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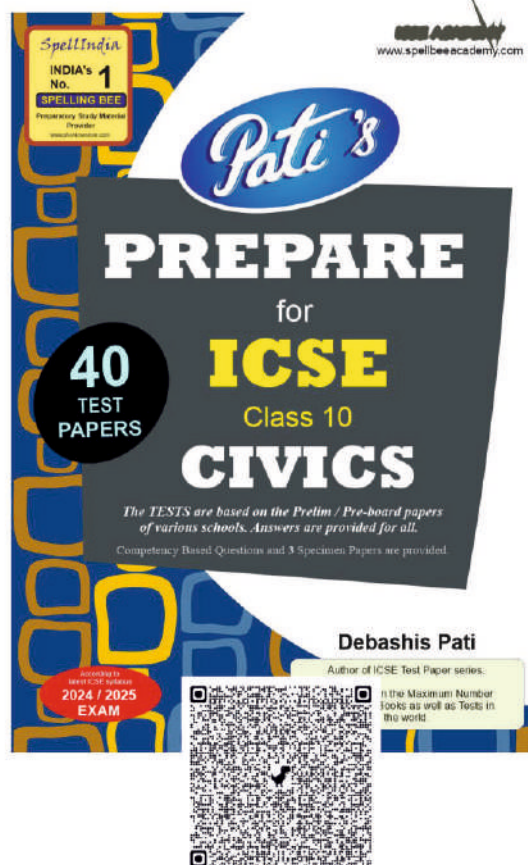
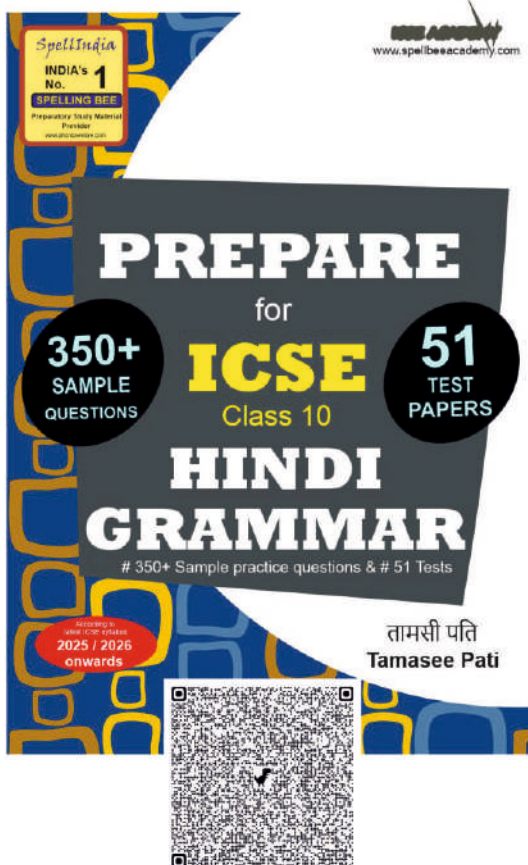
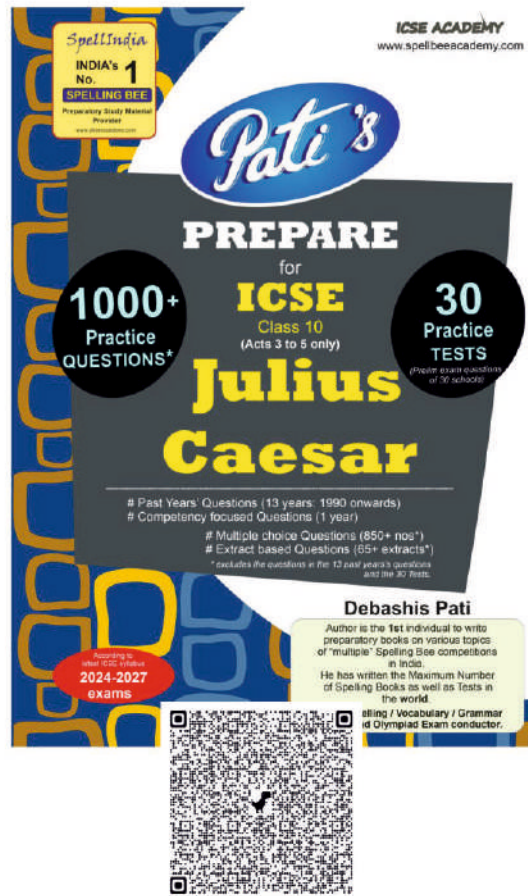
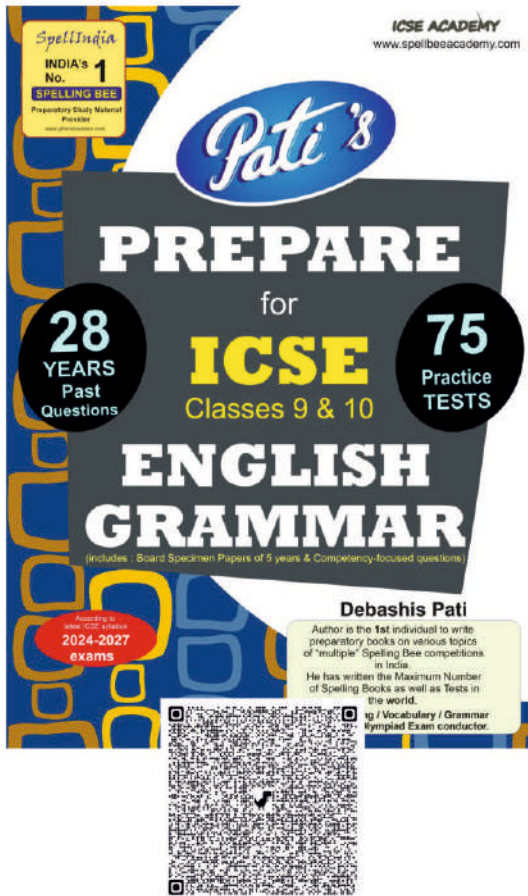
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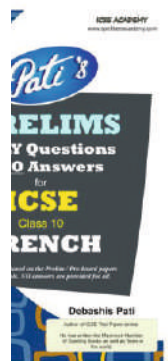
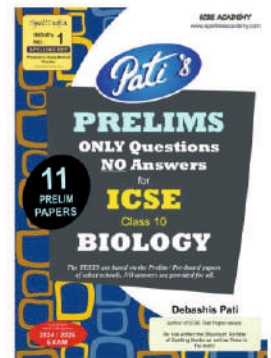
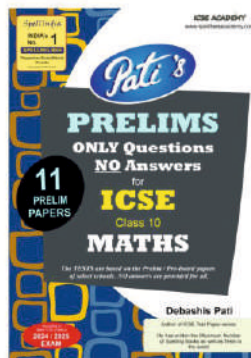
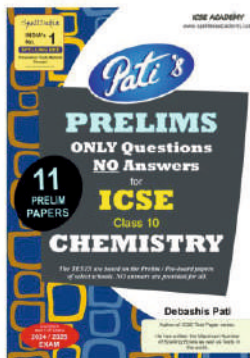
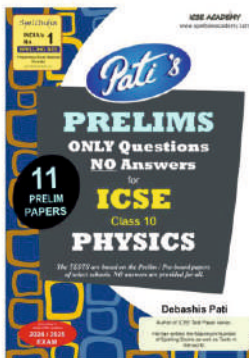
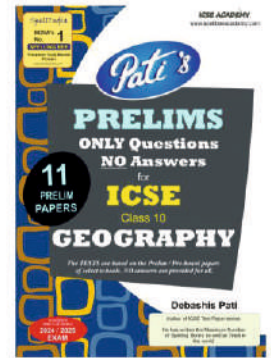
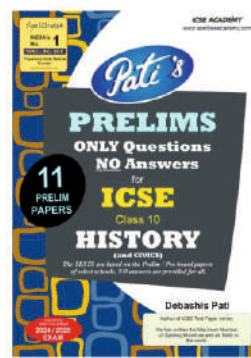
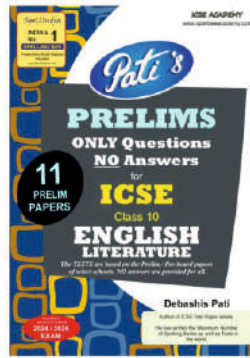
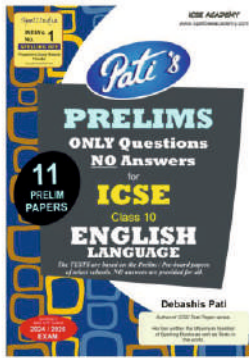
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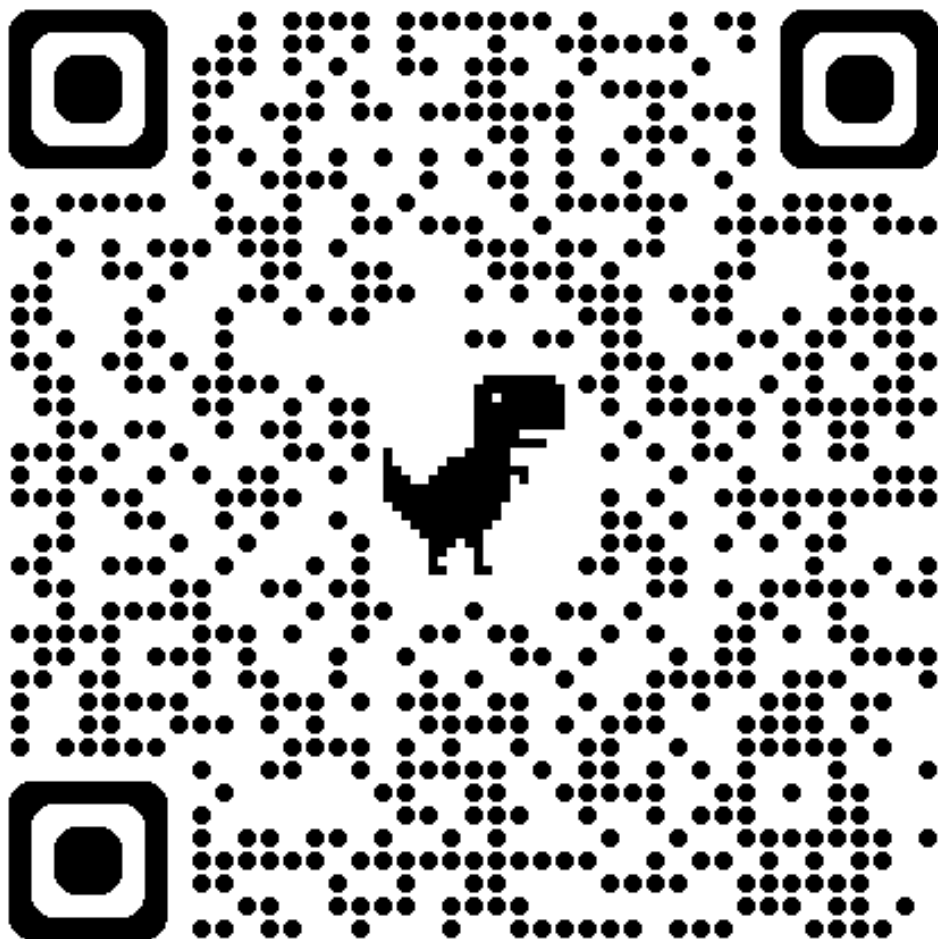


