Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – SUMMER 2025

Subject Code:3140705 Date:23-05-2025

Subject Name: Object Oriented Programming -I

Time: 10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain method overriding and method overloading in Java.	**03**
	(b)	Demonstrates use of BufferedReader and the readLine() method.	**04**
	(c)	Define and explain object and class in Java with appropriate example.	**07**
Q.2	**(a)**	What is constructor? What is it role? Explain various features/characteristics of constructors.	**03**
	(b)	What are different types of access modifier?	**04**
	(c)	What is purpose of using methods? How do you declare a method? How do you invoke a method?	**07**
		OR	
	(c)	What is difference between final, finally and finalize.	**07**
Q.3	**(a)**	What is super class?	**03**
	(b)	Define interface in java.	**04**
	(c)	Explain inheritance with example.	**07**
		OR	
Q.3	**(a)**	What is use of super keyword?	**03**
	(b)	What is package concept and Describe the use of package.	**04**
	(c)	Explain polymorphism with example.	**07**
Q.4	**(a)**	Explain use of throw in exception handling with example.	**03**
	(b)	Explain creation of different shapes in JAVAFX application?	**04**
	(c)	Explain Generics classes with example.	**07**
		OR	
Q.4	**(a)**	Explain difference between throw and throws.	**03**
	(b)	Write programs to deal with MouseEvents.	**04**
	(c)	Explain Generics methods with example.	**07**
Q.5	**(a)**	Demonstrate use of the Animation, PathTransition.	**03**
	(b)	Describe the life cycle of a thread object.	**04**
	(c)	Explain use of Linked List collection class with example.	**07**
		OR	
Q.5	**(a)**	Create a radio button using the RadioButton class and group radio buttons using a ToggleGroup.	**03**
	(b)	Explain runnable interface.	**04**
	(c)	Explain Sets with examples.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2024

Subject Code:3140705 Date:08-07-2024

Subject Name: Object Oriented Programming -I

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Answer in one word:(one mark for each) I. Which integral type in Java has the exact range from -2147483648 (-2^{31}) to 2147483647 (2^{31}-1). II. The software for developing and running Java programs. III. It is similar to machine instructions but is architecture neutral and can run on any platform that has a Java Virtual Machine (JVM).	**03**
	(b)	Write a program that reads an integer and adds all the digits in the integer. For example, if an integer is 932, the sum of all its digits is 14. Hint: Use the % operator to extract digits, and use the / operator to remove the extracted digit. For instance, 932 % 10 = 2 and 932 / 10 = 93.	**04**
	(c)	Analyze following code pieces (assume they are properly enclosed in class and main function) and write the output/error (No justification is required): (one mark for each)	**07**

I.
```
int num = 5;
    int x = 1;
    for (int i = 1; i <= num; i++) {
       x *= i;
    }
 System.out.println("x is " + x);
```

II.
```
int[] nums = {1, 5, 3, 9, 7};

    int m= 1;
    int s= 0;
    for (int i = 0; i < nums.length; i++) {
       if (nums[i] > m) {
          s = m;
          m = nums[i];
       } else if (nums[i] > s && nums[i] != m) {
          s = nums[i];
       }
    }
    System.out.println("s is: " + s);
```

III. int i=1,j=0,k=0;
if (i > k) {
if (j > k)
System.out.println("i and j are greater than k");
}
else
System.out.println("i is less than or equal to k");

IV. int x = 3, y = 3;
switch (x + 3) {
case 6: y = 1;
default: y += 1;
}
System.out.println("y is " + y);

V. class HelloWorld {
public static void main(String[] args) {
int[] numbers = new int[1];
numbers[0]=0;
m(numbers);
System.out.println("numbers[0] is" + numbers[0]);
}
public static void m(int[] y) {
y[0] = 3;
}
}

VI. StringBuffer s1 = new StringBuffer("Complete");
s1.setCharAt(1,'i');
s1.setCharAt(7,'d');
System.out.println(s1);

VII. int Integer = 24;
char String ='I';
System.out.print(Integer);
System.out.print(String);

Q.2 **(a)** Describe the relationship between an object and its defining class. **03**

(b) Write java statements for following class: **04**

public class Counter {
int c;
}

i. Declare a parameterized constructor to initialize variable c.

ii. Declare instance method to increment c and return updated value of c.

(c) Justify following: **07**

i. In general, constructors should be public.
ii. Why main is declared as static.
iii. Why we do not declare destructors in java.
iv. There is no pointer in java.

