP concepts:

   i. *encapsulation*;

   ii. *polymorphism*.

   b. Explain three differences between *overloading* and *overriding* in C++.

   c. State the difference between *Data abstraction* and *Encapsulation*.

   d. Create a class *Employee* with data members *employeeID, name, designation* and *salary*. Write methods *getEmployee()* - to take user input, *showEmployee()* - to display employee details and *showOrder()* - to display grade of employees based on salary as follows:

   i. if salary greater than Rs. 50000 grade A;

   ii. if salary between Rs. 30000 and Rs. 50000 grade B;

   iii. if salary less than Rs. 30000 grade C.