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Maximum Marks: 100

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.*
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[].*

Instruction for the Supervising Examiner

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This paper consists of 12 printed pages.

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Turn Over

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 the correct answers only.)

- (i) What is the **result** of the expression: $7 * 8 \% 3$?
- (a) 18
 - (b) 2
 - (c) 0
 - (d) 28
- (ii) Which of the following **Character methods results in char**?
- (a) `Character.isUpperCase(char)`
 - (b) `Character.isLowerCase(char)`
 - (c) `Character.toUpperCase(char)`
 - (d) `character.toupperCase(char)`

(iii)



Select the correct method to perform the above conversion:

- (a) `Integer.parseInt(4578)`
- (b) `Integer.parseInt("4578")`
- (c) `Integer.parse(4578)`
- (d) `Integer.parseint("4578")`

- (iv) Which of the following *String methods* can be *Overloaded*?
- (a) compareTo
 - (b) equalsIgnoreCase
 - (c) length
 - (d) substring
- (v) The **number of bytes** occupied by the array of 10 elements which are decimal values.
- (a) 80 bytes
 - (b) 320 bytes
 - (c) 10 bytes
 - (d) 8 bytes
- (vi) The **right statement to invoke the method** perform which accepts an integer and a character and returns a double value.
- (a) perform (45, 'A')
 - (b) double m = perform(45, 'A')
 - (c) double m = perform("A", 45)
 - (d) perform ('A', 45)
- (vii) A method which has the **same name of the class and initialises the instance variables with their default values is:**
- (a) Parameterised Constructor
 - (b) Overloaded method
 - (c) Default constructor
 - (d) Non-parameterised constructor

(viii) Consider the following program segment:

```
if ( x > y )
```

```
System.out.println("Precious");
```

```
else
```

```
System.out.println("Priceless");
```

The equivalent statement for the above program segment ~~terminates~~ **with** *operators* is:

(a) `x>y?System.out.println("Priceless");System.out.println("Precious");`

(b) `System.out.println(x>y?"Priceless": "Precious");`

(c) `x>y?System.out.println("Precious");System.out.println("Priceless");`

(d) `System.out.println(x>y? "Precious": "Priceless");`

(ix) Consider the array : `int x [ ] = {4, 3, 7, 9 , 120, -12, 8};`

What is the *index* of the *negative number* of the array?

(a) 5

(b) 6

(c) 4

(d) `x.length`

(x) The output of the statement `"MEDITERRIAN".indexOf('R')` is

(a) true

(b) 7

(c) -1

(d) 6

- (xi) Which of the following represents the *escape sequence* for a *new line*?
- (a) \n
 - (b) /n
 - (c) //n
 - (d) \\n
- (xii) Raj was asked to accept the *name of the employee, gender and the basic salary*. Help him to choose the *correct datatypes in order*.
- (a) String, char, double
 - (b) char, int, boolean
 - (c) double, char, String
 - (d) int, char, double
- (xiii) Which statement is executed *only once* in a *for* statement?
- ```
for(initialisation;check;update)
{ body of the loop
}
```
- (a) Update
  - (b) check
  - (c) initialisation
  - (d) body of the loop



- (xiv) Fill in the blank in the following java statement.  
Scanner ob = new Scanner (System.in);  
char ch = \_\_\_\_\_;
- (a) ob.nextLine( )
  - (b) ob.next().charAt()
  - (c) ob.next().charAt(0)
  - (d) ob.next().charat(0)
- (xv) The statement to **create an object** “BridalGown” of the class “Apparel” with an integer argument as 34 is:
- (a) Apparel BridalGown = new Apparel(34);
  - (b) BridalGown Apparel= new Apparel(34);
  - (c) Apparel BridalGown = new Apparel( );
  - (d) Apparel BridalGown = new BridalGown(34);
- (xvi) Which of the following is the correct **output** for the java statement:  
System.out.println(“Dear Child\n”May God Bless You\””);
- (a) Dear Child  
“May God Bless You”
  - (b) Dear Child”May God Bless You”
  - (c) Dear childMayGod Bless You
  - (d) Dear Child  
\”May God Bless You\”

- (xvii) The following character array is sorted in alphabetical order using **SELECTION SORT** method.

|   |   |   |   |   |
|---|---|---|---|---|
| W | S | L | A | H |
|---|---|---|---|---|

After the first iteration the array is changed to

|   |   |   |   |   |
|---|---|---|---|---|
| A | S | L | W | H |
|---|---|---|---|---|

What will be the array after the **second iteration**?

- (a) 

|   |   |   |   |   |
|---|---|---|---|---|
| W | S | L | A | H |
|---|---|---|---|---|
- (b) 

|   |   |   |   |   |
|---|---|---|---|---|
| A | H | L | A | S |
|---|---|---|---|---|
- (c) 

|   |   |   |   |   |
|---|---|---|---|---|
| A | H | L | W | S |
|---|---|---|---|---|
- (d) 

|   |   |   |   |   |
|---|---|---|---|---|
| W | E | L | A | H |
|---|---|---|---|---|
- (xviii) **Assertion (A):** Math methods are a part of the package java.lang.  
**Reason (R):** Math method should be prefixed with the class name.
- (a) (A) is true and (R) is false.
- (b) (A) is false and (R) is true.
- (c) Both (A) and (R) are true.
- (d) Both (A) and (R) are false.
- (xix) Which of the following is **NOT** a keyword?
- (a) if
- (b) for
- (c) return
- (d) Switch

- (xx) Consider the array : `int x[ ][ ] = {{2, 3, 4}, {7, 9, 10}, {-11, 4, 6}};`  
 What is the result of the statement : `System.out.println(x[0][2]*x[2][0]);`
- (a) 24  
 (b) -44  
 (c) 16  
 (d) -22

## Question 2

- (i) **Evaluate** the following java expression: [2]  
`x- = x + + + + + x - x + x;`  
 When  $x = 7$
- (ii) Sam was asked to calculate the value of **m raised to the power of  $\frac{2}{3}$** . She wrote [2]  
 the following code and the code resulted in **1.0** irrespective of the value of m.  
 State the **type of the error**, **correct the code** to obtain the correct answer:  
`System.out.println (Math.pow(m, 2/3));`
- (iii) Write the java expression for the following: [2]  
 Assign the **sum of square root of M and the square of N to an appropriate variable**.
- (iv) Differentiate between **searching** and **sorting** in single dimensional arrays. [2]
- (v) Consider the following two dimensional array and answer the questions given [2]  
 below:  
`char x[ ][ ] = {{‘A’, ‘C’, ‘E’}, {‘M’, ‘A’, ‘P’}, {‘A’, ‘C’, ‘T’}};`
- (a) How **many bytes** are occupied by the array?  
 (b) What is the **index of ‘P’**?

