

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: B.Tech
BRANCH: CSE/AI&ML**

**SEMESTER : III
SESSION : MO/2023**

SUBJECT: CS233 OBJECT ORIENTED PROGRAMMING AND DESIGN PATTERNS

TIME: 3 hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
-

		CO	BL
Q.1(a)	Explain the characteristics and development environment of Java.	[5]	1 1
Q.1(b)	Create a class called Invoice that a hardware store might use to represent an invoice for an item sold at the store. An Invoice should include four pieces of information as instance variables—a part number (type String), a part description (type String), a quantity of the item being purchased (type int) and a price per item (double). Your class should have a constructor that initializes the four instance variables. Provide a set and a get method for each instance variable. In addition, provide a method named getInvoiceAmount that calculates the invoice amount (i.e., multiplies the quantity by the price per item), then returns the amount as a double value. If the quantity is not positive, it should be set to 0. If the price per item is not positive, it should be set to 0.0. Write the main function in a class named InvoiceTest that demonstrates class Invoice 's capabilities.	[5]	1 6
Q.2(a)	Use of break and continue makes a program unstructured. Give an example of how you can replace the break and continue keywords and use appropriate replacement to make a program more structured.	[5]	2 4
Q.2(b)	Illustrate the difference between standard and enhanced for statements using ArrayLists .	[5]	2 3
Q.3(a)	What are the possible ways to make an object eligible for Garbage collector. Write a program in java to justify your answer.	[5]	1 2
Q.3(b)	Write an interface named Readable that has one method named read() . There are two classes named TextMessage and EBook that implements the interface. Class TextMessage has two data members named sender and content . It has methods named getSender() and one parameterized constructor that takes two arguments to initialize the data members of the class. Class EBook has three data members named name , pages and pageNumber . The member page is an ArrayList of type String . The class has three methods named getName() , page() , nextPage() and one parameterized constructor that initializes the data members of the class. The method nextPage() adds one to the current pageNumber . Reset the page number if the modulus of page number with page size becomes zero. The ebook is read page by page, and calling the public String read() method always returns the next page as a string. In the main method create a few pages and add them into the ArrayList . Create an object of EBook type and add the pages in EBook . Read the pages of EBook one by one and print it using the suitable methods. Create another object for class TextMessage and initialize its data members. Display the contents of the Class using suitable methods.	[5]	2 6
Q.4(a)	What is the difference between final , finally and finalize() ? Explain with appropriate examples.	[5]	2 3
Q.4(b)	Describe any two GUI components along with the EventType , EventListener and Method associated with the components.	[5]	3 1
Q.5(a)	What is Regular Expression? Write a Java program to validate your BIT Mesra email id using Regular Expression. One example of BIT Mesra email id is btech10000.22@bitmesra.ac.in	[5]	4 3
Q.5(b)	Explain the lifecycle of a Thread in Java with a proper diagram.	[5]	5 2