

Inter Nobillian first semester examination 2025-26.

Computer Applications

Full Marks: 100

Class 10

Time : 2 hours

Maximum Marks: 100

Time allowed: Two hours

1. Answers to this Paper must be written on the paper provided separately.
 2. You will **not** be allowed to write during the first 15 minutes.
 3. This time is to be spent in reading the question paper.
 4. **The time given at the head of this Paper is the time allowed for writing the answers.**
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5. This Paper is divided into **two** Sections.
 6. Attempt **all** questions from **Section A** and **any four** questions from **Section B**.
 7. The intended marks for questions or parts of questions are given in brackets[].
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SECTION A (40 Marks)

(Attempt **all** questions from this **Section**.)

Question 1

[20]

Choose the correct answers to the questions from the given options.
(Do not copy the questions, write only the correct answers.)

i)



Consider the one dimensional array arr[6]. Of peripherals (input/output devices) given above, state index of the device **Printer** and **Monitor**.

- (a) arr[0] and arr[2]
- (b) arr[1] and arr[3]
- (c) arr[2] and arr[4]
- (d) arr[3] and arr[5]

[Analysis]

ii) If `int x[]={4,3,7,8,9,10}`; what are the value of A?

`A = x[2]+x[5]*x[4]`

- (a) 37
- (b) 47
- (c) 75
- (d) 97

[Understanding]

iii) Math class methods are found in the **package** called in Java:

- (a) java.util
- (b) java.lang
- (c) java.awt
- (d) Java.io

[Recall]

iv) The output of `5 + 12 * 2 / 4 % 3` is

- (a) 5
- (b) 6
- (c) 7
- (d) 8

[Analysis]

v) Which of the following is **primitive data type** and **reference data type**?

1. array and class	3. byte and array
2. integer and character	4. class and interface

(a)

only 1

- (b) 1 and 3
- (c) Only 3
- (d) Only 4

[Understanding]

vi) `System.out.println((char)('A'+5));`

- (a) A
- (b) B
- (c) F
- (d) G

[Analysis]

vii) Which of the following code examples represents an **exit-controlled loop**?

- (a) `for ( int i = 1; i <= 5; i++) { System.out.println(i); }`
- (b) `while ( i <= 5) { System.out.println(i); i++; }`
- (c) `do { System.out.println(i); i++; } while(i <= 5);`
- (d) `while (true) { System.out.println("Infinite"); }`

[Understanding]

viii) In Java, when a primitive type variable is passed to a method, which of the following is true?

- (a) The method receives a reference to the original variable
- (b) Changes made inside the method reflect outside
- (c) A copy of the variable is passed, and original remains unchanged
- (d) The variable is passed by reference

[Understanding]

ix) what will be the output of the following code:

```
public class Main {  
    public static void main(String[] args) {  
        int a = -5, b = -6, c = -9;  
        System.out.println((a > b) ? ((a > c) ? a : c) : ((b > c) ? b : c));  
    }  
}
```

- (a) -4
- (b) -5
- (c) -6
- (d) -9

[Analysis]

x) What is the output of `Math.ceil(7.9)+Math.floor(6.9)`?

- (a) 12.0
- (b) 13.0
- (c) 14.0
- (d) 9.0

[Analysis]

xi) What will be the output of the following Java program?

```
public class Test {  
    public static void main(String[] args) {  
        int i = 0;
```

(a) 1
(b) 5
(c) 1 3 5
(d) No output

xii) If an array `arr[]` has 10 elements, what will be the index (subscript) of the 5th element stored in the array?

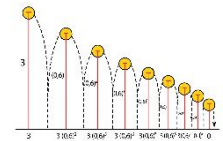
- (a) `arr[4]`
- (b) `arr[5]`
- (c) `arr[10]`
- (d) `arr[arr.length - 1]`

xiii) What is the purpose of a function (method) in Java?

