**Experts' Institute**
8-D, Kutchery Road Prayagraj. Ph:9415368884

**JAVA** Comp. Applications

**Python** Robotics & AI

St. Mary's Convent Inter College, Prayagraj
Preliminary Examination 2024 - 25

Time : 2hr.

**Class- 10**
**COMPUTER APPLICATIONS**

M.M. :100

Name : ........................................................    Roll No. ..........................    Date : ........................

*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.)*
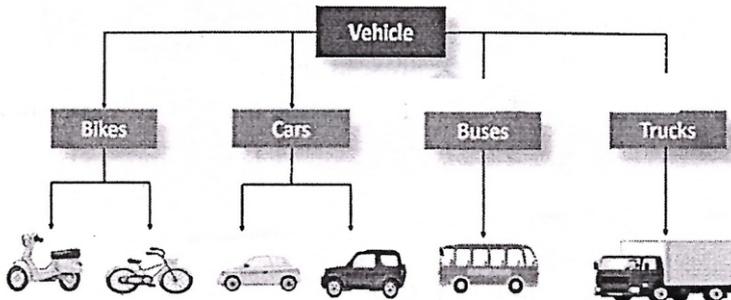
**Question 1:**                                                                                                  [20×1=20]
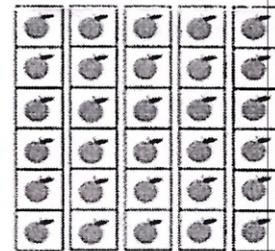
i)      What does the following diagram depict :



a)  Modularity
b)  Polymorphism
c)  Abstraction
d)  Inheritance

ii)     Name the given structure :

a)  Single Dimensional Array
b)  Double dimensional Array with 5 rows 6 columns
c)  Three-Dimensional Array
d)  Double Dimensional Array with 6 rows 5 columns



iii)    Which of the following returns a String?
        a)  length()          b)  charAt(int)          c)  replace(char,char)          d)  indexOf(char)

iv)     Consider the given array : char ch[ ] = { 'A', 'E', 'I', 'O', 'U'};
        What is the output of the following statement: System.out.println( ch[0]*2 );
        a)  65          b)  130          c)  'A'          d)  0

v)      A single dimensional array has 50 elements , which of the following is the correct statement to initialize the last element to 100.
        a)  X[51] = 100          b)  X[48] = 100          c)  X[49] = 100          d)  X[50] = 100

vi)     The method to convert a lowercase character to uppercase is:
        a)  String.toUpperCase( )                          b)  Character.isUpperCase( char )

        c)  Character.toUppercase( char )                d)  toUpperCase ( )

vii) Assertion ( A ) :Integer class can be used in a program without calling a package.
Reason ( R ): It belongs to the default package java.lang.
a) Both Assertion A and Reason R are true and Reason R is the correct explanation of the Assertion A
b) Both Assertion A and Reason R are true and Reason R is not the correct explanation of the Assertion A
c) Assertion A is true and Reason R is false
d) Assertion A is false and Reason R is true

viii) Assertion ( A ) : An array's size can dynamically change.
Reason ( R ): The size of the array has to be specified in the beginning while declaring it.
a) Both Assertion A and Reason R are true and Reason R is the correct explanation of the Assertion A
b) Both Assertion A and Reason R are true and Reason R is not the correct explanation of the Assertion A
c) Assertion A is true and Reason R is false
d) Assertion A is false and Reason R is true

ix) The statement used to find the total number of strings present in the string array String S[ ] is:
a) S.length    b) S.length( )    c) length( S )    d) len( S )

x) The output of the statement "talent".compareTo("tale") is :
a) 0    b) 110    c) 2    d) -2

xi) What method checks whether a character is a letter or digit?
a) isDigit( char )    b) isLetterOrDigit( char )
c) isLetterOrDigit( )    d) isLETTERorDIGIT( char )

xii) The number of bytes occupied by a character array of 4 rows and 3 columns is:
a) 12    b) 24    c) 36    d) 48

xiii) What is the output of the java code given below?
*String color[ ] = { "Blue". "Red", "Violet"};*
*System.out.println( color[2].indexOf( 'a' ));*
a) 1    b) 0    c) -1    d) Error

xiv) The system of automatic conversion oof an object of a wrapper class into its primitive data type is called _____.
a) Autoboxing    b) Reboxing    c) Unboxing    d) Preboxing

xv) Which of the following are composite data types:
1) static int a ;    2) Arr[ 4 ] = 21;    3) