

INTER NOBILIAN FIRST SEMESTER EXAMINATION 2023–24

Computer Application – Class 9

Full Marks: 100

Duration: 2 Hours

Instructions

- Answers to this paper must be written on the paper provided separately.
- You will not be allowed to write during the 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.
- This paper is divided into **two sections**.
- Attempt **all questions from Section A** and **any four questions from Section B**.
- The intended marks for questions or parts of questions are given in brackets [].

SECTION – A

(Attempt all questions from this Section)

Question 1 [20]

Choose the correct answer from the given options.

(Do not copy the question. Write only the correct option.)

i) Which of the following is **not** a valid comment?

- a) `/"comment"/`
- b) `/comment/`
- c) `/*comment`
- d) `//comment`

ii) Which of the following does **not** represent a character literal?

- a) `'a'`
- b) `"a"`
- c) `'\a'`
- d) `'1'`

iii) Which of the following is **not** a token?

- a) Keywords
- b) Identifiers
- c) Statement
- d) Operators

iv) `(1 > 0) && (0 > 1)` is

- a) 1
- b) 0
- c) false
- d) true

v) Which of the following will compile correctly?

- a) `System.out.println(Math.max(x))`
- b) `System.out.println(Math.random(10,3))`
- c) `System.out.println(Math.round("20"))`
- d) `System.out.println(Math.sqrt(10))`

vi) An if statement within another if statement is known as

- a) Grouped-if
- b) Paired-if
- c) Nested-if
- d) Clustered-if

vii) Which keyword turns a variable declaration into a constant declaration?

- a) final
- b) constant
- c) const
- d) fixed

viii) The programming languages that require knowledge of computer machine architecture and circuitry are known as

- a) High Level Languages
- b) Low Level Languages
- c) Machine Languages
- d) Assembly Languages

ix) A class inheriting features of another class and adding its own features is called

- a) Base class
- b) Super class
- c) Sub class
- d) Low class

x) The programming paradigm that emphasizes procedure is called

- a) Modular paradigm
- b) Procedural programming paradigm
- c) Object Oriented Programming paradigm
- d) Object Based Programming paradigm

xi) JVM combined with _____ makes Java platform.

- a) Java programs
- b) Java API
- c) Java Byte Code
- d) All the above

xii) The expression **8 % 3** evaluates to

- a) 4
- b) 0
- c) 2
- d) 1

xiii) `i = i++ + 5` (where `i = 10`)

- a) 15
- b) 16
- c) 14
- d) None of the above

xiv) The Math class is a part of which Java library package?

- a) java.util
- b) java.io
- c) java.random
- d) java.lang

xv) What will be the output of

`System.out.println(Math.abs(-2.1));`

- a) 1.0
- b) 2.1
- c) -2.1
- d) -2.0

xvi) What will be the result of the expression **9 / 9.0**?

- a) 1
- b) 18
- c) 9
- d) None of the above

xvii) Wrapping up of characteristics and behaviour into one single unit is

- a) Polymorphism
- b) Inheritance
- c) Abstraction
- d) Encapsulation

xviii) _____ is an identifiable entity with some characteristics and behaviour.

- a) Class
- b) Data
- c) Object
- d) Functions

xix) Objects interact with one another through

- a) Methods
- b) Message Passing
- c) Object Calling
- d) None of the above

xx) Which of the following is an invalid integer?

- a) 1934
- b) 0123
- c) 0XFACE
- d) 01934

Question 2 [20]

a) State the rules of operator precedence. [2]

b) What will be the result of the following two expressions if **i = 10** initially?

- i) `i++ <= 10`
- ii) `++i <= 10`

C) What are the values of **i** after each code is executed? [2]

Evaluate the following expressions if

a = 2, b = 3, c = 9

- i) `(a - (b++)) * (-c)`
- ii) `a * (++b) % c`

[2]

d) Find the value of each expression.

- i) `Math.round(Math.PI)`
- ii) `Math.pow(4, 2)`

[2]

e) What is the problem with the following snippet?

```
class X
{
    public void Test()
    {
        int i = 5, j = 10;

        if((i<j) || (i=10))
            System.out.println("OK");
        System.out.println("NOT OK");
    }
}
```

[2]

f) What is the result of each of the following expressions? If the expression is illegal, indicate so.

i) "Hello" + "World"

ii) "pi is " + 3.14

(Be specific in your output.)