- (vi) Give the **output** of the following program segment, also mention how **many** **times** the following loop is executed. [2]  
for ( k = 10; k >= 1 ; k - = 3 );  
System.out.println(k\*5);
- (vii) Convert the following program segment using the **Multiple branching statement**: [2]  
if(a>=1 && a<=3)  
System.out.println("Moderate");  
else  
System.out.println("Tough");
- (viii) What is the **output** of the following statements: [2]  
(a) **"COMPASSIONATE".compareTo("COMPANION");**  
(b) **Math.ceil(14.2) + Math.floor(17.9);**
- (ix) Write the **prototype** of the method CALCULATE which accepts two integers and a String and displays a formatted output. [2]
- (x) **Rewrite** the following program segment using the **exit controlled statement** : [2]  
for(k=1, m = 5; k<=10; k++, m++)  
System.out.println(k\*m);

### SECTION B (60 Marks)

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

*The answers in this section should consist of the programs in 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. Flowcharts and algorithms are not required. Each question carries **15** marks.*

#### Question 3

[15]

Performance criteria of an employee is calculated based on the inputs as accuracy (a), reliability(r), and adaptability(ad) which is recorded as 1 to 10, 10 being the excellent score. Define a class with the following specifications:

Class name : performance

Member variables : String n – name of the employee  
int a, r, ad  
double basic, bonus

Member methods :

void input( ) – to accept the name, accuracy(a), reliability(r) and adaptability(ad), basic from the user using the methods of Scanner class

void calculate ( ) – to calculate the average of the three inputs (accuracy(a), reliability(r) and adaptability(ad)) and allot the bonus as per the given criteria:

$$average = \frac{accuracy + reliability + adaptability}{3}$$



If average is above 7 then the bonus given to the employee is 7.5% of basic salary otherwise it is 5% of the basic salary.

void print ( )                    –        to print the name of the employee, bonus.

void main ( )                    –        to create an object of the class and invoke the methods.

#### Question 4

[15]

Define a class to accept a number and check if it is a *Special buzz number or not*. A number is a Special buzz number *if it ends with 7 and the sum of the digits of the number is also divisible by 7*.

Example: 957

The number ends with 7 and the sum of the digits ( $9 + 5 + 7 = 21$ ) also is divisible by 7.

#### Question 5

[15]

Define a class to accept the names of 10 students in an array, arrange the names in alphabetical order using the **BUBBLE SORT** method, print the original array and the sorted array.

#### Question 6

[15]

A secret agency encodes the given message (String) as follows:

The first letter of the message is converted to @ if it is a Vowel, otherwise it is converted to #

All the other letters are reversed.

Print the original String and the encoded string.

Example : S = "APPEARANCE6"

Encoded String : @6ECNARAEPP

Example : S = "PERFORM"

Encoded String : #MROFRE

### Question 7

[15]

Define a class to overload the method display as follows:

void display ( ) – to display the format using NESTED LOOPS only:

1 2 3

4 5 6

7 8 9

void display (int n, char ch): to print the square root of n if ch is 'S' or  
print the cube root of n if ch is 'C'

double display

(double r, double h): to return the volume of a cylinder as follows

volume = area x h

area =  $\pi r^2$

### Question 8

[15]

Define a class to accept values into a 4 x 4 array and check if it is a **Super array or not** an array is Super **if the sum of even elements is greater than the sum of odd elements of the array.**

|    |    |    |    |
|----|----|----|----|
| 12 | 7  | 8  | 13 |
| 1  | 3  | 6  | 5  |
| 15 | 2  | 9  | 10 |
| 4  | 11 | 14 | 16 |

Sum of even elements =  $12 + 8 + 6 + 2 + 10 + 4 + 14 + 16 = 72$

Sum of odd elements =  $7 + 13 + 1 + 3 + 5 + 15 + 9 + 11 = 64$

Array is a super array.

## COMPUTER APPLICATIONS

***Maximum Marks: 100***

***Time allowed: Two hours***

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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) The full form of **JVM** is:
- (a) Java Visible Machine
  - (b) Java Virtual Mode
  - (c) Java Virtual Machine
  - (d) Java Visible Mode
- (ii) Which of the following occupies **2 bytes** of storage?
- (a) 25
  - (b) AM
  - (c) 35.2
  - (d) \\
- (iii) In a statement  $c = c + (x * d + e)$ ; which **variable** is an **accumulator**?
- (a)  $d$
  - (b)  $c$
  - (c)  $e$
  - (d)  $x$

- (iv) Which of the following is **NOT** an access specifier?
- (a) private
  - (b) protected
  - (c) package
  - (d) public
- (v) What is the output of the statement ***Math.pow (36, 6/5);*** ?
- (a) 36.0
  - (b) 1.0
  - (c) 73.71
  - (d) 6.0
- (vi) Read the *if program segment* given below:
- ```
if (a > b)  
z = 25;  
else  
z = 35;
```
- Which one of the following is the **correct conversion** of the **if program segment** to **ternary**?
- (a) $z = a > b ? 35 : 25;$
 - (b) $z = a > b ? 25 : 35;$
 - (c) $z = a > b : 35 ? 25;$
 - (d) $z = a > b : 25 ? 35;$
- (vii) The output of the statement:
- System.out.println(Character.toUpperCase('b') + 2);*** is:
- (a) 66
 - (b) 100
 - (c) 68
 - (d) 98

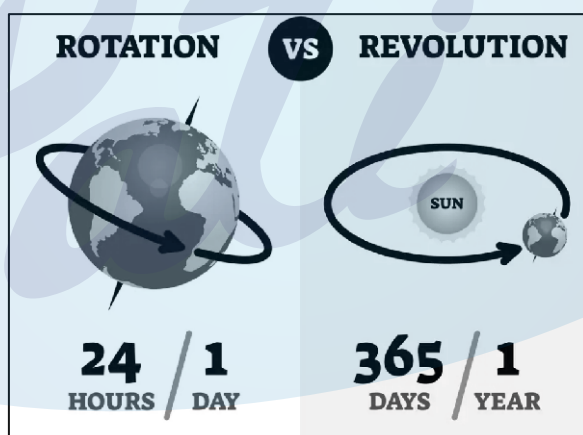
(viii) Consider the following statements:

```
Computer desktop = new Computer( );
```

```
Computer Mainframe = new Computer( );
```

Name the **objects** of the class given above:

- (a) Desktop, Mainframe
 - (b) desktop, Mainframe
 - (c) Computer, Mainframe
 - (d) Computer, desktop
- (ix) The earth spins on its axis completing one rotation in a day. The earth revolves around the sun in 365 days to complete one revolution. What is **Java** **concept** depicted in the given picture?



- (a) Array
- (b) Condition
- (c) Nested loop
- (d) While loop

- (x) In the following method prototype to accept a character, an integer and return **YES** or **NO**, fill in the blank to complete the method prototype.

public _____ **someMethod (char ch, int n)**

- (a) boolean
 - (b) String
 - (c) int
 - (d) double
- (xi) In a calculator which Java feature allows **multiple methods named calculate()** for the different operations?

- (a) abstraction
- (b) inheritance
- (c) encapsulation
- (d) polymorphism

- (xii) **Assertion (A):** The result of the Java expression $3 + 7/2$ is 6.

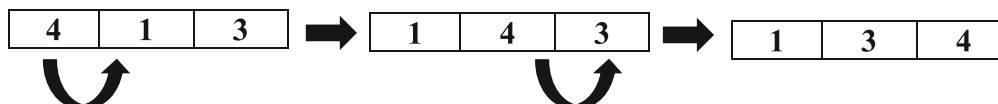
Reason (R): According to the hierarchy of operators in Java, addition is done first followed by division.

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

- (xiii) What is the *type of parameter* to be given for the method *parseInt()*?
- (a) double
 - (b) String
 - (c) char
 - (d) int
- (xiv) To extract the word *NOW* from the word “*ACKNOWLEDGEMENT*”, the Java statement “*ACKNOWLEDGEMENT*”.*substring*(3, _____) is used.
- Choose the correct number to fill in the blank.
- (a) 6
 - (b) 7
 - (c) 5
 - (d) 8
- (xv)

```
String a[ ] = {"Atasi", "Aditi", "Anant", "Amit", "Ahana"};
System.out.println(a[1].charAt(1) + "*" + a[2].charAt(2));
```
- The *output* of the above statement is:
- (a) da
 - (b) d * a
 - (c) ti
 - (d) t * i
- (xvi) Which of the following *String* methods *returns a negative value*?
- (a) length()
 - (b) equals()
 - (c) compareTo()
 - (d) charAt()

- (xvii) An array with 3 elements is arranged in ascending order as follows:



Name the technique used:

- (a) Bubble sort
 - (b) Linear Search
 - (c) Selection sort
 - (d) Binary Search
- (xviii) The sales made by 5 salesmen selling 5 products is stored in a two-dimensional array of *integer data type*. How many *bytes* does the array occupy?
- (a) 25
 - (b) 200
 - (c) 50
 - (d) 100
- (xix) **Assertion (A):** The substring() method modifies the original String.
Reason (R): The substring() method can extract part of a string starting from a specific index.
- (a) (A) is true and (R) is false.
 - (b) (A) is false and (R) is true.
 - (c) Both (A) and (R) are true and (R) is the correct explanation of (A).
 - (d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