- (a) To store data
- (b) To perform a specific task or operation
- (c) To define a new class
- (d) To compile Java programs

xiv) The games teacher asks the students to bounce the ball 10 times. Which programming construct best represents this instruction?

- (a) if
- (b) if else if
- (c) switch
- (d) for



xv) In which of the following, a method can modify the external state or objects, so that changes inside the method can affect values outside?

- (a) Pure method
(b) Impure method
(c) Pass by value
(e) (d) None of these

xvi) **Assertion (A):** The break statement exits the loop entirely, whereas the continue statement skips the

Reason (R): Both break and continue can only be used in for loops and not in while or do-while loops.

- (a) Both A and R are true, and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

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xvii) What will be the output of the following Java statement?

```
int a=2;b=3;  
System.out.println("Sum=" + a + b);
```

- a) Sum=5
- b) Sum=6
- c) Sum=23
- d) Compilation Error

[Analysis]

xviii) `System.out.println(Math.ceil(23.2) - Math.floor(9.8));`

The output of the above statement is:

- a) 14.0
- b) 13.0
- c) 12.0
- d) 15.0

[Analysis]

xix) Consider the following program segment in which the statements are jumbled. Choose the correct order of the statements to calculate and return the sum of all the digits of n;

```
System.out.println(s);      --- → 1  
{ s = s + n % 10;          ---→ 2  
while(n > 0)                ---→ 3  
int s = 0, n = 123;         ---→ 4  
n = n / 10; }              ---→ 5
```

- a) 2 → 3 → 4 → 5 → 1
- b) 4 → 3 → 2 → 5 → 1
- c) 3 → 4 → 5 → 2 → 1
- d) 4 → 2 → 3 → 5 → 1

[Analysis]

xx) Assertion (A): Recording daily attendance throughout the year can be implemented using nested loops in programming.

Reason (R): A nested loop structure can represent months as the outer loop, weeks as the middle loop, and days as the inner loop, repeating the attendance marking process.

- (a) Both (A) and (R) are true, and (R) is the correct explanation of (A)
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
- (c) (A) is true, but (R) is false
- (d) (A) is false, but (R) is true

[Application]

Question 2

- (i) Write a Java expression to round up the value of a variable P and round down the value of a variable Q, and then calculate their sum. [Understanding] [2]
- (ii) What will be the output of the following Java code? [2]

```
int a = 5, b = 7, c = 3, d = 6;  
System.out.println(Math.max(a, Math.max(b, Math.min(c, d))));
```

[Analysis]

- (iii) Consider the following Java for loop that calculates the sum of alternate numbers from 1 to 10:
`for(int i = 1, S = 0; i <= 10; i++)` [2]
`{ S = S + i;`
`i = i + 1;}`
`System.out.println(S);` [Analysis]

Rewrite this loop using an entry-controlled loop to perform the same task.

- (iv) Write a Java expression for $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$ [2]
 [Understanding]

- (v) Observe the following Java program carefully. What will be the output? [2]

```
public class Find {
    public static int find(int a, int b) {
        int max = (a > b) ? a : b;
        while (true) {
            if (max % a == 0 && max % b == 0) {
                return max;
            }
            max++;
        }
    }
    public static void main(String[] args) {
        int num1 = 16, num2 = 18;
        int x = find(num1, num2);
        System.out.println("First number that appears in both multiplication tables of " +
            num1 + " and " + num2 + " is: " + x);
    }
}
```

 [Analysis]

- (vi) Evaluate the given expression when the value of a=5 and b= 7 [2]
`a* = a++ - ++b+ ++a%3` [Analysis]

- (vii) Dinesh was asked to write a java program to calculate the area of a triangle using the formula: $\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{a+b+c}{2}$ [2]

He wrote the following code:

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

[Analysis]

Identify the type of the error in the above program, correct it, and rewrite the code so that it works correctly.

