

Answer to this Paper must be written on the paper provided separately.

You will not be allowed to write during first 15 minutes.

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Section A is compulsory. Attempt any four questions from Section B.

The intended marks for questions or parts of questions are given in brackets [].

SECTION A (40 MARKS)
(Attempt all questions from this Section)

Question 1

[20]

Choose the correct answers to the questions from the given options.

- (i) Which keyword is used to achieve abstraction in Java?
 - (a) abstract
 - (b) interface
 - (c) extends
 - (d) implements
- (ii) How is abstraction different from encapsulation in Java?
 - (a) Abstraction is a way to hide data, while encapsulation is a way to hide implementation details.
 - (b) Encapsulation is a way to hide data, while abstraction is a way to hide implementation details.
 - (c) Abstraction and encapsulation are the same concepts in Java.
 - (d) Both abstraction and encapsulation involve hiding implementation details only.
- (iii) Which of the following is the correct syntax for the conditional (ternary) operator in Java?
 - (a) $x \text{ ? } y \text{ : } z$
 - (b) $x \text{ ? } y \text{ -> } z$
 - (c) $x : y \text{ ? } z$
 - (d) $x \text{ -> } y \text{ : } z$
- (iv) Which of the following operators is used for exponentiation in Java?
 - (a) ^
 - (b) **
 - (c) %
 - (d) ~~
- (v) What is the default value of each element in a character array in Java?
 - (a) '0'

- (b) ' ' (space)
 - (c) '\u0000'
 - (d) null
- (vi) What is the result of the expression! (5 > 3) in Java?
- (a) True
 - (b) False
 - (c) It will cause a syntax error.
 - (d) It will throw a runtime exception.
- (vii) What does the default case in a switch statement represent?
- (a) It is executed when no other case matches.
 - (b) It is used to terminate the switch statement.
 - (c) It is an alternative to the break statement.
 - (d) It is not a valid keyword in a switch statement.
- (viii) How do you check if the next input is an integer using the Scanner class?
- (a) `isInt()`
 - (b) `hasNextInt()`
 - (c) `nextInt()`
 - (d) `checkInt()`
- (ix) How do you close a Scanner object named input in Java?
- (a) `close(input);`
 - (b) `input.close();`
 - (c) `Scanner.close(input);`
 - (d) `closeScanner(input);`
- (x) Which method is used to find the length of a character array in Java?
- (a) `length()`
 - (b) `size()`
 - (c) `count()`
 - (d) `length`
- (xi) Which of the following is a valid way to compare if two strings, `str1` and `str2`, are equal in Java?
- (a) `str1 == str2`
 - (b) `str1.equals(str2)`
 - (c) `str1.equals = str2`
 - (d) `str1.compare(str2)`
- (xii) Which class contains the `parseInt` method in Java?
- (a) `String`
 - (b) `Math`
 - (c) `Integer`
 - (d) `Scanner`

- (xiii) In Java, how do you call an object's method?
- (a) By using the 'new' keyword
 - (b) By using the 'call' keyword
 - (c) By using the 'class name' followed by a 'dot' and the 'method name'
 - (d) By using this keyword
- (xiv) Which method is used to convert a string to lowercase in Java?
- (a) toLower()
 - (b) toLowerCase()
 - (c) convertToLower()
 - (d) caseLower()
- (xv) If a class does not define any constructors, what kind of constructor(s) will be provided by default in Java?
- (a) Default constructor with parameters
 - (b) No constructor will be provided
 - (c) Default constructor without parameters
 - (d) Parameterized constructor with default values
- (xvi) Assertion (A): A class in Java is known as an object factory.
Reason (R): Objects are created from a class that contains common attributes and behaviour.
- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
 - (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion.
 - (c) Assertion is true and Reason is false.
 - (d) Assertion is false and Reason is true.
- (xvii) How is method overloading related to constructors in Java?
- (a) Constructors and methods cannot be overloaded in Java.
 - (b) Overloading applies only to methods, not constructors.
 - (c) Constructors and methods can both be overloaded.
 - (d) Overloading is the same as overriding in Java.
- (xviii) Assertion(A): A do-while loop always executes at least once.
Reason(R): A do-while loop is called an exit-controlled loop.
- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
 - (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion.
 - (c) Assertion is true and Reason is false.
 - (d) Assertion is false and Reason is true.
- (xix) What is the purpose of this keyword within a class method in Java?
- (a) To refer to the current instance of the class
 - (b) To create a new object
 - (c) To access a static variable
 - (d) To declare a constructor
- (xx) Which of the following is the correct usage of valueOf to convert a boolean to

a string?

- (a) `String.valueOf(true)`
- (b) `Boolean.valueOf("true")`
- (c) `String.convert(true)`
- (d) `boolean.valueOf("true")`

Question 2

- (i) Write the output of the following: [2]
 - (a) `"Java Programming".substring(5, 12)`
 - (b) `"Java is fun!".indexOf("Python") + ""`
- (ii) Predict the output of the following code snippet: [2]

```
String a = "15";
String b = "3";
int result = Integer.parseInt(a)/Integer.parseInt(b);
System.out.print(result);
```
- (iii) How many times will the following loop execute? [2]

```
int limit = 8;
for (int i = 3; i <= 10; i++) {
    if (i > limit) {
        break;
    }
    System.out.println("Iteration " + i);
}
```
- (iv) Name any two types of access specifiers. [2]
- (v) Write one difference between Linear Search and Binary Search. [2]
- (vi) Answer the following: [2]
 - (a) Name a string function which removes the blank spaces provided in the prefix and suffix of a string.
 - (b) Name a string function that will convert the int value to 1234 to its string equivalent "1234".
- (vii) Write an import statement that makes the Scanner class available to your program. [2]
- (viii) Write the difference between `length` and `length()` functions. [2]
- (ix) Consider the following class: [2]

```
public class myClass
{
    public static int x = 3, y = 4;
    public int a = 2, b = 3;
}
```

 - (a) Name the variables for which each object of the class will have its own distinct copy.
 - (b) Name the variables that are common to all objects of the class.
- (x) Create a class with one integer instance variable. Initialise the variable using: [2]
 - (a) default constructor
 - (b) parameterised constructor

SECTION B (60 Marks)

(Answer any four questions from this section.)

Question 3**[15]**

Write a program to accept a number and print it in the reverse order.

Question 4**[15]**

Write a program to initialise the given data in an array and find the minimum and maximum values along with the sum of the given elements.

Numbers: 12, 15, 14, 11, 13

Output:

Minimum value: 11

Maximum value: 15

Sum of the elements: 65

Question 5**[15]**

Write a program to input ten words in an array. Arrange these words in descending order of alphabets, using selection sort technique. Print the sorted array.

Question 6**[15]**

Write a program to input a number and check and print whether it is a Pronic number or not. (Pronic number is a number which is the product of two consecutive integers.)

Examples:

42 = 6 × 7

40 = 5 × 8

Question 7**[15]**

Design a class to overload a function area() as follows:

- (i) double area (double a, double b, double c) with three double arguments, returns the area of a scalene triangle using the formula:

$$area = \sqrt{s(s-a)(s-b)(s-c)}$$

where

$$s = \frac{a+b+c}{2}$$

- (ii) double area(int a, int b, int height) with three integer arguments, returns the area of a trapezium using the formula:

$$area = \frac{1}{2} \times (a+b) \times h$$

- (iii) double area(double diagonal1, double diagonal2) with two double arguments, returns the area of a rhombus using the formula:

$$area = \frac{1}{2} \times (diagonal1 * diagonal2)$$

Question 8

[15]

Write a program to display the following pattern.

```
\ * * * * * /\n* \ * * * * * /\n* * \ * * * * * /\n* * * \ * * * * * /\n* * * * \ * * * * * /\n* * * * * \ * * * * * /\n* * * * * / * * * * * \n* * * / * * * * * \n* * / * * * * * \n* / * * * * * \n/* * * * * * \
```

Ans. 1

- (i) (a) abstract
- (ii) (b) Encapsulation is a way to hide data, while abstraction is a way to hide implementation details
- (iii) (a) $x ? y : z$
- (iv) (b) **
- (v) (c) '\u0000'
- (vi) (b) False
- (vii) (a) It is executed when no other case matches.
- (viii) (b) hasNextInt()
- (ix) (b) input.close();
- (x) (d) length
- (xi) (b) str1.equals(str2)
- (xii) (c) Integer
- (xiii) (c) By using the 'class name' followed by a 'dot' and the 'method name'
- (xiv) (b) toLowerCase()
- (xv) (c) Default constructor without parameters
- (xvi) (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (xvii) (c) Constructors and methods can both be overloaded.
- (xviii) (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (xix) (a) To refer to the current instance of the class
- (xx) (a) String.valueOf(true)

Ans. 2

- (i) (a) Program
(b) -1
- (ii) 5
- (iii) 6
- (iv) public and private
- (v) Linear search can be used with both sorted and unsorted arrays whereas binary search can be used with sorted arrays only.
- (vi) (a) trim()
(b) valueOf()
- (vii) import java.util.Scanner;
- (viii) The length is a property of an array that gives the size of the array. The length() is a method of the String class that gives the size of the String.

- (ix) (a) a and b – non-static variables, each object of the class will have its own distinct copy.
(b) x and y – static variables are common to all objects of the class.