- (xx) In **constructor overloading** all constructors should have the same name as of the class but with a different set of _____.
- (a) Access specifiers
 - (b) Classes
 - (c) Return type
 - (d) Parameters

Question 2

- (i) **Rewrite** the following program segment using a **for loop**. [2]

```
int a = 5, b = 10;
while (b > 0)
{ b -= 2;
}
System.out.println (a * b);
```

- (ii) **Evaluate** the Java expression: [2]

```
x = a * b % (++c) + (++a) + (--b);
if a = 7, b = 8, c = 2
```

- (iii) Write the **Java expression** to find the **sum of cube root of x and the absolute value of y**. [2]

- (iv) Users must be above 10 years to open a self-operated bank account. Write this logic using a **ternary operator** and store the result (the eligibility message) in a String variable named idStatus and print it. [2]

- (v) Give the output of the following program segment: [2]

```
String S = "GRACIOUS".substring(4);
System.out.println(S);
System.out.println ("GLAMOROUS".endsWith(S));
```

- (vi) Give the **output** of the following program segment and mention **how many times** the loop is executed. [2]

```
int K = 1;
do
{ K += 2;
System.out.println (K);
} while (K <= 6);
```

- (vii) The following program segment **calculates and displays the factorial of a number**. [Example : Factorial of 5 is $1 \times 2 \times 3 \times 4 \times 5 = 120$] [2]

```
int p, n = 5, f = 0;
for (p = n; p > 0; p --)
f *= p;
System.out.println(f);
```

Name the type of error if any; correct the statement to get the desired output.

- (viii) `int X[ ][ ] = {{4, 5}, {7, 2}, {19, 4}, {7, 4}};` [2]

Write the **index of the maximum element** and the **index of the minimum element** of the array.

- (ix) The following program segment **swaps the first element and the second element** of the given array **without using the third variable**, fill in the blanks with appropriate java statements: [2]

```
void swap()
{ int x[ ] = {4, 8, 19, 24, 15};
(1) _____;
(2) _____;
x[0] = x[0] / x[1];
System.out.println(x[0] + " " + x[1]); }
```

- (x) Name the following: [2]
- (a) The **return data type** of the method ***equals()***.
- (b) The **String method** which has **no parameter** and **returns a String**.

SECTION B (60 Marks)

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

The answers 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.

Flowcharts and algorithms are not required.

Question 3 [15]

Define a class named **StepTracker** with the following specifications:

Member Variables:

- String name — stores the user's name.
- int sw — stores the total number of steps walked by the user.
- double cb — stores the estimated calories burned by the user.
- double km — stores the estimated distance walked in kilometers.

Member Methods:

- void accept() — to input the name and the steps walked **using Scanner class methods only**.
- void calculate() — calculates calories burned and distance in km based on steps walked using the following estimation table:

Metric	Calculation Formula
Calories Burned	steps walked $\times$ 0.04 (e.g., 1 step burns 0.04 calories)
Distance (Km)	steps walked / 1300 (e.g., 1300 steps is approx. 1 km)

- void display() — Display the calories burned, distance in km and the user's name.

Write a main method to **create an object** of the class and **invoke the methods**.

Question 4

[15]

Write a program to accept the designations of 100 employees in a single dimensional array. Accept the designation from the user and **print the total number of employees** with the designation given by the user as input.

Example:

Trainee	Manager	Chef	Manager	Director	Manager
---------	---------	------	---------	----------	---------

Input: Manager Output: 3

Question 5

[15]

Write a program to accept a two-dimensional **integer array of order 4 x 5** as input from the user. Check if it is a **Sparse Matrix** or not. A matrix is considered to be a sparse, if the total number of zero elements is greater than the total number of non-zero elements. Print appropriate messages.

Example:

4	3	0	1	0
1	0	0	2	0
1	0	1	0	0
0	3	2	0	0

Number of zero elements = 11

Number of non zero elements = 9

Matrix is a Sparse Matrix

Question 6

[15]

Write a program to accept a number and check if it is a **Mark number** or not. A number is said to be Mark when sum of the squares of each digit is an even number as well as the last digit of the sum and the last digit of the number given is same.

Example: $n = 246$

$$\text{sum} = 2 \times 2 + 4 \times 4 + 6 \times 6 = 56$$

56 is an even number as well as last digit is 6 for both sum as well as the number.

Question 7

[15]

Define a class to **overload** the method **format** as follows:

void format (): To print the following pattern using *Nested for loops only*:

```
1 2 3 4 5
2 3 4 5
3 4 5
4 5
5
```

int format (String s): To calculate and return the sum of ASCII codes of each character of the String.

Example: CAB

Output: 67 + 65 + 66
198

void format (int n): To calculate and display the sum of natural numbers up to **n** given by the formula.

$$\frac{n(n+1)}{2}$$

Question 8

[15]

Write a program to accept a word and print the **Symbolic** of the accepted word.

Symbolic word is formed by **extracting** the characters from the **first consonant**, then add characters before the first consonant of the accepted word and end with "TR".

Example: **AIRWAYS** Symbolic word is **RWAYSITR**

BEAUTY Symbolic word is **BEAUTYTR**

COMPUTER APPLICATIONS

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.*
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[].*

Instruction for the Supervising Examiner

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

This paper consists of 15 printed pages and 1 blank page.

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Turn Over

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) Which of the following *String methods* results into *boolean* data type?

- (a) trim()
- (b) equals()
- (c) replace()
- (d) concat()

(ii) Which *construct* can be used to get only one of the required ice creams?



- (a) switch construct
- (b) while construct
- (c) do.. while construct
- (d) for construct

(iii) Which statement is *correct* for the *method prototype* given below:

int check(char ch, String s)

- (a) check() does not return any value
- (b) check() has return type int
- (c) check method has two actual parameters
- (d) check() is a constructor

(iv) The ***Math method*** which returns *int* value is:

- (a) round()
- (b) cbrt()
- (c) ceil ()
- (d) random()

(v) What is the output of the following statement:

"MONOPOLY".lastIndexOf('O');

- (a) 1
- (b) 3
- (c) 2
- (d) 5

- (vi) Typecasting is often necessary when dealing with financial data. Identify the correct syntax to *typecast a double to an int* using the variables:

int amount; double valueINR

- (a) `int amount = valueINR;`
 - (b) `int amount = Integer.parseInt (valueINR);`
 - (c) `int amount = (int) valueINR;`
 - (d) `int amount = int (valueINR);`
- (vii) What is the *output* of the code snippet given below?

int lives = 5;

System.out.print(lives--);

System.out.print(lives);

- (a) 4 3
 - (b) 5 4
 - (c) 5 3
 - (d) 4 4
- (viii) What will be the *output* of the following statement?

`String s = "JavaProgramming";`

`System.out.println(s.substring(4, 11).toUpperCase());`

- (a) Programm
- (b) PROGRAMM
- (c) PROGRAM
- (d) program

- (ix) Which of the following *access specifiers* will make a member accessible *only* within its own class?
- (a) public
 - (b) private
 - (c) protected
 - (d) default

- (x) What will be the *output* of the following Java method?

Character.isLetterOrDigit('\n')

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

- (xi) Which of the following is *not* a type of *token* in Java?

1. Method	3. Literal
2. Identifier	4. Keyword

- (a) only 1
- (b) 1 and 3
- (c) only 2
- (d) only 4

(xii) The statement given below is termed as:

public void Accept(int a)

- (a) Method signature
- (b) Method block
- (c) Method prototype
- (d) Constructor

(xiii) What is the **output** of the following Java code?

```
boolean flag = false;  
if (flag) {  
System.out.println("True");  
} else {  
System.out.println("False");  
}
```

- (a) True
- (b) False
- (c) No output
- (d) Compilation error

(xiv) Identify the **static method** from the list given below:

- (a) length()
- (b) nextLine()
- (c) substring(int)
- (d) isLetter(char)

- (xv) `String a[]={"Rohini", "Rajarshi", "Rajeev", "Rehan", "Rebecca"};`
`System.out.println(a[2].substring(2));`

Which one of the following will be the output of the above statements?

- (a) jeev
- (b) Ra
- (c) Raj
- (d) je

- (xvi) `System.out.println(Math.round(Math.ceil(-8.8)));` will result in:

- (a) 8.0
- (b) -8.0
- (c) -9
- (d) -8

- (xvii) Which one of the following Java statements **assign 100** to the **last** element of a **3×3 array**?

- (a) `x[2][2]=100;`
- (b) `x[3][3]=100;`
- (c) `x[2][3]=100;`
- (d) `x[3][2]=100;`

(xviii)

		
Floppy Disk	Pen Drive	DVD
		
Hard Disk	Storage Tape	Memory card

Consider the *Two dimensional array* $S[2][3]$, of *storage devices* given above, state the *index* of the *Hard disk*.

