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UNIVERSITY EXAMINATIONS 2023/2024

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS INFORMATION TECHNOLOGY AND BACHELOR OF SCIENCE IN INFROMATION TECHNOLOGY

CIT 3157: OBJECT ORIENTED PROGRAMMING

DATE: APRIL 2024 **TIME: 2 HOURS**

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

a) Write a class **Marks** with three data members to store three marks. Write three methods **in( )** to input marks, **sum( )**to calculate and return the sum and **avg( )** to calculate and return the average marks. [5 Marks]

b) Explain the steps in writing and running a Java application. [4 Marks]

c) Define: [4 Marks]

i. super()
ii. instanceOf operator
iii. Extends
iv. this.

d) Discuss the significance of the following OOP concepts: [4 Marks]

i. Abstraction.
ii. Encapsulation.

iii. Inheritance

iv. Polymorphism.

e) State any three difference between C and Java language [4 Marks]

f) Write a program that demonstrates use of Logical operators [4 Marks]

g) Java is said to be complied and interpreted language. Discuss. [2 Marks]

h) What is the output of this code: [3 Marks]

```
public class ArrayInitialization
{
  public static void main(String[] args)
  {
    final int MONTHS = 12;  // Number of months

    // Create and initialize an array.
    int[] days = { 31, 28, 31, 30, 31, 30,
                   31, 31, 30, 31, 30, 31};

    // Display the days in each month.
    for (int index = 0; index < MONTHS; index++)
    {
      System.out.println("Month " + (index + 1)
        + " has " + days[index] + " days.");
    }
  }
}
```

QUESTION TWO (20 MARKS)

a) Write a Java program to convert seconds to hour, minute and seconds. [4 Marks]

b) Illustrate and explain the types of Inheritance supported by Java [4 Marks]

c) There are two types of access specifiers in java. Discuss. [2 Marks]

d) Explain the types of constructors supported by Java. [3 Marks]

e) Explain: **Scanner input = new Scanner (System.in);** [2 Marks]

f) Discuss What is: [5 Marks]

i. Method Overloading in Java

ii. Encapsulation

iii. Method overriding in java

iv. Class

v. JDK

QUESTION THREE (20 MARKS)

a) Write a Java program to print numbers between 1 to 80 which are divisible by 3, 5 and by both [3 Marks]

b) Discuss Thread lifecycle [4 Marks]

c) Differentiate between:

i. Local variable, Static (or class) variable and Instance variable [3 Marks]

ii. Static Polymorphism and Dynamic Polymorphism [2 Marks]

iii. Abstract method and abstract class. [2 Marks]

d) What is the output of this program? [3 Marks]

```
public class LogicalOperatorDemo {
   public static void main(String args[]) {
      boolean b1 = true;
      boolean b2 = false;

      System.out.println("b1 && b2: " + (b1&&b2));
      System.out.println("b1 || b2: " + (b1||b2));
      System.out.println("!(b1 && b2): " + !(b1&&b2));
   }
}
```

e) Write a short note on: [3 Marks]

i. Ternary operator

ii. JRE

iii. Bytecode

QUESTION FOUR (20 MARKS)

a) Using a code snippet, write the syntax for the following: [4 Marks]

i. Array declaration

ii. Accessing class members
iii. Scanner object creation
iv. Do/while

b) Explain the difference between: [6 Marks]
i. Ternary operator and ***while***
ii. Compiler and interpreter
iii. M++ and ++M

c) Describe the concept of Java Virtual Machine [2 Marks]

d) Compare and contrast entry-controlled and exit-controlled loops using a flow chart. [2 Marks]

e) If the int variables i, j, and k contain the values 3, 20, and 100 respectively, what is the value of the following logical expression: [2 Marks]

```
j < 4 || j == 5 && 1 <= k3 < 4 || 20 == 5 && 3< 100
```

f) Write a switch construct code that display the following menu: [4 Marks]

```
Main Menu
---------

  1. View balance
  2. Deposit
  3. Withdraw
  4. Exit

Enter a choice (1 - 4):
```

QUESTION FIVE (20 MARKS)

a) List the rule to define a valid Java identifier. [3 Marks]

b) Distinguish between local and global variables. [4 Marks]

c) List and explain the components of a method? [2 Marks]

d) Differentiate polymorphism and encapsulation [2 Marks]

e) Write a JavaFx program that displays the following menu. [4 Marks]

f) Briefly outline any three access specifiers. [3 Marks]