[2]

g) What is a type, as this term relates to programming?

[2]

h) Write a short note on programming in low-level languages.

[2]

i) How is the ordinary compilation process different from Java compilation?

[2]

j) What will be the output when

i) val = 500

ii) val = 1500

```
int val, sum, n = 550;
```

```
sum = n + val > 1750 ? 400 : 200;
```

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

[2]

SECTION – B

(Answer any four questions from this Section)

The answers in this section should consist of programs in either BlueJ environment or any other Java programming environment.

- Each program should be written using **meaningful variable names (mnemonic codes)** so that the logic of the program is clearly depicted.
- **Flowcharts and algorithms are not required.**

Question 3 [15]

A shopkeeper offers **10% discount** on the printed price of a **Digital Camera**. However, a customer has to pay **6% sales tax** on the remaining amount.

Write a program in Java to calculate the amount to be paid by the customer, taking the printed price as input.

Question 4 [15]

Write a program to input **three different single-digit numbers between 1 and 9 (both inclusive)**.

Display the:

- Greatest three-digit number
- Smallest three-digit number

Sample Input

2 7 4

Sample Output

Greatest three-digit number = 742

Smallest three-digit number = 247

Question 5 [15]

A library charges a fine for books returned late as given below:

Number of Days Late

Fine

First 5 days

40 paise per day

6 to 10 days

65 paise per day

Above 10 days

80 paise per day

Write a Java program to calculate the total fine assuming that a book is returned N days late.

Question 6 [15]

Write a class named **Employee** with **basicPay** as its data member.

Calculate the following:

- Dearness Allowance (DA) = **25% of Basic Pay**
- House Rent Allowance (HRA) = **15% of Basic Pay**
- Provident Fund (PF) = **8.33% of Basic Pay**

Calculate:

`Net Pay = Basic Pay + Dearness Allowance + House Rent Allowance`

`Gross Pay = Net Pay - Provident Fund`

Use meaningful variable names.

Question 7 [15]

A computer manufacturing company announces a special offer to its customers on purchasing **Laptops and Printers**.

Discount offered:

- **Laptop:** 15%
- **Printer:** 10%

Write a **Java program** to calculate the total discount if a customer purchases **one Laptop and one Printer**.

Question 8 [15]

Write a program to enter the **three angles of a triangle** and check whether the triangle is possible or not.

If the triangle is possible, display whether it is:

- An **Acute-Angled Triangle**
- A **Right-Angled Triangle**
- An **Obtuse-Angled Triangle**

Otherwise, display:

`Triangle is not possible.`

Sample Input

`40
110
30`

Sample Output

`The triangle is possible.`

`An Obtuse-Angled Triangle`

Answers

INTER NOBILIAN FIRST SEMESTER EXAMINATION (2023–24)

Computer Applications – Class 9

Complete Answer Key with Explanations

Part 1 – Question 1 (i–x)

Question 1

Choose the correct answer from the given options.

(Do not copy the question. Write only the correct option.)

(i) Which of the following is not a valid comment?

Options

- a) `/*comment*/`
- b) `/*comment`
- c) `//comment`
- d) `/*"comment"*/`

Answer

(b) `/*comment`

Explanation

Java supports two types of comments:

1. Single-line Comment

```
// This is a comment
```

Everything after `//` on the same line is ignored by the compiler.

2. Multi-line Comment

```
/* This is  
   a multi-line  
   comment */
```

A multi-line comment **must begin with `/*` and end with `*/`**.

Option **(b)** starts the comment but **does not close it**, so it is **invalid**.

Remember

Every `/*` must have a matching `*/`.

Exam Tip

A comment never affects the execution of the program.

(ii) Which of the following does not represent a character literal?

Options

- a) `'a'`
- b) `"a"`
- c) `'\a'`
- d) `'1'`

Answer

(b) `"a"`

Explanation

A **character literal** is enclosed within **single quotation marks** (`' '`) and contains **only one character**.