- (a) $S[1][0]$
- (b) $S[0][1]$
- (c) $S[1][2]$
- (d) $S[0][0]$

(xix) How many times the *for* statement given below is executed?

for ($k = 10; k \geq 0; k--$)

- (a) 10
- (b) 11
- (c) 12
- (d) 0

- (xx) Consider the following program segment in which the statements are *jumbled*.
Choose the *correct order* of the statements to return the *sum of first 10 natural numbers*.

<i>for(i=1; i<=10; i++)</i>	→ 1
<i>return sum;</i>	→ 2
<i>int sum = 0, i;</i>	→ 3
<i>sum+=i;</i>	→ 4

- (a) 1 2 3 4
(b) 3 4 1 2
(c) 1 4 2 3
(d) 3 1 4 2

Question 2

- (i) Write *Java expression* for the following: [2]
 $x^{10} + y^{10}$
- (ii) *Evaluate* the given expression when $x = 4$ [2]
 $x* = - - x + x - - + x;$
- (iii) Convert the following *switch* case into *if else if*: [2]

```
switch(x)
{
    case 'T' :
    case 't' : System.out.print("Teacher"); break;
    default : System.out.print("Student");
}
```

- (iv) Write the **output** of the following program segment: [2]

```
for( int a=1; a<=10;a++)  
{    if(a%2==0)  
    continue;  
    System.out.print(a+" ");  
}
```

- (v) In the example given below of class **Cat**, identify the **variable** and the **methods**: [2]

Cat
Name
meow()
eat()
play()

- (vi) Give the **output** of the following program segment and mention **how many times** the loop is executed. [2]

```
int k = 100;  
while (k>=10)  
{  
    System.out.println(k);  
    k-=40;  
}
```

(vii) Consider the given array and answer the questions given below: [2]

`int z[ ][ ] = { {2, 3, 4}, {5,1,2}, {7, 9, 3}};`

(a) What is the **order** of the array `z[ ][ ]`?

(b) What is the value in `z[2][0]`?

(viii) Give the **output** of the following: [2]

(a) `"ROSE".compareTo("ROJA")`

(b) `"DEDICATE".replace('D', 'L')`

(ix) Consider the following array and answer the questions given below: [2]

`char ch [ ] = { 'A', '%', 'y', '@', '7', 'p'};`

(a) How many **bytes** does the array occupy?

(b) What is the output of the statement `Character.isDigit(ch[4])`?

(x) [2]

`class perform`

`{ int m ; String name;`

`perform( int x , String y)`

`{ m=x;`

`name=y;`

`}`

`void print ()`

`{ System.out.print( name+" "+m);`

`}`

`public static void main()`

`{ perform ob1=new perform( 95 , "Xavier");`

`ob1.print();`

`}`

`}`

- (a) Give the **output** of the code given above.
- (b) Name the **type** of the **constructor** used.

SECTION B (60 Marks)

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

The answers 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.

Flowcharts and algorithms are not required.

Question 3

[15]

Define a class with following specifications.

class name: **Hotel**

Member variables:

String name: stores name of customer name

long mobno: stores mobile number

int days: stores number of days customer stayed in hotel

int bill: stores customer bill

Member method:

void input () – input values using Scanner class methods only

void charge() – calculate bill as per the following criteria

<u>days</u>	<u>charge/day</u>
-------------	-------------------

first 3 days	1000 Rs/ day
--------------	--------------

next 4 days	900 Rs/day
-------------	------------

> 7 days	800 Rs/day
----------	------------

bill = bill + gst (18% of bill)

void print()- Display customer name, mobile number and bill.

Invoke all the above methods in **main method** with the help of an object.

Question 4

[15]

Define a **class** to accept values into a 3x3 integer array and print the **product of each row** elements.

Example:

3	1	2
4	2	1
5	1	2

Output:

Row 0 – 6

Row 1 – 8

Row 2 – 10

Question 5

[15]

Define a *class* to *overload* the method *transform* as follows:

int transform(int n) – to return the sum of the digits of the given number

Example: n = 458 output : 17

void transform(String s) – to convert the given String to upper case and print

Example: if S = “Blue” Output : BLUE

void transform (char ch) – to print the character ch in **3 rows** and **3 columns** using nested loops.

Example: if ch = ‘@’ Output : @@@

@@@

@@@

Question 6

[15]

Define a *class* to accept a string. Check if it is a *Special String* or not.

A String is Special if the *number of vowels equals to the number of consonants*.

Example: MINE

Number of vowels = 2

Number of Consonants = 2

Question 7

[15]

Define a *class* to accept a number and check if the sum of the *first digit* and the *last digit* is an *even number* or an *odd number*.

Example:	N = 2396	N = 9316
First digit:	2	9
Last digit:	6	6
Sum:	8	15
Output:	Sum is even	Sum is odd

Question 8

[15]

Define a *class* to accept 10 integers in an array, search for the given value using the *Linear Search technique* and print appropriate messages.

COMPUTER APPLICATIONS

Maximum Marks: 100

Time allowed: Two hours

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Turn Over

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) Character class methods are found in the *package* called:
- (a) java.util
 - (b) java.lang
 - (c) java.awt
 - (d) java.io
- (ii) `System.out.println('Z'+32);` will display:
- (a) z
 - (b) Z
 - (c) 122
 - (d) 154
- (iii) `double x []={2.5,4.5,5.5,6.4};` occupies _____ bytes.
- (a) 16
 - (b) 4
 - (c) 8
 - (d) 32
- (iv) The output of `42/6%2` is:
- (a) 1
 - (b) 10
 - (c) 2
 - (d) 0

(v)

 Mouse	 Keyboard	 Printer
 Scanner	 Barcode Scanner	 Microphone

Consider the *Two dimensional array* $P[2][3]$, of peripherals (input / output devices) given above, state the index of the device *Barcode Scanner*.

- (a) $P[1][1]$
- (b) $P[0][1]$
- (c) $P[1][2]$
- (d) $P[0][0]$

(vi)

Which of the following is *user defined data type*?

1. array	3. class
2. double	4. boolean

- (a) only 1
- (b) 1 and 3
- (c) only 2
- (d) only 4

(vii)

Select the *infinite* loop:

- (a) `for(int i=1;i<=10;i++)`
- (b) `for(int i=2; i!=0 ;i-=3)`
- (c) `for(int i=5 ;i<=5;i++)`
- (d) `for(int i =1;i>=1; i - -)`

- (viii) The output of *Math.max(-7, Math.min(-5, -4))* is:
- (a) -5
 - (b) -4
 - (c) -7
 - (d) error
- (ix) Which of the following *is true* for the given object creation statement?
Game cricket = new Game();
- (a) Game is an object of cricket class
 - (b) New keyword creates object Game
 - (c) Game is a class and cricket is an object
 - (d) Game and cricket are objects
- (x) ***Post office*** is an example for _____ access specifier.
- (a) public
 - (b) local
 - (c) protected
 - (d) private
- (xi) **Assertion (A):** In switch case ***break*** statement avoids fall through.
Reason (R): ***break*** statement helps to execute only one case at a time.
- (a) Both (A) and (R) are true and (R) is a correct explanation of (A).
 - (b) Both (A) and (R) are true and (R) is not a correct explanation of (A).
 - (c) (A) is true and (R) is false.
 - (d) (A) is false and (R) is true.

- (xii) A physical education teacher asks the students to do the *side stretch* as shown below, 10 times. Which *programming construct* the teacher uses?

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



- (xiii) The *index (subscript)* of the last element of an array *ar[]* is:

- (a) `ar.length( )`
- (b) `ar[ ].length`
- (c) `ar.length()-1`
- (d) `ar.length-1`

- (xiv) **Assertion (A):** A clock is a real-life example of *nested loops*.

Reason (R): The hour hand moves through 12 positions, while the minute hand moves through 60 positions within each hour.

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

- (xv) Which of the following *pairs of methods* will cause a *compile-time error* due to incorrect method *overloading*?

- (a) `void test(int a, int b)` and `void test(double a, double b)`
- (b) `void test(int a, double b)` and `void test(double a, int b)`
- (c) `void test(int a, double b)` and `void test(int a)`
- (d) `void test(int a)` and `int test(int a)`

(xvi) Which of the following converts “25” to 25.0?

- (a) Double.Parsedouble(“25”)
- (b) Double.parse(“25”)
- (c) Double.parseDouble(“25”)
- (d) Double.parseDouble(25)

(xvii) Consider the program segment:

int p=0;

for(p=4 ; p>0 ; p-=2);

System.out.print(p);

System.out.println(p);

The above statements will display:

- (a) 42
- (b) 4200
- (c) 0
0
- (d) 00

(xviii) ***System.out.println("I said,\"It's wise to obey elders.\");***

The **output** of the above statement is:

- (a) I said,'It is wise to obey elders.'
- (b) I said, “It's wise to obey elders.”
- (c) I said,It's wise to elders.
- (d) “It's wise to obey elders.”

(xix) What is the **output** of the statement given below?