OR

(c) Differentiate between following: **07**

i. this keyword vs super keyword
ii. abstract class vs interface

Q.3 **(a)** Give definition of method overloading. **03**

(b) i. Analyze following code pieces and write the output/error and briefly justify output: **04**

```
public class Test {
  public static void main(String[] args) {
    new Person().printPerson();
    new Student().printPerson();
  }
}

class Student extends Person {
  @Override
  public String getInfo() {
    return "Student";
  }
}

class Person {
  public String getInfo() {
    return "Person";
  }

  public void printPerson() {
    System.out.println(getInfo());
  }
}
```

ii. Given the following source code, which comment line can be uncommented without introducing errors?

```
abstract class MyClass {
abstract void f();
final void g() {}
//final void h() {} // comment (1)
}
final class MyOtherClass extends MyClass {
public static void main(String[] args) {
MyClass mc = new MyOtherClass();
}
void f() {}
void h() {}
 //void g() {} // comment (2)
}
```

(c) Discuss public, private, protected and default access modifiers with examples. **07**

OR

Q.3 **(a)** What is the final keyword? Give different uses of the final keyword. **03**

(b) Declare an interface called Function that has a method named evaluate that takes an int parameter and returns an int value. **04**

Create a class called Half that implements the Function interface. The implementation of the method evaluate() should return the value obtained by dividing the int argument by 2.

(c) What is an Exception? Explain Exception handling in JAVA with the help of example. **07**

Q.4	**(a)**	How do keyword throw differ from throws in Exception handling?	**03**
	(b)	Differentiate between a byte oriented and a character-oriented stream.	**04**
	(c)	Explain binary I/O classes. Demonstrate java file I/O with any I/O class to read a text file.	**07**

OR

Q.4	**(a)**	Compare JavaFX with Swing and AWT.	**03**
	(b)	i. List any four UI controls in JavaFX. ii. List any two Panes for Containing and Organizing Nodes	**04**
	(c)	Write a program to demonstrate GUI application development using JavaFX.	**07**
Q.5	**(a)**	What are the differences between ArrayList and LinkedList? Which list should you use to insert and delete elements at the beginning of a list?	**03**
	(b)	What is Java Collection Framework? List four collection classes?	**04**
	(c)	Give the name of class or interface that provides following facility (Do not elaborate)(one mark for each) i. Dynamic array to store the duplicate element of different data types. It maintains the insertion order. ii. Implements the last-in-first-out data structure. iii. Implements the first-in-first-out data structure. iv. Implements the first-in-first-out data structure and it holds the elements or objects which are to be processed by their priorities. v. It represents the unordered set of elements which doesn't allow us to store the duplicate items. vi. It is a red-black tree-based implementation. It provides an efficient means of storing key-value pairs in sorted order. vii. It allows us to store key and value pair, where keys should be unique.	**07**

OR

Q.5	**(a)**	Explain thread life cycle.	**03**
	(b)	What is the package? Explain steps to create a package with example.	**04**
	(c)	Declare a class called Employee having employee_Id and employee_Name as members. Extend class Employee to have a subclass called SalariedEmployee having designation and monthly_salary as members. Define following: - Required constructors - Methods to insert, update and display all details of employees. - Method main for creating an array for storing these details given as command line arguments and showing usage of above methods.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023

Subject Code:3140705 Date:25-07-2023

Subject Name:Object Oriented Programming -I

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is the Java bytecode, and what is the extension of Java bytecode file? Which software is needed to run Java bytecode?	**03**
	(b)	Describe syntax errors (compile errors), runtime errors, and logic errors by giving suitable examples?	**04**
	(c)	Answer in brief (within 50 words):	**07**

I. Justify Java enables high performance.

II. Differentiate between while and do while loop?

III. How many times is the println statement executed?

```
for (int i = 0; i < 10; i++)
for (int j = 0; j < i; j++)
   System.out.println(i * j);
```

IV. If the value of variable x is 1 then what will be returned by the following expression:

```
x % 2 = = 0
```

Q.2	**(a)**	What is the use of this keyword? How it is different from super keyword?	**03**
	(b)	(i) Given that Thing is a class, how many objects and how many reference variables are created by the following code?	**04**

```
Thing item, stuff;
item = new Thing();
Thing entity = new Thing();
```

(ii) Examine following code. Write and justify output.

```
public class MyClass {
public static void main(String[] args) {
C c = new C();
System.out.println(c.max(12, 29));
}
}
class A {
int max(int x, int y) { if (x>y) return x; else return y; }
}
class B extends A{
int max(int x, int y) { return super.max(y, x) - 10; }
}
class C extends B {
int max(int x, int y) { return super.max(x+10, y+2); }
}
```

	(c)	Write a program that defines class named StopWatch. The class contains:	**07**

- Private data fields startTime and endTime with getter methods.

- no-arg constructor that initializes startTime with the current time.
- A method named start() that resets the startTime to the current time.
- A method named stop() that sets the endTime to the current time.
- A method named getElapsedTime() that returns the elapsed time for the stopwatch in milliseconds.
- Declare object of StopWatch to demonstrate stop watch.