Examples:

```
'a'  
'1'  
'@'
```

A **String literal** is enclosed within **double quotation marks** (`" "`).

Example:

```
"Hello"  
"Java"
```

"a"

Although "a" contains only one letter, it is still a **String**, not a character.

Remember

Character

'A'

Single quotes

String

"A"

Double quotes

(iii) Which of the following is not a token?

Options

- a) Keywords
- b) Identifiers
- c) Statement
- d) Operators

Answer

(c) Statement

Explanation

A **token** is the smallest individual unit in a Java program.

Examples of tokens are:

- Keywords
- Identifiers
- Operators
- Literals
- Separators

A **statement** is made up of several tokens, so it is **not** a token.

Example:

```
int a = 10;
```

Tokens are:

- int
- a
- =
- 10
- ;

The complete line is called a **statement**.

(iv) What is the result of

```
(1 > 0) && (0 > 1)
```

Answer

(c) false

Explanation

First condition:

```
1 > 0
```

Result:

True

Second condition:

```
0 > 1
```

Result:

False

Now,

```
True && False
```

The AND (&&) operator returns **true only when both conditions are true**.

Therefore,
`True && False = False`

Truth Table

First	Second	Result
T	T	T
T	F	F
F	T	F
F	F	F

Exam Tip

For AND (&&), both conditions must be true.

(v) Which of the following will compile correctly?

- a) `System.out.println(Math.max(x));`
- b) `System.out.println(Math.random(10,3));`
- c) `System.out.println(Math.round("20"));`
- d) `System.out.println(Math.sqrt(10));`

Answer

(d) `System.out.println(Math.sqrt(10));`

Explanation

Let's check each option.

Option (a)

`Math.max(x)`

✗ Incorrect.

`Math.max()` requires two arguments.

Example:

`Math.max(10,20)`

Option (b)

`Math.random(10,3)`

✗ Incorrect.

`Math.random()` takes no arguments.

Correct:

`Math.random()`

Option (c)

`Math.round("20")`

✗ Incorrect.

`Math.round()` expects a numeric value (float or double), not a String.

Option (d)

`Math.sqrt(10)`

✓ Correct.

`sqrt()` accepts a numeric value and returns its square root.

Important Math Functions

Function	Meaning
<code>Math.abs()</code>	Absolute value

Function	Meaning
Math.sqrt()	Square root
Math.pow()	Power
Math.round()	Rounds the value
Math.random()	Random number

(vi) An if statement within another if statement is known as

Answer

(c) Nested-if

Explanation

When one `if` statement is placed inside another `if` statement, it is called a **Nested if**.

Example:

```
if (age >= 18)
{
    if (hasLicense)
    {
        System.out.println("Eligible to drive");
    }
}
```

The second `if` is inside the first `if`, so it is a **nested if**.

(vii) Which keyword turns a variable declaration into a constant declaration?

Answer

(a) final

Explanation

The `final` keyword is used to declare a constant.

Example:

```
final double PI = 3.14;
```

The value of `PI` cannot be changed later.

Attempting to modify it will result in a compile-time error.

Remember

final = Constant

(viii) The programming languages that require knowledge of computer machine architecture and circuitry are known as

Answer

(b) Low Level Languages

Explanation

Low-level languages are closer to the computer hardware and require knowledge of the computer's architecture.

Examples:

- Machine Language
- Assembly Language

They are:

- Fast in execution
- Difficult to learn

- Machine dependent
High-level languages like Java and Python are easier for humans to understand.

(ix) A class inheriting features of another class and adding its own features is called

Answer

(c) Sub class

Explanation

In Java inheritance:

- The existing class is called the **Superclass**.
- The new class that inherits from it is called the **Subclass**.

Example:

```
class Animal
{
}

class Dog extends Animal
{
}
```

Here:

- Animal → Superclass
- Dog → Subclass

(x) The programming paradigm that emphasizes procedures is called

Answer

(b) Procedural Programming Paradigm

Explanation

Procedural programming organizes programs into procedures or functions.

Examples of procedural languages:

- C
- Pascal

Object-Oriented Programming (OOP), used in Java, focuses on objects and classes.

