WEST BENGAL UNIVERSITY OF TECHNOLOGY

EC-605A

OBJECT ORIENTED PROGRAMMING

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable. All symbols are of usual significance.

GROUP A
(Multiple Choice Type Questions)

1. Answer *all* questions. 10×1 = 10

(i) Which statements are not correct about Objects?

(A) An Object is an instance of a class
(B) Objects can access both instance and static data
(C) All classes extend the Object class
(D) Objects do not permit encapsulation.

(ii) What is an aggregate object?

(A) An object instance that has only static methods
(B) An object instance that has only primitive attributes
(C) An object instance that contains other objects
(D) An object that has only primitive attributes and instances methods.

(iii) A class can have many methods with the same name, as long as the number of parameters is different. This is known as

(A) method overloading (B) method invocating
(C) method overriding (D) method labeling

(iv) The phrase "*IS A*" refers to the object-oriented concept of _____

(A) composition (B) polymorphism
(C) inheritance (D) none of these

(v) Analyze the following block of code and select the appropriate output:

```
for(int i = 1; i < 5; i ++)
  {
     if(i% 2 = = 0)
            System.out.println("Hello World:" + i);
  }
```

(A) Hello World 2
Hello World 4

(B) Hello World 1
Hello World 2
Hello World 3
Hello World 4

(C) Hello World:1
Hello World: 2
Hello World: 3
Hello World: 4

(D) Hello World: 2
Hello World: 4

(vi) Analyze the following method signature and select the statement that must be true:

Private int doSomething(int a, Object b, String c, char d)

(A) a is pass by reference, b is pass by value, c is pass by reference, and d is pass by value

(B) a is pass by value, b is pass by reference , c is pass by reference , and d is pass by value

(C) a is pass by reference , b is pass by reference, c is pass by reference, and d is pass by reference

(D) a is pass by reference, b is pass by value, c is pass by value, and d is pass by value

(vii) What is the main difference the JRE and the JDK?

(A) The JRE does not include the development tools

(B) The JDK does not include runtime tools

(C) The JRE includes the virtual machine

(D) The JDK does not include the virtual machine

(viii) In order to determine the type that a polymorphic variable refers to, decision is made by the

(A) Operating system when the program is loaded into memory

(B) Java run-time environment at run time

(C) Compiler at compile time

(D) Programmer at the time the program is written

(ix) Which statements about the Java language are true?

(A) Java supports both procedural and object-oriented programming

(B) Java is only a procedural language

(C) Java is only an Object-Oriented

(D) None of the above

(x) If an attribute is private, which methods have access to it?

(A) Only those defined in the same class

(B) Only static methods in the same class

(C) Only instance methods in the same class

(D) Only classes in the same package

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. (a) What do java compiler and java interpreter do? 3+2

   (b) Can you make any method with abstract and final both? Justify your answer.

3. Can an abstract class have a constructor? Explain. Where is the final keyword used in Java? 3+2

4. How does Java implement command line arguments? Explain with an example. 5

5. (a) Why is the main () method in Java declared as a public and static? 3+2

   (b) What is a wrapper class?

6. Which statements are put inside the try block? Is it essential to catch all types of exception? How is explicit casting different from implicit casting? 1+2+2

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. $3 \times 15 = 45$

7. (a) Design a class in Java named 'Students' which contains the following as data members: 10
Name of the student, date of admission, stream
Define a default, a parameterized and a copy constructor for the class. Further create two more methods to accept data from the user and display data for a particular student.
Design another class called 'Marks' which has an array of 5 elements as its data member. In addition to the array the Marks also has data members to hold the total and the average. The class Marks inherits the class Student. Define default, parameterized and a copy constructor for the class and call the constructors of the super class from inside the constructors of the subclass. Also write methods to accept marks of a student as input.

   (b) How is a class diagram and an object diagram different? Draw the UML diagram for the above problem. 5

8. (a) Which keyword is used to distinguish between a data member and a formal parameter of a method inside a class? Explain with an example. 4

   (b) What might be the functionality between a machine with only JDK installed and another machine with JRE installed? 2

   (c) Explain the use of 'final', 'finally' and 'finalize' keyword in Java. 6

   (d) Differentiate between static binding and dynamic binding. 3

9. (a) Explain the life cycle of a thread. 4

   (b) What are packages in Java? 2

   (c) Give an example of a method which is deprecated in Thread class? 1

(d) Write a program to implement Runnable class to create a Thread. 5

(e) How does Java ensure platform independence? 3

10. (a) How are objects and variables passed to methods in Java? 2

(b) How are static data members of a class initialized? Explain with an example. 3

(c) What is the sequence in which constructors are called in multilevel inheritance? 3

(d) How are 'throw' and 'throws' different? 3

(e) Give an example of user defined exception. 4

11. Write short notes on any *three* of the following: 3×5

(a) Polymorphism

(b) Different types of inheritance in Java

(c) File handling in Java

(d) Component diagram and Deployment diagram in UML

(e) Interfaces in Java