

THE SECOND PRE-BOARD EXAMINATION 2023-24
Class X (ICSE)
COMPUTER APPLICATIONS

Time: Two hours

Maximum marks: 100

Instructions:

- * Answers to this paper must be written on the answer script provided separately.
- * All subsections of each question are to be answered in the correct order.
- * All working including rough work should be done on the same sheet as the rest of the answer.
- * 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 the paper is the time allowed for writing the answers.
- * Please do not write anything on the question paper except your name and roll number.
- * The intended marks for questions or parts of questions are given in brackets [].
- * Attempt **all** questions from **Section A** and any **four** questions from **Section B**.

SECTION A [40 marks]

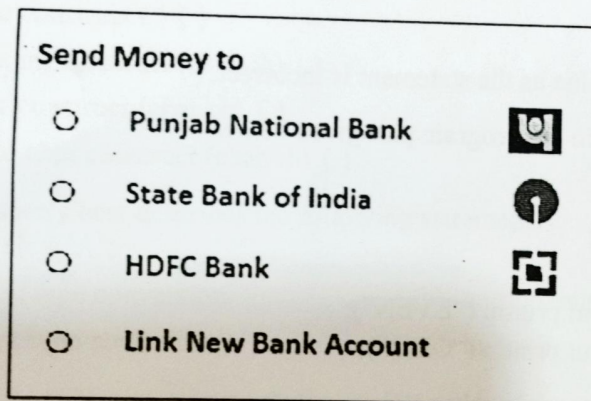
(Attempt all questions from this section.)

Question 1

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

[20]

(i)



Which structure of Java programming language is represented by the above picture?

- (a) switch case
 - (b) for loop
 - (c) if else
 - (d) method overloading
- (ii) Keyword that is used to create the object of a class:
- (a) class
 - (b) this
 - (c) new
 - (d) final

- (iii) Assertion (A): A constructor cannot be overloaded.
Reason (R): A constructor gets executed automatically at the time of creation of object.
- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 - (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
 - (c) Assertion (A) is true and Reason (R) is false.
 - (d) Assertion (A) is false and Reason (R) is true.
- (iv) Which of the following method is NOT used to input an integer value?
- (a) nextLong()
 - (b) nextByte()
 - (c) nextInt()
 - (d) next()
- (v) The value returned by the following statement will be:
`Math.max (40, Math.min (60, 55));`
- (a) 40
 - (b) 55
 - (c) 60
 - (d) will not return any value as the statement is incorrect.
- (vi) The type of error present in the program part given below:
- ```
void check (int x)
{ int remainder = x%2;
 switch (remainder)
 { case 0: System.out.println ("EVEN");
 case 1: System.out.println ("ODD");
 }
}
```
- (a) syntax error
  - (b) runtime error
  - (c) logical error
  - (d) does not have any error
- (vii) Choose the odd one out from among the following:
- (a) for
  - (b) if
  - (c) while
  - (d) do while



- (viii) Keyword that is used to resolve the conflict between method parameter and instance variable / fields when they have the same name?
- (a) new (b) static  
(c) private (d) this
- (ix) In the statement given below which part represents the constructor?  
Digital mpu = new Digital( );
- (a) Digital (b) mpu  
(c) new (d) Digital( )
- (x) Which of the following access specifiers group allows accessibility outside the class?  
X) private Y) protected Z) public
- (a) Z only (b) Y and Z only  
(c) X, Y and Z (d) X only
- (xi) Only \_\_\_\_\_ data can be used in pass by value.
- (a) non-primitive (b) reference  
(c) primitive (d) composite
- (xii) Which of the following could be the correct syntax to create a parameterized constructor of the class "construct"?
- (a) public construct ( ) { }  
(b) public int construct (char ch) { }  
(c) public construct (char ch) { }  
(d) private char construct (char ch) { }
- (xiii) Which property best describes the following statement?  
Character ch = 'A';
- (a) implicit type conversion (b) autoboxing  
(c) explicit type conversion (d) unboxing
- (xiv) Which of the following represents the correct order of precedence (from higher to lower)?
- (a) &&, ?:, >=, ++ (b) ++, >=, &&, ?:  
(c) ?:, ++, >=, && (d) ++, >=, ?:, &&
- (xv) Which of the following can be used to control the visibility of the parts of a class?
- (a) class (b) object  
(c) access specifiers (d) polymorphism



(xvi) In Java which of the following represents the fourth element of the second row in a two dimensional array arr[ ][ ]?

(a) arr[4][2]

(b) arr[2][4]

(c) arr[1][3]

(d) arr[3][1]

(xvii) Assertion (A): For using string methods, package containing them is not imported using keyword import.

Reason (R): class String is a part of java.util package which gets imported by default.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not a correct explanation of Assertion (A).

(c) Assertion (A) is true and Reason (R) is false.

(d) Assertion (A) is false and Reason (R) is true.

