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FACULTY OF COMPUTING AND TECHNOLOGY

Bachelor of Science Honours in Computer Science
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CSCI 21052 - Object Oriented Programming I

No. of Questions: **Four (04)** Time: **Two and a half (02 $\frac{1}{2}$) hours** No. of Pages: **Eight (08)**

Instructions:

- The question paper consists of two parts, Part I and Part II.
- Part I has twenty multiple-choice questions and Part II has three essay type questions.
- Answer **all** the questions in both Part I and Part II.
- Answers for the part I should be provided on the same paper.

Part I

1. Select the most appropriate answer.

a) Which of the following options lead to portability and security in Java?

i. Bytecode is executed by JVM.

ii. The applet makes the Java code secure and portable.

iii. Use of exception handling.

iv. Dynamic binding between objects.

b) Evaluate the following Java expression, if **x=3**, **y=5**, and **z=10**:

```
++z + y - y + z + x++
```

i. 24

ii. 23

iii. 20

iv. 25

c) If a class has a method, static block, instance block, and constructor, what should be the execution order?

```
public class First_C {
    public void myMethod() {
        System.out.println("Method");
    }

    {
        System.out.println(" Instance Block");
    }

    public void First_C() {
        System.out.println("Constructor ");
    }
    static {
        System.out.println("static block");
    }
    public static void main(String[] args) {
        First_C c = new First_C();
        c.First_C();
        c.myMethod();
    }
}
```

i. Instance block, method, static block, and constructor.

ii. Method, constructor, instance block, and static block.

iii. Static block, method, instance block, and constructor.

iv. Static block, instance block, constructor, and method.

d) What do you mean by nameless objects?

i. An object created by using the new keyword.

ii. An object of a superclass created in the subclass.

iii. An object without having any name but having a reference.

iv. An object that has no reference.

e) Select the correct pair of output statements.

```
class A {
    String name = "A";

    String getName() {
        return this.name;
    }

    String greeting() {
        return "Class " + this.getName();
    }

    class B extends A {

        String name = "B";

        String getName() {
            return this.name;
        }
    }
}


public class App {
    public static void main(String[] args) {
        A a = new A();
        A.B b = a.new B();
        System.out.println(a.greeting() + " has name " + a.getName());
        System.out.println(b.greeting() + " has name " + b.getName());
    }
}
```

i. Class A has name A
Class B has name B

ii. Class A has name B
Class B has name A

iii. Class B has name A
Class A has name B

iv. Class A has name A
Class B has name

f) What is meant by the classes and objects that depend on each other?

i. Tight Coupling

ii. Cohesion

iii. Loose Coupling

iv. None of the above

g) What is a listener in the context of event handling?

i. A listener is a variable that is notified when an event occurs.

ii. A listener is an object that is notified when an event occurs.

iii. A listener is a method that is notified when an event occurs.

iv. None of the above.

h) Which of these methods are used to register a keyboard event listener?

i. KeyListener()

ii. addKistener()

iii. addKeyListener()

iv. eventKeyboardListener()

i) Consider the following two statements:

int x = 25;

Integer y = new Integer(33);

What is correct about the above two statements?

i. Both are primitive data types

ii. Primitive data type and an object of a wrapper class

iii. Both are wrapper class

iv. None of the above

j) In which memory type will the primitive data type values be stored?

i. Heap Memory

ii. Stack Memory

iii. Both A & B

iv. None of the above

k) In Java, arrays are;

i. objects

ii. object references

iii. primitive data type

iv. None of the above

l) The name of an array variable or identifier can start with ___.

i. A letter

ii. Underscore (_)

iii. Dollar Symbol ($)

iv. All

m) What are the contents of arr after the following code has been executed?

```
int[][] arr = { {3,2,1},{1,2,3} };
int value = 0;
for (int row = 1; row < arr.length; row++) {
   for (int col = 1; col < arr[0].length; col++) {
      if (arr[row][col] % 2 == 1)
      {
          arr[row][col] = arr[row][col] + 1;
      }
      if (arr[row][col] % 2 == 0)
      {
          arr[row][col] = arr[row][col] * 2;
      }
   }
}
```

i. { {6, 4, 2}, {2, 4, 6} }

ii. { {3, 2, 1}, {1, 4, 6} }

iii. { {3, 2, 1}, {1, 4, 8} }

iv. { {4, 4, 2}, {2, 4, 4} }

n) Which of the following are correct in java?

1) The keyword final can be used with variables, methods and class.
2) You can create only one instance of abstract class.
3) interface extends interface.
4) List, Set, Map are classes in java.

i. 1,4

ii. 2,3

iii. 1,3

iv. 1,3 & 4

o) For which of the followings can the synchronized keyword be applied?

i. Variables and Methods

ii. Methods and Classes

iii. Variables and Classes

iv. Methods and Blocks

p) When is the concept of synchronization required?

i. Multiple threads operating simultaneously on the same object.

ii. Multiple threads are operating on multiple objects.

iii. Both (i) and (ii) above

iv. None of the above

q) Which constructs an anonymous inner class instance?

i. Runnable r = new Runnable() { };

ii. Runnable r = new Runnable(public void run() { });

iii. Runnable r = new Runnable { public void run(){}};

iv. System.out.println(new Runnable() {public void run() { }});

r) Which feature of OOP reduces the use of nested classes?

i. Encapsulation

ii. Inheritance

iii. Binding

iv. Abstraction

s) Which statement among the following is false?

i. Object must be created before using members of a class

ii. Memory for an object is allocated only after its constructor is called

iii. Objects can't be passed by reference

iv. Objects size depends on its class data members

t) Which specifier allows a programmer to make the private members which can be inherited?

i. Private

ii. Default

iii. Protected

iv. Protected and default

Part II

2. (a) Explain Abstraction in Object Oriented Programming using a suitable example.

(30)

(b) State two differences between an Interface and an Abstract class. **(20)**

(c) What is Encapsulation in Object Oriented Programming? Give an example using Java. **(30)**

(d) State two benefits of using encapsulation. **(20)**

[100 marks]

3. (a) What is meant by an exception that could occur in a program? **(15)**

(b) Explain the difference between checked and unchecked exceptions in Java. **(20)**

(c) Using appropriate examples, briefly explain how to create your own exception class in Java. **(30)**

(d) What are static variables in Java? Using appropriate example code, demonstrate how to use static variables in a Java program. **(35)**

[100 marks]

4. (a) What is a Java package and what is the use of a java package? Briefly explain. **(15)**

(b) What is multithreading in the context of a Java application? List two advantages of using multithreading. **(20)**

(c) State two ways of creating a thread. Provide an example for one of the ways to create a thread. **(25)**

(d) Explain runtime polymorphism and compile time polymorphism using suitable examples. **(40)**

[100 marks]

---------- End of Paper ----------