EASTERN UNIVERSITY, SRI LANKA
DEPARTMENT OF MATHEMATICS
FIRST EXAMINATION IN SCIENCE (2013/2014)
SECOND SEMESTER (Apr/May, 2016)
CS104 – OBJECT ORIENTED PROGRAMMING TECHNIQUES

ANSWER ALL QUESTIONS — TIME: TWO HOURS

1)

a) Briefly describe the following in the context of object oriented programming:

i) Class;

ii) Object.

b) Describe two types of class members used in object oriented programming languages.

c) Explain how three types of class access specifiers are used in object oriented programming.

d) Using an object oriented language (C++), give an example of a class definition which illustrates the use of the concepts you described in your answer to parts b) and c).

e) You have been invited to give a talk to trainee programmers outlining the reasons for the widespread use of object oriented programming within the software development industry. Summarize the points you would present in your talk.

)

a) What is the difference between *Local variable* and *Global variable* in C++? Also, give suitable C++ code to illustrate both.

b) Explain the following terms:

i. Constructor;

ii. Destructor;

iii. Copy constructor;

iv. Static data members.

c) Consider the following class definition that represents students' mark sheet system.

```
class marksSheet
{
public:
 Roll_no;
 Subject_name ;
 Subject_code ;
 Exam_Marks ;
void getDetails(); // Read Roll_no, Subject_name, Subject_code &Exam_Marks
void display();    // Display Roll_no, Subject_name, Subject_code &Exam_Mar
};
```

i. Provide a redesigned **marksSheet** class that uses more appropriate modifiers.

ii. Provide a constructor for the **marksSheet** class that will initialize the in variables to suitable (valid) initial values.

iii. Write a body for the **getDetails ()** method that enables storing the infor and with the **display ()** method display results.

d) Write the output of the following program:

```
#include <iostream>
using namespace std;
class Box {
private:
double length;
double breadth;
double height;
public:
```

```
static int objectCount ;
Box(double l=2.0, double b=2.0, double h=2.0)
{
cout <<"Constructor called." << endl;
length = l; breadth = b; height = h;
objectCount++;
}
double Volume()
{
return length * breadth * height;
}
};
int Box::objectCount = 0;
int main()
{
Box Box1(3.3, 1.2, 1.5);
Box Box2(8.5, 6.0, 2.0);
cout << "Total objects: " << Box::objectCount << endl;
return 0;
}
```

3)

a) What is operator overloading and list out the operators that cannot be overloaded.

b) Describe the binary operator overloading with an example.

c) Briefly explain the following types of inheritance:

i. Multiple inheritance;

ii. Multi level inheritance;

iii. Hierarchical inheritance.

d) Define the following terms:

i. Dynamic variable;

ii. New operator;

iii. Delete operator.

e) State what is meant by polymorphism.

f) Implement a program for the following algorithm:

Step 1: Start the program.

Step 2: Declare the base class student.

Step 3: Declare and define the function get() to get the student details.

Step 4: Declare the other class sports.

Step 5: Declare and define the function getsm() to read the sports mark.

Step 6: Create the class statement derived from student and sports.

Step 7: Declare and define the function display() to find out the total and average.

Step 8: Declare the derived class object to call the functions get(),getsm() and display(

Step 9: Stop the program.

4) The follow questions relate to class diagrams represented in the Unified Mo Language (UML).

a) State the UML symbol used to represent the following class member visibility leve

i. protected

ii. derived

iii. private

iv. static

v. public