"ANGER".compareTo("ANGEL")

- (a) 3
- (b) -6
- (c) 6
- (d) 0

(xx) Consider the following program segment in which the statements are **jumbled**.
Choose the **correct order** of statements to calculate and return the **factorial of 4**.

for (k=1; k<=4; k++) —————> 1

return fa; —————> 2

long fa = 1, k; —————> 3

fa*=k; —————> 4

- (a) 1, 2, 3, 4
- (b) 3, 1, 4, 2
- (c) 3, 1, 2, 4
- (d) 1, 3, 2, 4

Question 2

- (i) Write the **java expression** to find the product of square root of **P** and the square root of **Q** using the methods of **Math class**. [2]
- (ii) Write the **output** of the following String method: [2]
String x= "talent" ; String y="matrix" ;
System.out.print(x.substring(3).concat(y.substring(3))) ;
- (iii) Write the Java statement for creating an object named '**sifra**' of the class [2]
'Robot', which takes **three double parameters**.

- (iv) Convert the given loop into **exit controlled loop**. [2]

```
int a,b;
for ( a=10 ,b=1; a>=1 ;a-=2)
{
    b+=a;
    b++;
}
System.out.print(b);
```

- (v) Consider and give the **output** of the following program: [2]

```
class report
{ int a,b;
  report()
  { a=10;
    b=15;
  }
  report(int x, int y)
  { a=x;
    b=y;
  }
  void print()
  { System.out.println(a*b);
  }
  static void main()
  { report r = new report();
    r.print();
    report p = new report(4, 5);
    p.print();
  }
}
```

(vi) (a) Name one **String method** which results in **positive integer only**. [2]

(b) Name one **String method** which results in a **character**.

(vii) John was asked to write a Java code to calculate the **surface area of a cone**, the following code was written by him: [2]

Surface area of cone is $A = \pi r l$

$$l = \sqrt{r^2 + h^2}$$

class area

```
{    double area (double r, double h)
    {    double l, a;
        a=22.0/7*r*l;
        l=Math.sqrt(r*r+h*h);
        return a;
    }
}
```

Specify the **type of the error** in the above program, correct and write the program to be error free.

(viii) Consider the following array and answer the questions given below: [2]

int a[] = {12,10,8,4,6,2,3,5,7}

(a) What is the **output** of `System.out.print(a[0]+a[5]);`?

(b) What is the **index (subscript)** of the **largest** element of the array **a[]**?

(ix) (a) Write the Java statement to initialise the **first 6 odd numbers** in a 3×2 array. [2]

(b) What is the result of $x[0][1] + x[2][1]$ of the above array?

(x) Give the **output** of the following program segment and specify **how many times** the loop is executed. [2]

```
String s = "JAVA";
for(i=0;i<s.length();i+=2)
    System.out.println(s.substring(i));
```

SECTION B (60 Marks)

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

The answers 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.

Flowcharts and algorithms are not required.

Question 3

[15]

Define a **class** named **CloudStorage** with the following specifications:

- **Member Variables:**

- int acno - stores the user's account number.
- int space - stores the amount of storage space in GB purchased by the user.
- double bill - stores the total price to be paid by the user.

- **Member Methods:**

- void accept() - prompts the user to input their account number and storage space using Scanner class methods only.
- void calculate() - calculates the bill total price based on the storage space purchased using the pricing table provided:

Storage range	Price per GB (Rs)
First 15 GB	15
Next 15 GB	13
Above 30 GB	11

- void display() - displays the account number, storage space and bill to be paid.

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

Question 4

[15]

Define a **class** to accept values into a 4 x 4 integer array. Calculate and print the **NORM** of the array.

NORM is the square root of sum of squares of all elements.

1	2	1	3
5	2	1	6
3	6	1	2
3	4	6	3

Sum of squares of elements = $1+4+1+9+25+4+1+36+9+36+1+4+9+16+36+9 = 201$

NORM = Squareroot of 201 = 14.177446878757825

Question 5

[15]

Define a **class** to accept a String and Print if it is a **Super string** or not. A **String is Super** if the **number of uppercase letters** are equal to the **number of lower case letters**.

[Use Character & String methods only]

Example : "COMmITmeNt"

Number of Uppercase letters – 5

Number of Lowercase letters – 5

String is a Super String

Question 6

[15]

Define a **class** to initialise the following data in an array.

Search for a given character input by the user, using the **Binary Search technique**.

Print "**Search Successful**" if the character is found otherwise print "**Search is not Successful**".

'A', 'H', 'N', 'P', 'S', 'U', 'W', 'Y', 'Z', 'b', 'd'

Question 7

[15]

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

void print () – To print the given format using nested loops.

@#@#@

@#@#@

@#@#@

@#@#@

double print(double a, double b) – To display the sum of numbers between **a** and **b** with difference of 0.5.

e.g. if $a = 1.0$, $b = 4.0$

output is: $1.0 + 1.5 + 2.0 + 2.5 + \dots + 4.0$

int print(char ch1, char ch2) – compare the two characters and return the ASCII code of the largest character.

Question 8

[15]

Define a **class** to accept a number. Check if the sum of the **largest digit** and the **smallest digit** is an even number or an odd number. **Print appropriate messages.**

Sample Input:	6425	3748
Largest digit:	6	8
Smallest digit:	2	3
Sample Output:	Sum is even	Sum is odd

COMPUTER APPLICATIONS

Maximum Marks: 100

Time allowed: Two hours

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 (40 Marks)

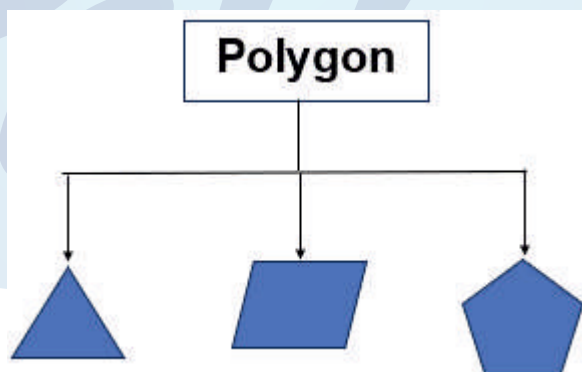
*(Attempt **all** questions from this **Section**.)*

Question 1**[20]**

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

(Do not copy the questions, write the correct answers only.)

(i)



Consider the above picture and choose the correct statement from the following:

- (a) Polygon is the object and the pictures are classes
- (b) Both polygon and the pictures are classes
- (c) Polygon is the class and the pictures are objects
- (d) Both polygon and the pictures are objects

This paper consists of 11 printed pages and 1 blank page.

- (ii) `int x = 98; char ch = (char)x;` what is the value in `ch`?
- (a) b
 - (b) A
 - (c) B
 - (d) 97
- (iii) The output of the statement `"CONCENTRATION".indexOf('T')` is:
- (a) 9
 - (b) 7
 - (c) 6
 - (d) (-1)
- (iv) The access specifier that gives least accessibility is:
- (a) package
 - (b) public
 - (c) protected
 - (d) private
- (v) The output of the statement `"talent".compareTo("genius")` is:
- (a) 11
 - (b) -11
 - (c) 0
 - (d) 13
- (vi) Which of the following is an escape sequence character in Java?
- (a) `/n`
 - (b) `\t`
 - (c) `/t`
 - (d) `//n`

(vii)

if ($a > b \& \& b > c$) then largest number is:

- (a) b
- (b) c
- (c) a
- (d) wrong expression

(viii)

What is the output of **Math.ceil(5.4)+Math.ceil(4.5)**?

- (a) 10.0
- (b) 11.0
- (c) 12.0
- (d) 9.0

(ix)

What is the method to check whether a character is a letter or digit?

- (a) isDigit(char)
- (b) isLetterOrDigit()
- (c) isLetterOrDigit(char)
- (d) isLETTERorDIGIT(char)

(x)

The extension of a Java source code file is:

- (a) exe
- (b) obj
- (c) jvm
- (d) java

(xi)

The number of bytes occupied by a character array of four rows and three columns are:

- (a) 12
- (b) 24
- (c) 96
- (d) 48

(xii)

Which of the following data type cannot be used with switch case construct?

- (a) int
- (b) char
- (c) String
- (d) double

(xiii)

Which of the following are entry controlled loops?

- 1. for
- 2. while
- 3. do..while
- 4. switch

- (a) only 1
- (b) 1 and 2
- (c) 1 and 3
- (d) 3 and 4

(xiv)

Method which reverses a given number is:

- (a) Impure method
- (b) Pure method
- (c) Constructor
- (d) Destructor

(xv)

If the name of the class is “Yellow”, what can be the possible name for its constructors?

- (a) yellow
- (b) YELLOW
- (c) Yell
- (d) Yellow

(xvi)

Invoking a method by passing the objects of a class is termed as:

- (a) Call by reference
- (b) Call by value
- (c) Call by method
- (d) Call by constructor

(xvii)

The correct statement to create an object named mango of class fruit:

- (a) Fruit Mango= new fruit();
- (b) fruit mango = new fruit();
- (c) Mango fruit=new Mango();
- (d) fruit mango= new mango();

(xviii)

Assertion (A): Static method can access static and instance variables.

Reason (R): Static variable can be accessed only by static method.