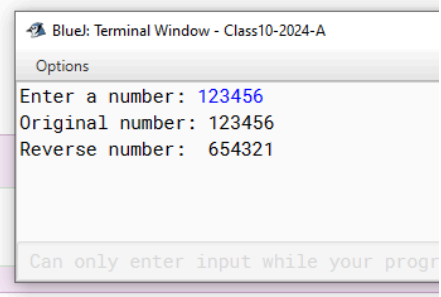
(x) class Constructor

```
{  
    int rollNumber;
```

Section B

Ans. 3

```
import java.util.Scanner;  
public class ReverseNumber  
{  
    public static void main(String args[])  
    {  
        Scanner keyboard = new Scanner(System.in);  
        int numOriginal, numReverse = 0;  
  
        System.out.print("Enter a number: ");  
        int num = keyboard.nextInt();  
  
        numOriginal = num;  
  
        while (num > 0)  
        {  
            int digit = num % 10;  
            numReverse = numReverse * 10 + digit;  
            num = num / 10;  
        }  
  
        System.out.println("Original number: " + numOriginal);  
        System.out.println("Reverse number: " + numReverse);  
    }  
}
```



Blue: Terminal Window - Class10-2024-A

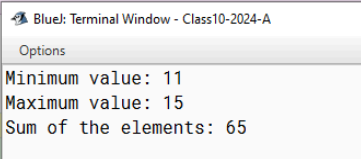
Options

Enter a number: 123456
Original number: 123456
Reverse number: 654321

Can only enter input while your program is running

Ans. 4

```
public class MinMaxSum  
{  
    public static void main(String args[])  
    {  
        int numbers[] = {12, 15, 14, 11, 13};  
        int min, max, sum;  
  
        min = numbers[0];  
        max = numbers[0];  
        sum = numbers[0];  
  
        for (int i = 1; i < numbers.length; i++)  
        {  
            if (numbers[i] > max)  
                max = numbers[i];  
  
            if (numbers[i] < min)  
                min = numbers[i];  
  
            sum += numbers[i];  
        }  
  
        System.out.println("Minimum value: " + min);  
        System.out.println("Maximum value: " + max);  
        System.out.println("Sum of the elements: " + sum);  
    }  
}
```



Blue: Terminal Window - Class10-2024-A

Options

Minimum value: 11
Maximum value: 15
Sum of the elements: 65

Ans. 5

```
public class SelectionSortWords
{
    public static void main(String args[])
    {
        String words[] = new String[10];
        int len = words.length;

        Scanner keyboard = new Scanner(System.in);
        for (int i = 0; i < len; i++)
        {
            System.out.print("Enter word " + (i+1) + ": ");
            words[i] = keyboard.nextLine();
        }

        for (int i = 0; i < len-1; i++)
        {
            int maxIndex = i;
            for (int j = i+1; j < len; j++)
            {
                if (words[j].compareTo(words[maxIndex]) > 0)
                    maxIndex = j;
            }

            String tmp = words[i];
            words[i] = words[maxIndex];
            words[maxIndex] = tmp;
        }

        System.out.println("Sorted array in descending order is:");
        for (int i = 0; i < len; i++)
        {
            System.out.println(words[i]);
        }

        keyboard.close();
    }
}
```

Blue: Terminal Window - Class10-2024-A

Options

Enter word 1: one
Enter word 2: two
Enter word 3: three
Enter word 4: four
Enter word 5: five
Enter word 6: six
Enter word 7: seven
Enter word 8: eight
Enter word 9: nine
Enter word 10: zero
Sorted array in descending order is:
zero
two
three
six
seven
one
nine
four
five
eight

Can only enter input while your program is running

Ans. 6

```
import java.util.Scanner;

public class PronicNumber
{
    public static void main(String args[])
    {
        Scanner keyboard = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int number = keyboard.nextInt();

        boolean pronic = false;

        for (int i = 1; i < number; i++)
        {
            int product = i * (i + 1);

            if (product == number)
            {
                pronic = true;
                break;
            }
        }

        if (pronic)
            System.out.println(number + " is a Pronic Number.");
        else
            System.out.println(number + " is not a Pronic Number.");

        keyboard.close();
    }
}
```

Blue: Terminal Window - Class10-2024-A

Options

Enter a number: 240
240 is a Pronic Number.

Can only enter input while your program is running

Ans 7.

```
public class AreaOverload
{
    public double area(double a, double b, double c)
    {
        double s = (a + b + c) / 2;
        double area = Math.sqrt(s * (s - a) * (s - b) * (s - c));
        return area;
    }

    public double area(int a, int b, int height)
    {
        double area = 0.5 * height * (a + b);
        return area;
    }

    public double area(double diagonal1, double diagonal2)
    {
        double area = 0.5 * (diagonal1 * diagonal2);
        return area;
    }
}
```

Ans 8.

```
public class Pattern
{
    public static void main(String args[])
    {
        int n = 10;

        for (int i = 1; i <= n; i++)
        {
            for (int j = 1; j <= n; j++)
            {
                if (i == j)
                {
                    System.out.print("\\ ");
                    continue;
                }

                if (i + j == n + 1)
                {
                    System.out.print("/ ");
                    continue;
                }

                System.out.print("* ");
            }

            System.out.println();
        }
    }
}
```

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Options

```
\ * * * * * /
* \ * * * * / *
* * \ * * * / * *
* * * \ * * / * * *
* * * * \ / * * * *
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/ * * * * * * \
```

Can only enter input while your pro