Hint: Use System.currentTimeMillis() to get current time in milliseconds.

OR

(c) Create a class called Employee that includes: **07**

I. Three instance variables— id (type String), name (type String) and monthly_salary (double).
II. A default constructor that initializes the three instance variables.
III. A setter and a getter method for each instance variable (for example for id variable void setId(String id), String getId( )).
IV. displayEmployee() method for displaying employee details.

Write a driver class named EmployeeTest that demonstrates class Employee's capabilities. Create two Employee objects and display each object's yearly salary. Then give each Employee a 10% raise and display each Employee's yearly salary again.

Q.3 **(a)** Differentiate between checked and unchecked exception? **03**

(b) Exemplify throw and throws clause of exception handling? **04**

(c) Demonstrate use of try catch block by catching ArithmeticExceptions and InputMismatchExceptions? **07**

OR

Q.3 **(a)** Describe thread life cycle with block diagram? **03**

(b) Differentiate between Thread class and Runnable interface for implementing Threads? **04**

(c) Write a program to make calculator that accepts input from commandline? Use java's exception handling mechanism to handle abnormal situation? **07**

Q.4 **(a)** Define Queue interface of java collection classes? **03**

(b) Explain types of polymorphism? **04**

(c) What are the differences between ArrayList and LinkedList? Demonstrates use of ArrayList with example? **07**

OR

Q.4 **(a)** Define Object Serialization? **03**

(b) What are the differences between text I/O and binary I/O? **04**

(c) Describe and demonstrate Binary I/O classes of java? **07**

Q.5 **(a)** Answer in one line: **03**

(i) Write the name of package in which all collection classes and interface are grouped.

(ii) Write the name of collection interface or abstract class which store and process object in a first-in, first-out fashion.

(iii) Write the name of method that checks whether the collection contains the specified element.

(b) List JavaFX UI controls? **04**

(c) What do you understand by event source and event object? Explain how to register an event handler object and how to implement a handler interface? **07**

OR

Q.5 **(a)** Enlist various Layout panes available in JavaFX? **03**

(b) Discuss JavaFX benefits? **04**

(c) Illustrate basic structure of JavaFX program? **07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2022

Subject Code:3140705 Date:08-07-2022

Subject Name:Object Oriented Programming -I

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	List out features of Java. Explain any two features.	**3**
	(b)	Write a single program which demonstrates the usage of following keywords: i) import, ii) new, iii) this, iv) break, v) continue Show how to compile and run the program in java.	**4**
	(c)	Demonstrate use of try-catch construct in case of hierarchical Exception Handling. (i.e handling various exception belongs to the exception hierarchy)	**7**
Q.2	**(a)**	Explain following Java keywords using appropriate examples: i) static, ii) final, iii) super	**3**

	(b)	Consider class A as the parent of class B. Explain among the following which statement will show the compilation error.
		i) A a = new A();
		ii) A a = new B();
		iii) B b = new A();
		iv) B b = new B();
			4

	(c)	Write a java program to take infix expressions and convert it into prefix expressions.	**7**
		OR	
	(c)	Write a java program that evaluates a math expression given in string form from command line arguments.	**7**
Q.3	**(a)**	Defines types of inheritance.	**3**
	(b)	Explain the following constructors using appropriate example: i) Default constructor and Parameterised constructor ii) Shallow copy and Deep copy constructor	**4**
	(c)	Explain file io using byte stream with appropriate example. hint: use FileInputStream, FileOutputStream	**7**
		OR	
Q.3	**(a)**	Define types of polymorphism	**3**
	(b)	Explain the following: i) Arguments and Parameters of a function ii) Pass by Value and Pass by reference	**4**

	(c)	Explain file io using character stream with appropriate example. hint: use FileReader, FileWriter	**7**
Q.4	**(a)**	Define Encapsulation and access specifier	**3**
	(b)	Explain multithreading using Thread class	**4**
	(c)	Write a short note on Java Collections.	**7**
		OR	
Q.4	**(a)**	Differentiate between Abstract class and Interfaces	**3**
	(b)	Explain multithreading using Runnable interface	**4**
	(c)	Write a program to add input elements in ArrayList collection class, then sort the inserted elements in descending order and display the sorted output. hint: use Collections.reverseOrder()	**7**
Q.5	**(a)**	Explain following Java keywords using appropriate examples: i) throw, ii) throws, iii) finally	**3**
	(b)	In multi-threading using Thread class, explain with an example how a start() method call invokes the run method of the class extending Thread class.	**4**
	(c)	Write a short note on JAVAFX controls.	**7**
		OR	
Q.5	**(a)**	Explain thread life cycle	**3**
	(b)	In multi-threads using the Runnable interface, explain with an example how a start() method calls the run() method of a class implementing a runnable interface.	**4**
	(c)	Develop a GUI based application using JAVAFX controls.	**7**

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