- (viii) Consider the following array: [Analysis] [2]

`char ch[] = { 'A', 'B', 'C', 'D', 'E' };`

i) What will be the value of `ch[0] + ch[2]`?

ii) What is the index (subscript) of the second last element?

- (ix) i) Rewrite the following program segment using the if-else statement [2]

`Comm = (sale>1500)? sale X  $\frac{5}{100}$  : 0;`

[Analysis]

ii) What is the value of x1 if x=5?

`x1=++x - x++ + --x`

(x) Analyze the following program segment and determine:

[2]

(i) How many times the loop will be executed, and

(ii) What will be the output of the program.

```
int p = 200;
while (true) {
    if (p < 100)
        break;
    p = p - 20;
}
```

`System.out.println(p);`

[Analysis]

SECTION B (60 Marks)

(Answer **any four** questions from this **Section**.)

The answer in this section should consist of the programs in either BlueJ environment or any program environment with Java as the base.

Each program should be written using variable description/mnemonic codes so that the logic of the program is clearly depicted.

Flowchart and algorithms are not required.

Question 3

[15]

Design a class named **ElectricityBill** with the following:

- **Member variables:**
 - String consumerName
 - int unitsConsumed
 - double billAmount
- **Member Methods:**
 - void accept() — to input consumer name and units
 - void calculate() — to compute bill :
 - First 200 units:** free (If `unitsConsumed ≤ 200`, energy charge = ₹0)
 - **₹6.85/unit** for units above 200 (urban rate)
 - **Meter rent:** ₹75 per month (flat)
 - **GST:** 18% **only on meter rent**
 - void display() — to show all details:
 - Consumer name-----, Units consumed-----, and detailed breakdown:
 - Energy charge -----
 - Meter rent -----
 - GST on meter rent-----
 - Total bill amount-----

Write the main method to create an object of the class and invoke the method to the class with respect to the object.

[Understanding/Application]

Question 4

[15]

Define a class named **array_sum_avg** that:

- a) Accepts 10 integer values into an array (array size fixed at 10).
- b) Calculates and prints:
 - Sum of all the elements.
 - Sum of all the even elements.
 - Sum of all the odd elements.
 - Average of all the elements

[Understanding/Application]

Question 5

[15]

Define a class to accept a number from user and check if it is an EvenPal number or not.

(The number is said to be EvenPal number when number is palindrome number [a number is palindrome if it is equal to its reverse] and sum of its digits is an even number.)

Example 121- is palindrome number

Sum of the digits – $1+2+1 = 4$ which is an even number.

[Understanding/Application]

Question 6

[15]

Define a class to print sum of the following series based on the user's choice using switch case statement:

- i) 1, 3, 9, 27, 81, 243, 729, 2187, 6561, 19683 [n^{i-1} where $n=3$ & $i=1,2,3...10$]
- ii) 1, 2, 4, 7, 11, 16, 22, 29, 37, 46 [The sequence starts at 1, with each term formed by adding an increment that increases by 1 each time.]

[Understanding/Application]

Question 7.

[15]

Define a class to overload the method check() in the following ways:

- void check(int a): – Checks whether the given number a is a prime number, and prints an appropriate message.
- double check(int a, int b) : – If b is even, return a raised to the power b (i.e., a^b).
– If b is odd, return the product of a and b. (i.e., $a \times b$)
- int check(char ch1, char ch2): – Compares the two characters and returns the ASCII value of the smaller character.

[Understanding/Application]

Question 8.

[15]

Write a program in Java to:

- Accept the marks obtained in 3 subjects from the user.
- Each subject mark should be between 0 and 100.
- Calculate the average percentage of the three subjects.
- Based on the average, display the grade according to the following criteria:

Percentage (%)	Grade
90 and above	Per Excellence
80 to less than 90	Distinction
60 to less than 80	First Honors
50 to less than 60	Second Honors
35 to less than 50	Pass
Below 35	Fail

[Understanding/Application]