Difference

Procedural Programming

Functions

Top-down approach

C, Pascal

Object-Oriented Programming

Objects

Bottom-up approach

Java, C++, Python

(xi) JVM combined with _____ makes Java Platform.

Options

- a) Java Programs
- b) Java API
- c) Java Byte Code
- d) All the above

Answer

✓ **(b) Java API**

Explanation

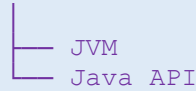
The **Java Platform** consists of two important parts:

1. **Java Virtual Machine (JVM)**
2. **Java API (Application Programming Interface)**

Together they provide everything required to run Java programs.

Java Platform

Java Platform



What is JVM?

JVM stands for **Java Virtual Machine**.

It converts **Bytecode** into machine language so that the program can run on any operating system.

What is Java API?

Java API is a collection of ready-made classes and packages such as:

- Math
- Scanner
- String
- System

These help programmers write programs easily.

Why are the other options wrong?

a) Java Programs

✗ Java programs are created by programmers. They are **not** part of the Java Platform.

c) Java Bytecode

✗ Bytecode is produced after compilation. It is executed by JVM but is **not** a component of the Java Platform.

d) All the above

✗ Incorrect because only JVM and Java API form the Java Platform.

Remember

Java Platform = JVM + Java API

(xii) The expression $8 \% 3$ evaluates to

Options

- a) 4
- b) 0
- c) 2
- d) 1

Answer

✓ (c) 2

Explanation

The $\%$ operator is called the **Modulus Operator**.

It returns the **remainder** after division.

$$\begin{array}{r} 2 \\ 3 \overline{) 8} \\ \underline{6} \\ 2 \end{array}$$

2 ← remainder

Therefore
 $8 \% 3 = 2$

More Examples

Expression	Answer
$10 \% 3$	1
$20 \% 5$	0
$15 \% 4$	3
$17 \% 2$	1

Remember

% means Remainder

(xiii) $i = i++ + 5$ (where $i = 10$)

Options

- a) 15
- b) 16
- c) 14
- d) None of the above

Answer

✓ (a) 15

Explanation

This question uses the post-increment operator ($i++$).

Step 1

Initially,
 $i = 10$

Step 2

$i++$

Post-increment means:

- Use the current value first.
- Increase later.

So,

$10 + 5 = 15$

The value of i temporarily becomes 11, but after the assignment:

$i = 15;$

The final value of i is 15.

Remember

Operator	Meaning
$i++$	Use first, increase later
$++i$	Increase first, then use

Exam Tip

Whenever you see post-increment, always remember:

Use $\rightarrow$ Increase

(xiv) The Math class is a part of which Java library package?

Options

- a) java.util
- b) java.io
- c) java.random
- d) java.lang

Answer

✓ (d) java.lang

Explanation

The **Math** class belongs to the package

`java.lang`

This package is imported automatically.

Therefore we simply write

`Math.sqrt(25);`

without importing anything.

Important Methods

Method	Purpose
<code>Math.abs()</code>	Absolute value
<code>Math.sqrt()</code>	Square root
<code>Math.pow()</code>	Power
<code>Math.round()</code>	Rounding
<code>Math.random()</code>	Random number

Remember

Math class → **java.lang package**

(xv) What will be the output?

`System.out.println(Math.abs(-2.1));`

Options

- a) 1.0
- b) 2.1
- c) -2.1
- d) -2.0

Answer

✓ (b) 2.1

Explanation

`Math.abs()` means

Absolute Value

Absolute value always removes the negative sign.

`| -2.1 | = 2.1`

Hence the output is

`2.1`

Examples

Expression	Output
Math.abs(-5)	5
Math.abs(7)	7
Math.abs(-3.6)	3.6

Remember

ABS means Always Becomes Positive

(xvi) What will be the result of the expression

9 / 9.0

Options

- a) 1
- b) 18
- c) 9
- d) None of the above

Answer

✓ (d) None of the above

Explanation

Since one operand (9.0) is a **double**, Java performs **floating-point division**.

$9 \div 9.0 = 1.0$

The answer is **1.0**, not **1**.

Since **1.0** is not given in the options, the correct choice is:

None of the above.