(xviii) Which of the following is the correct order of type conversion in which no part of data value is lost?

(a) byte → int → short → long → double

(b) byte → int → short → long → double → float

(c) byte → short → int → float → long → double

(d) byte → short → int → long → double

(xix) Automatic conversion of an object of a wrapper class to its primitive data type is called \_\_\_\_\_.

(a) implicit conversion

(b) type promotion

(c) autoboxing

(d) unboxing

(xx) Read the following text and choose the correct answer:

When a method is declared, the first line is known as method header or method prototype. This line contains the access specifier, return type, method name and list of parameters. Method signature is a part of method header containing only the name of the method along with the parameters list.

What does a method prototype contain?

(a) return type and method signature

(b) function name and parameter list only

(c) function signature, parameter list and method header

(d) method name, list of parameters, access specifier and return type.

## Question 2

- (i) Give one example for each of the following:
- (a) dynamic initialisation [2]
  - (b) explicit type conversion. [2]
- (ii) Using a shorthand assignment operator write the equivalent expression for:
- ```
a = a/100.0;
```
- [2]
- (iii) What will be the output of the following program snippet?
- ```
String str = "Lucknow";
int m = 100, n = 200;
String result = m + n + str;
System.out.println(result);
```
- [2]
- (iv) If  $y = 9$  and  $z = 2$  initially then what will be the value of variable  $z$  after executing the following statement?
- ```
z *= ++y * (y++ + 10);
```
- [2]
- (v) Write an example of a non executable statement. [2]
- (vi) Write the output of the following statement:
- ```
System.out.println(Math.ceil(Math.pow(0.2, 3)));
```
- [2]
- (vii) 

```
void abc (char ch)
{ String V = "aeiouAEIOU"; int n = V.indexOf(ch);
 if (n >= 0)
 System.out.println(V.substring(5));
 else
 System.out.println(n * n);
}
```
- Write the output of the above code when:
- (a)  $ch = 'e'$
  - (b)  $ch = '5'$  [2]



- (viii) Find the error(s) in the given program segment and re-write the statements correctly. It has been coded to assign 10 values to an integer array.

```
int a = new int(10);
for (int i = 0; i <= 10; i ++);
 a [i] = i;
```

[2]

- (ix) double sum (int x, int y)

```
{
 return (double) (x + y);
}
void printSum(int a, int b)
{
 int x = sum(a + b);
 System.out.println(x);
}
```

Re-write the code for method printSum( ) after correcting the error(s) present in it.

[2]

- (x) How many bytes will be occupied by a boolean array of 20 elements?

[2]

### SECTION B [60 marks]

*Attempt any four questions from this Section.*

#### Question 3

Define a class waterBill in Java with the following specifications:

**Class** : waterBill

**Instance variables/data members:**

String name : stores the name of the customer  
int gallons : stores the number of gallons of water consumed  
double bill : stores the amount to be paid in a year.

**Member methods:**

void input( ) : accepts the name of the customer and the number of gallons of water consumed by a family in a year  
void calculate( ) : calculates the bill as per the following:

| Water consumed in a year<br>(in gallons) | Amount  |
|------------------------------------------|---------|
| up to 18000                              | Rs 2000 |
| above 18000 up to 40000                  | Rs 5000 |
| above 40000                              | Rs 7000 |

A surcharge of 3% is charged on the bill amount if the water consumed is above 60000 gallons.

void display( ) : Prints the detail as follows:  
Name : \_\_\_\_\_  
Water consumed : \_\_\_\_\_ gallons  
Bill amount : \_\_\_\_\_

Write the main method to create the object of the class and call the member methods in logical order to enable the task. [15]

#### Question 4

Define a class in Java to accept names of 40 students of a class. Sort them in ascending order using bubble sort technique. Display the names after sorting the array. [15]

#### Question 5

Define a class in Java to accept a string. Count and print the number of uppercase letters, number of words and the number of special characters. [15]

#### Question 6

Write a program in Java to accept a list of bank account numbers of 50 employees of an organisation in an array. Accept an account number to check and print whether it is present in the array or not (using binary search technique). Assume that the account numbers of 50 employees in the array are entered in ascending order. [15]

#### Question 7

Define a class to overload the method find( ) as follows:

a) void find (int x, int n) : to find and print the sum of the following series:  
$$x^1 + x^2 + x^3 \dots\dots\dots + x^n$$

b) void find (String str, char ch) : to find and print the number of times the character present in ch occurs in string str. [15]



### Question 8

Write a program in Java to input an integer and print whether it is a special number or not.

(A number is said to be a special number if the sum of the factorial of the digits of the number is the same as the original number.)

Example :145 is a special number because  $1! + 4! + 5!$

$$= 1 + 24 + 120$$

$$= 145$$

Where ! stands for factorial of the number and the factorial value of a number is the product of all integers from 1 up to that number, for example  $5! = 1 \times 2 \times 3 \times 4 \times 5 = 120$  [15]