(Answer Only Four Questions)

1.

    a. How does one discover **syntax** errors and **logical** errors in a java program? Explain each of these errors separately by providing suitable examples.

    b.

        i. What is the difference between a **variable** and a **literal** in Java.

        ii. Explain the difference between a **primitive** type and a **reference** type variable and give an example of each.

    c. What is the output produced by the following program?

```
public class MyTest{
        Public static void main(String [ ] args) {
                int x=0;
                int y=10;
                while (x < 5) {
                        y = y + x;
                        System.out.println(x+":" + y );
                        ++x;
                }
        }
}
```

    d. Write a Java program to calculate the distance between two points with coordinates (x1, y1) and (x2, y2). The values for x1, y1, x2 and y2 should be taken from the keyboard.

2.

    a. Explain the purpose of using comments in a java program. Explain how different types of comments are written in Java?

    b. Write the following mathematical expressions in Java.

        i. $L = \sqrt{a^2 + b^2} - \dfrac{a^2}{p(m1 - m2)}$

        ii. $c = \left(d + y^2 + x^n\right)$

c. Using the declarations and initializations given below, evaluate the following expressions.

> int i=13, j = 20, k=30, n =100;

   i. i % 5 + 1

  ii. ++j * 10

 iii. k + 12 * n

 iv. k / i * n

d. Write a Java program to convert and display temperature from Celsius to Fahrenheit. The program should request the starting Celsius value, number of conversions to be made and the increment between conversions. The ouput should have appropriate headings and list of Celsius values and corresponding Fahrenheit values in a tabular form as given below. Use the relationship **Fahrenheit = (9.0/5.0) *Celsius +32.**

```
Enter starting Celsius value: 20
Enter Number of Conversions: 5
Increment between Celsius values: 1

Celsius            Fahrenheit
---------          --------------
20                 36.00
21                 37.80
22                 39.60
23                 41.49
24                 43.20
25                 45.00
```

3.

a. Explain the four components of a *while* loop.

b. What is the output produced by the following program

```
public class JavaMultiFor {

    public static void main(String[] args) {

        for (int x=0; x<6; x++) {
            for (int y=4; y>2; y--) {
                System.out.println(x + " " + y);
            }
            if (( x== 1) || (x == 3)) {
                x++;
            }
        }
    }
}
```

c. Rewrite the following *do..while* loop into an equivalent *while* loop.

```
int n=1;
double x=0;
double s;
do {
    s=1.0/(n*n);
    x = x+ s;
    n++;
} while (s > 0.01)
```

d. Find logical errors in the following code segments and rewrite the corrected code.

i. .
```
if (income >=5000)
    rate = 0.10;
else if (income >= 10000)
    rate = 0.20;
else
    rate = 0.00
```

ii.
```
. total =0; i = 1;
while (i <= 100) {
        total = total + 1;
}
```

e. Write a Java program which takes the final mark of a student as a keyboard input and outputs his/her grade. The grade should be calculated as follows.

The Final Mark	Grade
70 – 100	A
55 – 69	B
40 – 54	C
30 – 39	D
0 - 29	E

4. .

a. Explain the main difference between methods in the **Math** class and the methods in the **Scanner** class in Java.

b. Write down three differences between **constructors** and **methods** in a Java program.

c. Consider the following Java classes and answer the questions given below.

```java
class DrumKit {

    boolean topHat = true;
    boolean snare = true;

    void playTopHat() {
        System.out.println("ding ding da-ding");
    }

    void playSnare() {
        System.out.println("bang bng b-bang");
    }
}

class DrumKitTestDrive {
    public static void main(String [] args) {
        Drumkit d = new Drumkit();
        d.playSnare();
        d.snare = false;
        d.playTopHat();

        if (d.snare = = true) {
            d.playSnare();
        }
    }
}
```

   i.   Write the output produced by the above Java program.

   ii.   Write names of the classes used in the above program.

   iii.   Write the names of the methods available in the above program,

   iv.   Write the names of the primitive variables in the program.

   v.   Write names of the reference variables in the program.

   vi.   Propose a suitable constructor for the class **Drumkit**

d. A Java class is required to represent a bank account. The class should have following methods and fields.

Methods:
- deposit a given amount into the account
- withdraw a given amount from the account
- check the amount of money in the account

Fields:
- instance variable to store the amount of money in the account
- instance variable to identify the customer

Write a complete Java class satisfying the above requirements.

5.

a. Consider the following array definition and answer the questions in below.

int[] marks = {1, 5, 4, 3, 2, 7, 6, 8, 9, 0}

i. What are the values in the array "marks" after executing the following code?

```
for (int index = 0; index < marks.length; i++)
    marks[index] = 2 * marks[index]
```

ii. What are the values of the array after executing the following code?

```
temp = array[0]
for (int i=0; i < marks.length -1; i++) {
    marks[i] = marks[i+1];
}
marks[marks.length-1] = temp;
```

iii. Write a Java code to sort the array according to ascending order?

b. The following flow chart provides the methods of finding a palindrome of a given number. Write a Java program to implement the design in the flow chart given below. (Palindrome of 1234 is 4321)

Cont...
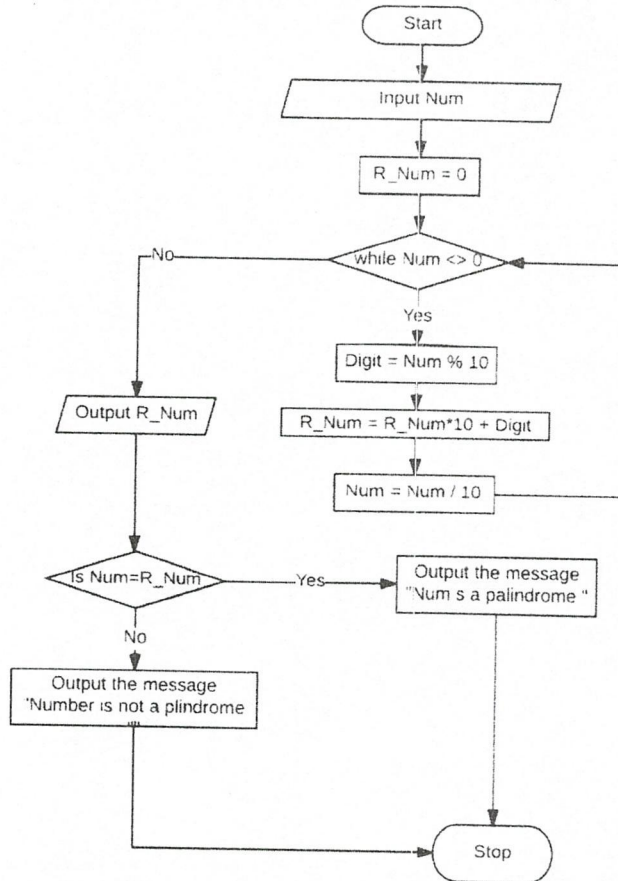
c. Write Java methods for each of the following requirements.

i. Pass integer number array as a parameter and return the maximum number in the array.

ii. Pass two integer number parameters and return the maximum of the two integers.