Rule

If one operand is a decimal number, the result will also be a decimal number.

Examples:

Expression	Output
10 / 2	5
10 / 2.0	5.0
7 / 2	3
7 / 2.0	3.5

(xvii) Wrapping up characteristics and behaviour into one single unit is

Options

- a) Polymorphism
- b) Inheritance
- c) Abstraction
- d) Encapsulation

Answer

✓ (d) Encapsulation

Explanation

Encapsulation means combining:

- Data (Characteristics)
 - Methods (Behaviour)
- into a single unit called a **Class**.

Example:

```
class Student
{
    String name;
    int marks;

    void display()
    {
        System.out.println(name);
    }
}
```

The data and methods are stored together inside the class.

Remember

Encapsulation = Data + Methods

(xviii) _____ is an identifiable entity with some characteristics and behaviour.

Options

- a) Class
- b) Data
- c) Object
- d) Functions

Answer

✓ (c) Object

Explanation

An **Object** is a real-world entity that has:

- Characteristics (Data)
- Behaviour (Methods)

Example:

Car

Characteristics:

- Colour
- Model
- Speed

Behaviour:

- Start
- Stop
- Accelerate

Thus, a car is an **Object**.

Remember

Object = Characteristics + Behaviour

(xix) Objects interact with one another through

Options

- a) Methods
- b) Message Passing
- c) Object Calling
- d) None of the above

Answer

✓ (b) Message Passing

Explanation

Objects communicate by sending messages to one another.

When one object calls a method of another object, it is called **Message Passing**.

Example:

```
student.display();
```

The `student` object sends a message to execute the `display()` method.

Remember

Objects communicate through **Message Passing**.

(xx) Which of the following is an invalid integer?

Options

- a) 1934
- b) 0123
- c) 0XFACE
- d) 01934

Answer

✓ (d) 01934

Explanation

In Java:

- Numbers beginning with **0** are treated as **octal (base 8)**.
- Octal numbers can contain only the digits **0 to 7**.

The number:

```
01934
```

contains the digit **9**, which is **not allowed** in an octal number.

Therefore, it is an **invalid integer literal**.

Valid Integer Literals

Integer	Valid?	Reason
1934	✓	Decimal integer
0123	✓	Octal (digits 0–7 only)
0XFACE	✓	Hexadecimal integer
01934	✗	Contains digit 9 in an octal literal

Remember

- **Decimal** → Digits 0–9
- **Octal** → Digits 0–7 (starts with 0)
- **Hexadecimal** → Digits 0–9 and A–F (starts with 0x or 0X)

Question 3

[15]

Discount on Digital Camera

Java Program

```
import java.util.Scanner;

class DigitalCamera
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);

        double printedPrice, discount, priceAfterDiscount;
        double salesTax, amountToBePaid;

        System.out.print("Enter Printed Price: ");
        printedPrice = sc.nextDouble();

        discount = printedPrice * 10 / 100;

        priceAfterDiscount = printedPrice - discount;

        salesTax = priceAfterDiscount * 6 / 100;

        amountToBePaid = priceAfterDiscount + salesTax;

        System.out.println("Discount = Rs. " + discount);
        System.out.println("Price after Discount = Rs. " + priceAfterDiscount);
        System.out.println("Sales Tax = Rs. " + salesTax);
        System.out.println("Amount to be Paid = Rs. " + amountToBePaid);
    }
}
```

Sample Output

Enter Printed Price: 50000

Discount = Rs. 5000.0

Price after Discount = Rs. 45000.0

Sales Tax = Rs. 2700.0

Amount to be Paid = Rs. 47700.0

Question 4

[15]

Greatest and Smallest Three-Digit Number

Java Program

```
import java.util.Scanner;

class GreatestSmallest
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);

        int a, b, c;
```

```

int greatest, middle, smallest;

System.out.print("Enter First Digit : ");
a = sc.nextInt();

System.out.print("Enter Second Digit : ");
b = sc.nextInt();

System.out.print("Enter Third Digit : ");
c = sc.nextInt();

greatest = Math.max(a, Math.max(b, c));
smallest = Math.min(a, Math.min(b, c));

middle = a + b + c - greatest - smallest;

System.out.println("Greatest Three Digit Number = "
    + greatest + middle + smallest);

System.out.println("Smallest Three Digit Number = "
    + smallest + middle + greatest);
}
}