- (a) Assertion and Reason both are correct.
- (b) Assertion is true and Reason is false.
- (c) Assertion is false and Reason is true.
- (d) Assertion and Reason both are false.

(xix)

What is the output of the Java code given below?

```
String color [ ] = {"Blue", "Red", "Violet"};
```

```
System.out.println(color[2].length());
```

- (a) 6
- (b) 5
- (c) 3
- (d) 2

(xx)

Which of the following mathematical methods returns only an integer?

- (a) Math.ceil(n)
- (b) Math.sqrt(n)
- (c) Math.floor(n)
- (d) Math.round(n)

Question 2

- (i) Write Java expression for: [2]

$$\frac{|a + b|}{\sqrt{a^2 + b^2}}$$

- (ii) Evaluate the expression when x is 4: [2]

$x += x ++ * ++ x \% 2;$

- (iii) Rewrite the following *do while* program segment using for: [2]

$x = 10; y = 20;$

do

{

$x++;$

$y++;$

} while ($x \leq 20$);

System.out.println($x * y$);

- (iv) Give the output of the following program segment. How many times is the loop executed? [2]

for($x=10; x>20; x++$)

System.out.println(x);

System.out.println($x*2$);

(v)

```
String s1 = "45.50"; String s2 = "54.50";
```

[2]

```
double d1=Double.parseDouble(s1);
```

```
double d2=Double.parseDouble(s2);
```

```
int x= (int)(d1+d2);
```

What is value of x?

(vi)

Consider the following two-dimensional array and answer the questions given below:

[2]

```
int x[ ][ ] = {{4,3,2}, {7,8,2}, {8, 3,10}, {1, 2, 9}};
```

(a) What is the order of the array?

(b) What is the value of $x[0][0]+x[2][2]$?

(vii)

Differentiate between boxing and unboxing.

[2]

(viii)

The following code to compare two strings is compiled, the following syntax error was displayed – incompatible types – int cannot be converted to boolean. Identify the statement which has the error and write the correct statement. Give the output of the program segment.

[2]

```
void calculate()
```

```
{
```

```
String a = "KING", b = "KINGDOM";
```

```
boolean x = a.compareTo(b);
```

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

```
}
```

(ix)

Consider the given program and answer the questions given below:

[2]

```
class temp
```

```
{
```

```
int a;
```

```
temp()
```

```
{  
a=10;  
}  
temp(int z)  
{  
a=z;  
}  
void print()  
{  
System.out.println(a);  
}  
void main()  
{  
temp t = new temp();  
temp x = new temp(30);  
t.print();  
x.print();  
}  
}
```

- (a) What concept of OOPs is depicted in the above program with two constructors?
- (b) What is the output of the method main()?
- (x) Primitive data types are built in data types which are a part of the wrapper classes. These wrapper classes are encapsulated in the java.lang package. Non primitive datatypes like Scanner class are a part of the utility package for which an object needs to be created. [2]
- (a) To which package the Character and Boolean classes belong?
- (b) Write the statement to access the Scanner class in the program.

SECTION B (60 Marks)

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

The answers 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.

Flowcharts and algorithms are not required.

Question 3

[15]

DTDC a courier company charges for the courier based on the weight of the parcel. Define a class with the following specifications:

class name: courier

Member variables: name – name of the customer

weight – weight of the parcel in kilograms

address – address of the recipient

bill – amount to be paid

type – ‘D’- domestic, ‘I’- international

Member methods:

void accept () – to accept the details using the methods of the *Scanner* class only.

void calculate () – to calculate the bill as per the following criteria:

Weight in Kgs	Rate per Kg
---------------	-------------

First 5 Kgs	Rs.800
-------------	--------

Next 5 Kgs	Rs.700
------------	--------

Above 10 Kgs	Rs.500
--------------	--------

An additional amount of Rs.1500 is charged if the type of the courier is I (International)

void print () – To print the details

void main () – to create an object of the class and invoke the methods

Question 4

[15]

Define a class to overload the method perform as follows:

double perform (double r, double h)

to calculate and return the value of

Curved surface area of cone

$$CSA = \pi r l \quad l = \sqrt{r^2 + h^2}$$

void perform (int r, int c)

Use NESTED FOR LOOP to generate the following format

r = 4, c = 5 output – 1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

void perform (int m, int n, char ch)

to print the quotient of the division of m and n if ch is Q else print the remainder of the division of m and n if ch is R

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 a palindrome number

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

Question 6

[15]

Define a class to accept values into an integer array of order 4 x 4 and check whether it is a DIAGONAL array or not. An array is DIAGONAL if the sum of the left diagonal elements equals the sum of the right diagonal elements. Print the appropriate message.

Example:

3 4 2 5

Sum of the left diagonal elements =

2 5 2 3

3 + 5 + 2 + 1 = 11

5 3 2 7

Sum of the right diagonal elements =

1 3 7 1

5 + 2 + 3 + 1 = 11

Question 7**[15]**

Define a class pin code and store the given pin codes in a single dimensional array. Sort these pin codes in ascending order using the Selection Sort technique only. Display the sorted array.

110061, 110001, 110029, 110023, 110055, 110006, 110019, 110033

Question 8**[15]**

Define a class to accept the gmail id and check for its validity.

A gmail id is valid only if it has:

- ➔ @
- ➔ . (dot)
- ➔ gmail
- ➔ com

Example: icse2024@gmail.com is a valid gmail id.

2023

COMPUTER APPLICATIONS

Maximum Marks: 100

Time allowed: Two hours

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*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 (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 the correct answers only.)

- (i) A mechanism where one class acquires the properties of another class:
- (a) Polymorphism
 - (b) Inheritance
 - (c) Encapsulation
 - (d) Abstraction
- (ii) Identify the type of operator **&&**:
- (a) ternary
 - (b) unary
 - (c) logical
 - (d) relational

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Turn Over

- (iii) The Scanner class method used to accept words with space:
- (a) next()
 - (b) nextLine()
 - (c) Next()
 - (d) nextString()
- (iv) The keyword used to call *package* in the program:
- (a) extends
 - (b) export
 - (c) import
 - (d) package
- (v) What value will `Math.sqrt (Math.ceil (15.3))` return?
- (a) 16.0
 - (b) 16
 - (c) 4.0
 - (d) 5.0
- (vi) The absence of which statement leads to *fall through* situation in switch case statement?
- (a) continue
 - (b) break
 - (c) return
 - (d) `System.exit(0)`
- (vii) State the type of loop in the given program segment:
- ```
for (int i = 5; i != 0; i - = 2)
 System.out.println(i);
```
- (a) finite
  - (b) infinite
  - (c) null
  - (d) fixed

(viii)

Write a method prototype name **check()** which takes an integer argument and returns a char:

- (a) char check()
- (b) void check (int *x*)
- (c) check (int *x*)
- (d) char check (int *x*)

(ix)

The number of values that a method can **return** is:

- (a) 1
- (b) 2
- (c) 3
- (d) 4

(x)

Predict the output of the following code snippet: String P = "20", Q = "22";

```
int a = Integer.parseInt(P);
int b = Integer.valueOf(Q);
System.out.println(a+""+b);
```

- (a) 20
- (b) 20 22
- (c) 2220
- (d) 22

(xi)

The String class method to **join** two strings is:

- (a) concat(String)
- (b) <string>.joint(string)
- (c) concat(char)
- (d) Concat()

(xii)

The output of the function "COMPOSITION".substring(3, 6):

- (a) POSI
- (b) POS
- (c) MPO
- (d) MPOS

(xiii) `int x = (int) 32.8;` is an example of \_\_\_\_\_ typecasting.

- (a) implicit
- (b) automatic
- (c) explicit
- (d) coercion

(xiv) The code obtained after *compilation* is known as:

- (a) source code
- (b) object code
- (c) machine code
- (d) java byte code

(xv) Missing a semicolon in a statement is what type of error?

- (a) Logical
- (b) Syntax
- (c) Runtime
- (d) No error

(xvi) Consider the following program segment and select the output of the same when `n = 10` :

```
switch(n)
{case 10 : System.out.println(n*2);
case 4 : System.out.println(n*4); break;
default : System.out.println(n);
}
```

- (a) 20  
40
- (b) 10  
4
- (c) 20, 40
- (d) 10  
10

(xvii)

A method which does not *modify* the value of variables is termed as:

- (a) Impure method
- (b) Pure method
- (c) Primitive method
- (d) User defined method

(xviii)

When an object of a Wrapper class is converted to its corresponding primitive data type, it is called as \_\_\_\_\_.

- (a) Boxing
- (b) Explicit type conversion
- (c) Unboxing
- (d) Implicit type conversion

(xix)

The number of *bits* occupied by the value 'a' are:

- (a) 1 bit
- (b) 2 bits
- (c) 4 bits
- (d) 16 bits

(xx)

Method which is a part of a *class* rather than an instance of the class is termed as:

- (a) Static method
- (b) Non static method
- (c) Wrapper class
- (d) String method

## Question 2

(i)

Write the Java expression for  $(a + b)^x$ .

