The Test is divided into three sections. The first section has MCQ's on Java, each question carries 2 marks, And the second section has Queries on MySQL, each question carries 3 marks. For the third section, three questions need to be completed, each question carries 25 marks.

Time Duration : 3hours

Section-1: Core Java MCQ's

Question 1: Given

```
public class Test {
    public static void main(String[] args) {
        int number = 5;
        boolean condition1 = true;
        boolean condition2 = false;

        if ((number == 4) && !condition2)
            System.out.print("A ");
        System.out.print("B ");

        if ((condition2 = true) && condition1)
            System.out.print("C ");
    }
}
```

What is the result?

A. A

B. B

C. A B

D. B C

E. A B C

F. Compilation fails.

Question 2: Given

```
try {
    // Some code here that might throw an exception
} catch (NullPointerException e1) {
    System.out.print("a");
} catch (Exception e2) {
    System.out.print("b");
} finally {
    System.out.print("c");
}
```

If some sort of exception is thrown inside try block , which output is possible?

A. a

B. b

C. c

D. ac

E. abc

Question 3:

```
public class Example {
    public static void main(String[] args) {
        int number = 42;
        Example e = new Example();
        e.performAction(number);
        System.out.print("main number = " + number);
    }

    void performAction(int number) {
        System.out.print("performAction number = " + number++);
    }
}
```

What is the result?

A. performAction number = 42 main number = 42

B. performAction number = 43 main number = 43

C. performAction number = 42 main number = 43

D. performAction number = 43 main number = 42

Question 4:

```
public abstract class Shape {
    private int x;
    private int y;

    public abstract void draw();

    public void setAnchor(int x, int y) {
        this.x = x;
        this.y = y;
    }
}
```

Which two classes use the Shape class correctly? (Choose two.)

A. public class Circle implements Shape {

private int radius;

}

B. public abstract class Circle extends Shape {

private int radius;

}

C. public class Circle extends Shape {

private int radius;

public void draw();

}

D. public abstract class Circle implements Shape {

private int radius;

public void draw();

}

E. public abstract class Circle implements Shape {

private int radius;

public void draw() { /* code here */ }

Question 5: Given

```
class Money {
    private String country = "Canada";
    public String getC() { return country; }
}

class Yen extends Money {
    public String getC() { return super.country; }
}

public class Euro extends Money {
    public String getC(int x) { return super.getC(); }
    public static void main(String[] args) {
        System.out.print(new Yen().getC() + " " + new Euro().getC());
    }
}
```

What is the result?

A. Canada

B. null Canada

C. Canada null

D. Canada Canada

E. Compilation fails due to an error on line.

Section-2: MySQL Queries

Patient ID	Patient Name	Sex	Age	Address
01	Sheela	F	23	Flat no 201, Vasavi Heights, Yakutap
02	Rehan	M	21	Building no 2, Yelahanka
03	Anay	M	56	H No 1, Panipat
04	Mahira	F	42	House no 12, Gandhinagar
05	Nishant	M	12	Sunflower Heights, Thane

Fig 1:**Patients Table**

PatientsCheckup Table

Patient ID	BP	Weight	Consultation Fees
01	121/80	67	300
02	142/76	78	400
03	151/75	55	300
04	160/81	61	550
05	143/67	78	700

Fig2:**patientsCheckup Table**

1)Write a SQL query to retrieve patient details, including Patient ID, Name, Age whose weight in the 'Patients Checkup' records exceeds 60 kgs. Ensure the results have no duplicate patient records and sort them alphabetically by the patient's name.

Ans:

---

2) Write a query to find those patients who have paid consultation fees between 400 to 700**.**

Ans:

---

	customer_id	first_name	last_name	amount	order_date	category	gender
1	110	Ajeet	Mishra	2000	2022-10-18 16:10:30.000	Cosmetics	male
2	111	Rana	sharma	5000	2000-11-11 12:19:26.000	Clothing	male
3	112	Divya	Khatri	3000	2021-10-05 17:30:56.000	Cosmetics	female
4	113	Vikas	Kohli	1500	2019-05-07 01:12:23.000	Clothing	Male
5	114	Rimi	Kumari	8000	2010-02-14 10:35:45.000	Jewellery	female

Fig 3 :**Customer Details Table**

Product Detail Table

	Product_id	customer_id	Product_name
1	1001	112	Skin Gel
2	1002	110	Face cleanser
3	1003	114	Earings
4	1004	120	Headphone
5	1008	111	Jeans

Fig4:**Product Details Table**

3)Write a query to find out the Customer name who has not been assigned any product.

Ans:

---

4) write a query to get the list the product names and the total number of each product purchased by male customers.

