THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME : LEVEL 04
DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE
No Book Test 1 – 2016/2017
CPU2242 : OBJECT ORIENTED PROGRAMMING USING C++ AND JAVA
DURATION:One and Half Hours (1 ½ Hours)

Date: 29.04.2017	Time: 10.30 am -12.00 noon

Answer All Questions.

1)

a) Describe three (3) differences between object oriented programming and procedure oriented programming.

b) Explain the following basic concepts of object oriented programming using examples.
    i. Encapsulation
    ii. Inheritance
    iii. Class
    iv. Object

c) Fill in the blanks in each of the following statements by using the words given inside the brackets below. (You may write only the suitable word for the blank in your answer sheet)

(Pseudo code, Runtime error, Object code, Logical error, OOA, Private, OOD, this, OOP, Classes, Source code, Objects, Selector, Class, Instance, Modifier, Static, Public, Protected, Super)

I. Algorithms expressed in English language and a programming language is called as
....

II. ....is produced when an interpreter or a compiler translates .... into recognizable and executable machine code.

III. A program runs without any errors being reported but output results that are wrong. This is a ....

IV. In the ....phase, the user requirements are translated into a set of abstractions, which can be represented as a set of ....with known relationships.

V. A ....method allows attributes to be altered.

VI. ....methods can only operate on class variables and they cannot access the ....variables defined in the class.

VII. Accessibility of instance variables can be controlled with three access specifiers. When a variable is declared as.........., it can be modified from all classes in the same or different packages. If the variable is ...., access is restricted to the class itself. If the variable is ...., access is allowed to the class itself, subclasses and all classes in the same package.

VIII. The ....keyword can be used to refer current class instance variable, if there is ambiguity between the instance variables and parameters.

IX. The .... keyword can be used to invoke immediate parent class constructor.

X. The ....keyword can be used to declare class variables rather than instance variables.

2.)

a) Briefly explain why Java is considered as platform independent.

b) Define a **Java class** to represent a **Circle** that contains the following data members and methods.
- A constant variable to store the **pi** value
- Two **private** data members
    - radius of the circle
    - x and y coordinates of the circles center
- Methods
    i. A default constructer to create a circle object with radius 1 and the center of the circle located on the origin (x=0, y=0).
    ii. A parameterized constructer to initialize the data members of the class.
    iii. A method called **area()** to return the area of the circle.
       (Hint : Area of the circle = πr^2 , where r is the radius)
    iv. A Selector method called **getRadius()** to read the radius of the circle.
    v. A method called **print()** to print the radius and the area of the circle.

c) Write a class called **Test** with a proper **main method** to test the class defined in part (b). Create two objects using the following details and print the details.

	radius	x and y coordinates
Circle1	1	origin
Circle2	5	x=5 , y=5

3.)

a) Define a **Java** class called **Sphere** which is derived from the **Circle class** created in **Q2(b)** , which has the following functionalities.

    i. A parameterized constructer to initialize the data members of the class.

    ii. Re-defined the **area()** method to compute the area of the sphere.

        (Hint : Area of the Sphere= $4 \pi r^2$, where r is the radius)

    iii. A method called **volume()** to compute the volume of the sphere.

        (Hint : Volume of the sphere = $4/3 \pi r^3$, where r is the radius)

    iv. Override the **print()** method to print the radius, area and the volume of the sphere.

b) Define **abstract class** and **abstract method** by giving examples. What is the difference between an abstract class and a normal class?

c) What is the purpose of using **final** key word when declaring variables, methods and classes? Explain briefly by providing examples for each case.

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