```

Sample Output

```

Enter First Digit : 2
Enter Second Digit : 7
Enter Third Digit : 4

```

```

Greatest Three Digit Number = 742
Smallest Three Digit Number = 247

```

Question 5

[15]

Library Fine

Java Program

```

import java.util.Scanner;

class LibraryFine
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);

        int daysLate;
        double fine;

        System.out.print("Enter Number of Days Late: ");
        daysLate = sc.nextInt();

        if(daysLate <= 5)
            fine = daysLate * 0.40;

        else if(daysLate <= 10)
            fine = daysLate * 0.65;

        else
            fine = daysLate * 0.80;

        System.out.println("Total Fine = Rs. " + fine);
    }
}

```

Sample Output

Enter Number of Days Late: 12

Total Fine = Rs. 9.6

Question 6

[15]

Employee Salary

Java Program

```
import java.util.Scanner;

class Employee
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);

        double basicPay;
        double DA, HRA, PF;
        double netPay, grossPay;

        System.out.print("Enter Basic Pay: ");
        basicPay = sc.nextDouble();

        DA = basicPay * 25 / 100;

        HRA = basicPay * 15 / 100;

        PF = basicPay * 8.33 / 100;

        netPay = basicPay + DA + HRA;

        grossPay = netPay - PF;

        System.out.println("Dearness Allowance = " + DA);
        System.out.println("House Rent Allowance = " + HRA);
        System.out.println("Provident Fund = " + PF);
        System.out.println("Net Pay = " + netPay);
        System.out.println("Gross Pay = " + grossPay);
    }
}
```

Sample Output

Enter Basic Pay: 30000

Dearness Allowance = 7500.0

House Rent Allowance = 4500.0

Provident Fund = 2499.0

Net Pay = 42000.0

Gross Pay = 39501.0

Question 7

[15]

Laptop and Printer Discount

Java Program

```
import java.util.Scanner;
```

```

class Discount
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);

        double laptopPrice;
        double printerPrice;

        double laptopDiscount;
        double printerDiscount;

        double totalDiscount;

        System.out.print("Enter Laptop Price : ");
        laptopPrice = sc.nextDouble();

        System.out.print("Enter Printer Price : ");
        printerPrice = sc.nextDouble();

        laptopDiscount = laptopPrice * 15 / 100;

        printerDiscount = printerPrice * 10 / 100;

        totalDiscount = laptopDiscount + printerDiscount;

        System.out.println("Laptop Discount = Rs. " + laptopDiscount);

        System.out.println("Printer Discount = Rs. " + printerDiscount);

        System.out.println("Total Discount = Rs. " + totalDiscount);
    }
}

```

Sample Output

```

Enter Laptop Price : 50000
Enter Printer Price : 15000

Laptop Discount = Rs. 7500.0
Printer Discount = Rs. 1500.0
Total Discount = Rs. 9000.0

```

Question 8

[15]

Triangle Type

Java Program

```

import java.util.Scanner;

class Triangle
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);

        int a, b, c;

        System.out.print("Enter First Angle : ");
        a = sc.nextInt();

        System.out.print("Enter Second Angle : ");
        b = sc.nextInt();
    }
}

```

```
System.out.print("Enter Third Angle : ");
c = sc.nextInt();

if(a + b + c == 180)
{
    System.out.println("The Triangle is Possible.");

    if(a < 90 && b < 90 && c < 90)
    {
        System.out.println("An Acute-Angled Triangle");
    }
    else if(a == 90 || b == 90 || c == 90)
    {
        System.out.println("A Right-Angled Triangle");
    }
    else
    {
        System.out.println("An Obtuse-Angled Triangle");
    }
}
else
{
    System.out.println("Triangle is not possible.");
}
}
```

Sample Output

```
Enter First Angle : 40
Enter Second Angle : 110
Enter Third Angle : 30
```

```
The Triangle is Possible.
An Obtuse-Angled Triangle
```