Ans:

---

5) Write down the query to fetch ProductName, Customer name that determines the category of products which has the highest total purchase amount.

Ans:

Section-3: Coding Challenges

Q1) As a secret agent, you need to send and receive classified messages securely. You've received a message "HELLO" from Agent Y that needs encryption. Using your Java program with a key of 3, you encrypt the message to "KHOOR." This secure encryption ensures your communications are safe from prying eyes during transmission. Agent Y can decrypt it with the same key on the other end.

Your program should provide the following functionality:

Accept an input string message from the user.

Accept an encryption key (an integer) from the user.

Encrypt the message by shifting each character in the message by the key positions.

Output the encrypted message.

Expected Input:

- Enter the message to encrypt: "HELLO"

- Enter the encryption key (an integer): 3

Expected Output:

- Encrypted Message: "KHOOR"

Q2) Imagine you are building a Java program for stock traders to analyze potential profits in a single trading day. The program should assist traders in making informed decisions about when to buy and sell stocks. It includes a `StockAnalyzer` class designed to determine the maximum profit that can be achieved by buying and selling a specific stock within the same trading day.

- Traders often look for opportunities to maximize profits by buying low and selling high.
- Throughout the trading day, stock prices vary minute by minute.
- The goal is to find the most profitable buy and sell points within the trading day's data.
- The `StockAnalyzer` class has been developed to facilitate this analysis.

Expected Input:
Enter the stockPrices = {7, 1, 5, 3, 6, 4};

Expected Output:

The expected maximum profit is 5, which can be achieved by buying the stock at a price of 1 and selling it at a price of 6.

Q3) Imagine you are part of a team developing an e-commerce platform. Write a Java program for a logistics company to calculate shipping costs for various packages with different weights and destinations. The program should provide the following functionality:

Accept user input for multiple packages, each with its weight and destination.
Determine the shipping cost for each package based on the following rules:

For weights less than or equal to 1 kg:

- Domestic shipping: $5
- International shipping: $10

For weights between 1 kg and 5 kg:

- Domestic shipping: $10
- International shipping: $20

For weights greater than 5 kg:

- Domestic shipping: $15
- International shipping: $30

Apply a 10% discount on the shipping cost for any package with a weight greater than 10 kg.
Calculate the total shipping cost for all packages.
Display the shipping cost for each package and the overall total shipping cost.

Example Interaction:

Welcome to the Shipping Calculator!

How many packages are you shipping? 3

Package 1:

Enter the weight of the package in kilograms: 0.8

Select the destination:

1. Domestic

2. International

Please enter your choice: 2

Package 2:

Enter the weight of the package in kilograms: 3.5

Select the destination:

1. Domestic

2. International

Please enter your choice: 1

Package 3:

Enter the weight of the package in kilograms: 12

Select the destination:

1. Domestic

2. International

Please enter your choice: 2

Shipping cost for Package 1: $8 (0.8 kg * $10 per kg)

Shipping cost for Package 2: $35 (3.5 kg * $10 per kg)

Shipping cost for Package 3: $324 (12 kg * $27 per kg)

Total Shipping Cost: $367

Q4) Imagine you must analyze the performance of the student depending on their scores, write a Java program to analyze the performance of students in a class who took a series of practice exams. Each student's exam scores are recorded in an array.

Your goal is to find the length of the longest continuous improvement sequence of scores to identify students who consistently improved in their practice exams.

- You have an array of exam scores for each student.

- You want to determine the length of the longest continuous improvement sequence of scores for each student.

- A continuous improvement sequence is a sequence of scores where each score is greater than or equal to the previous one.

- The program should identify the student with the longest continuous improvement sequence and provide the length of that sequence.

- The program will help educators and students track their progress and recognize areas where improvement is consistent over multiple exams.

Example Input:

You have exam scores for three students:

Student 1: [78, 80, 85, 89, 92, 94, 96, 91, 92, 94]

Student 2: [65, 70, 68, 75, 78, 82, 88, 87, 90, 93]

Student 3: [88, 80, 85, 82, 90, 92, 95, 96, 98, 94]

Expected Output:

- For Student 1, the longest continuous improvement sequence has a length of 7.

- For Student 2, the longest continuous improvement sequence has a length of 5.

- For Student 3, the longest continuous improvement sequence has a length of 6.

Q5) Let's say you're building an e-commerce platform that lets users discover pairs of products whose combined prices match their specified budget. This feature streamlines multi-item shopping, making it budget friendly. It elevates the shopping experience and empowers users to make cost-effective choices when buying multiple products.

Expected Input:

Product Prices: [3, 2, 4, 5, 7, 1]

Target Budget: 6

Expected Output: Pairs with Sum 6: (3, 3), (2, 4), (4, 2), (5, 1), (1, 5)