Instructions for Candidates

All questions carry equal marks. Attempt any **_FOUR_** questions.

Q. 1)   a) Java is a platform independent programming language. Explain in your own words.

b) Consider the following data of a student: _Name, Age, Gender, Class, Section, Father's Name, Mother's Name, Address, Mobile_ and _Marks_. Suggest a suitable datatype in Java for each of the given data.

c) Write a method in Java that initializes the given data by taking input from the user.

Q. 2)   a) Explain any three types of literals in Java with the help of examples.

b) Differentiate between Type Conversion and Type Promotion in Java with the help of examples.

c) A set of statements has to be repeated N times in Java. Which looping structure has to be used? Give reasons for choosing the looping structure.

d) Consider the following code in Java:

```
if (age < 13) {
    System.out.println("Person is Child");
}
else if (age < 19) {
    System.out.println("Person is Teenager");
}
else if (age < 45) {
```

```
            System.out.println("Person is Adult");
        }
        else if (age < 60) {
            System.out.println("Person is Middle-aged");
        }
        else {
            System.out.println("Person is Senior Citizen");
        }
```

What will be the output of the above given code if age is 45? Rewrite the above sequence using Switch-Case in Java.

e) Write a method in Java to check whether a number is positive or negative. Provide the user input.

Q. 3) a) Consider a two dimensional array in java. The integer array is of 5 by 6 size. Write code in Java to initialize the array using loop, with each element containing the remainder of the division of product of its indexes by 4.

b) Explain with the help of examples to differentiate between "<<" and "<<<" operators.

c) How many types of relational operators are there in Java? Write a code in Java to illustrate the use of each of them.

d) Consider the following code in Java:

```
        int i = 0;
        void try(){
            int j = 1;
            System.out.println(i);
        }
```

What will be output of the above given code? What is the scope of the variables in above given code? Suppose statement "int j = 1;" is replaced with "int i = 1;". What will be the output after the replacement of the statement? Justify your answer.

Q. 4) a) Consider the following data members: *Name, Age, Gender, Address, Mobile Number, Position, Department* and *Salary*. Define a class *Employee* in Java for this

data. The class should contain a method for inputting the values for all the data members from the user. The class should also contain a method to display them.

b) Explain which concept of OOP is applied here.

c) Describe how Garbage collection works in Java with the help of above mentioned class.

Q. 5)   a) Create a superclass named *Shape* which consists of a Empty Constructor. This class is inherited by a subclass *Quadrilateral* which consists of a constructor and an abstract method *Perimeter*. Further, *Quadrilateral* subclass is inherited by three subclasses namely, *Rectangle*, *Square* and *Circle*. Write the code in Java to implement these five classes.

b) Suppose class *Square* also wants to inherit from the class *Shape*. Can *Square* class inherit from both *Quadrilateral* and *Square* classes? Give reasons.

c) How can we ensure that our class cannot be inherited? Explain with the help of examples.

Q. 6)   a) Consider a method *Compute* in Java. It has two inputs, x and y. The method *Compute* checks whether the number x is prime or not. In case it is prime, the method prints the sum of first y natural numbers. However, in case, x is not prime, the method prints the first y Fibonacci numbers. Implement the method *Compute* in Java.

b) Write logical expressions to represent each of the following conditions:

   Marks scored are greater than 300 but less than 500

   The *category* is either 'A' or 'D'

   The *experience* is less than 4

   Value is between 2000 and 2500.