[2]

(ii)

Evaluate the expression when the value of  $x = 4$ :

[2]

$x * = - - x + x++ + x$

- (iii) Convert the following do...while loop to for loop: [2]
- ```
int x=10;  
do  
{x--;  
System.out.print(x);  
} while (x>=1);
```
- (iv) Give the output of the following Character class methods: [2]
- (a) Character.toUpperCase ('a')
- (b) Character.isLetterOrDigit('#')
- (v) Rewrite the following code using the if-else statement: [2]
- ```
int m= 400;
double ch = (m>300) ? (m / 10.0) * 2: (m / 20.0) - 2;
```
- (vi) Give the output of the following program segment: [2]
- ```
int n = 4279; int d;  
while(n>0)  
{d=n%10;  
System.out.println(d);  
n=n/100;  
}
```
- (vii) Give the output of the following String class methods: [2]
- (a) "COMMENCEMENT" . lastIndexOf('M')
- (b) "devote" . compareTo("DEVOTE")
- (viii) Consider the given array and answer the questions given below: [2]
- ```
int x[]={4,7,9,66,72,0,16};
```
- (a) What is the length of the array?
- (b) What is the value in x[4]?
- (ix) Name the following: [2]
- (a) What is an instance of the class called?
- (b) The method which has same name as that of the class name.

(x)

Write the value of  $n$  after execution:

[2]

```
char ch ='d';
```

```
int n = ch + 5;
```

### SECTION B (60 Marks)

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

*The answers 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.*

*Flowcharts and algorithms are not required.*

#### Question 3

[15]

Design a class with the following specifications:

Class name:

**Student**

Member variables:

name – name of student

age – age of student

mks –marks obtained

stream – stream allocated

(Declare the variables using appropriate data types)

Member methods:

void **accept()** – Accept name, age and marks using methods of Scanner class.

void **allocation()** – Allocate the stream as per following criteria:

| mks                    | stream                |
|------------------------|-----------------------|
| $\geq 300$             | Science and Computer  |
| $\geq 200$ and $< 300$ | Commerce and Computer |
| $\geq 75$ and $200$    | Arts and Animation    |
| $< 75$                 | Try Again             |

void **print()** – Display student name, age, mks and stream allocated.

Call all the above methods in main method using an object.

#### Question 4

[15]

Define a class to accept 10 characters from a user. Using **bubble sort** technique arrange them in ascending order. Display the sorted array and original array.

### Question 5

[15]

Define a class to overload the function **print** as follows:

void **print**()

to print the following format

```
1 1 1 1
2 2 2 2
3 3 3 3
4 4 4 4
5 5 5 5
```

void **print**(int n)

To check whether the number is a lead number. A lead number is the one whose sum of even digits are equal to sum of odd digits.

e.g. 3669      odd digits sum =  $3 + 9 = 12$

even digits sum =  $6 + 6 = 12$

3669 is a lead number.

### Question 6

[15]

Define a class to accept a String and print the number of digits, alphabets and special characters in the string.

Example: S = "KAPILDEV@83"

Output:    Number of digits – 2

            Number of Alphabets – 8

            Number of Special characters – 1

### Question 7

[15]

Define a class to accept values into a narray of double data type of size 20. Accept a double value from user and search in the array using **linear search** method. If value is found display message "Found" with its position where it is present in the array. Otherwise display message "not found".

### Question 8

[15]

Define a class to accept values in integer array of size10. Find sum of *one digit* number and sum of *two digit* numbers entered. Display them separately.

Example: Input:      a[ ] = {2, 12, 4, 9, 18, 25, 3, 32, 20, 1}

Output:      Sum of one digit numbers :  $2 + 4 + 9 + 3 + 1 = 19$

Sum of two digit numbers :  $12 + 18 + 25 + 32 + 20 = 107$





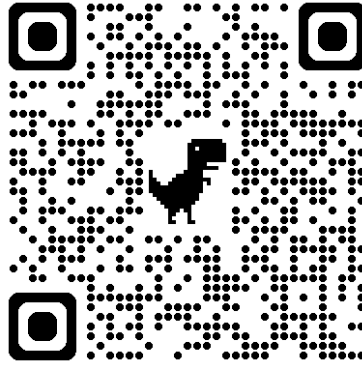
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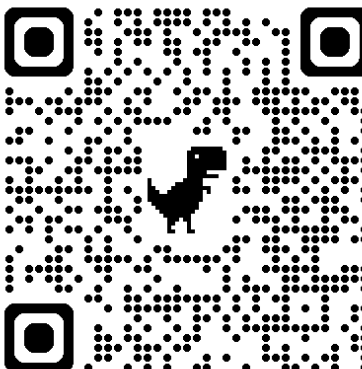
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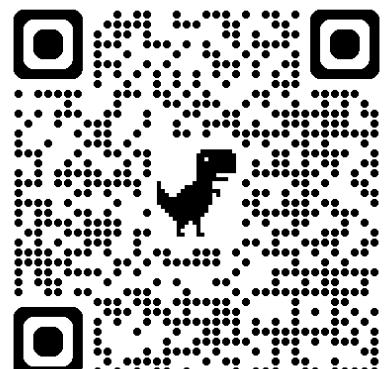
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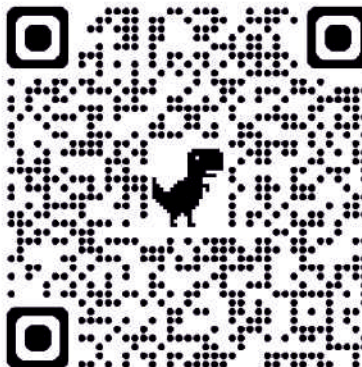
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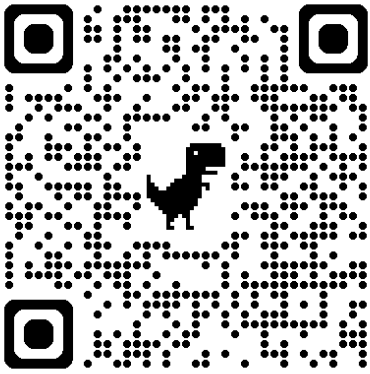




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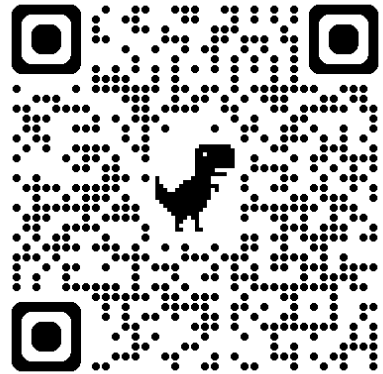
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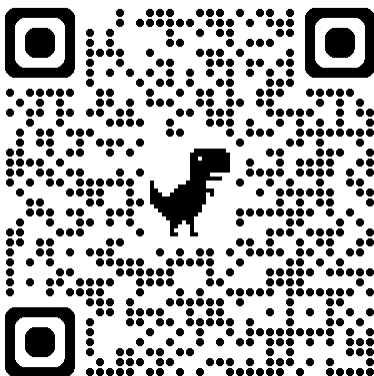
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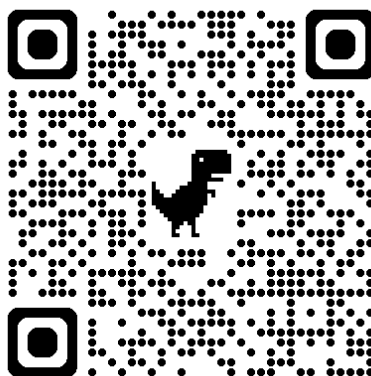
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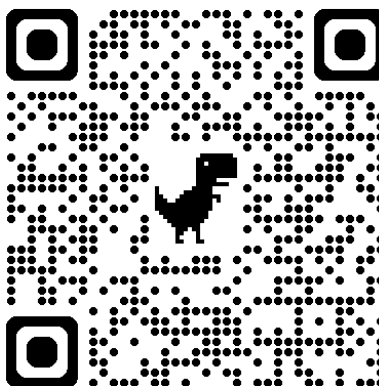
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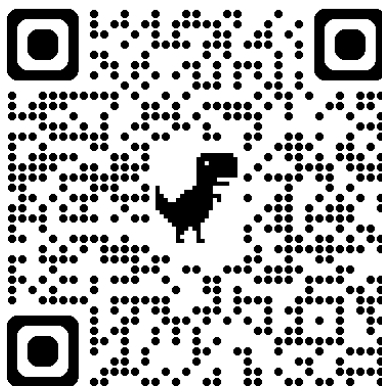
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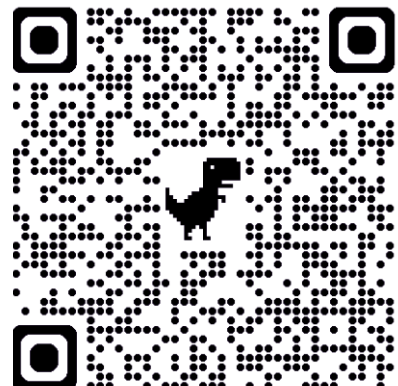
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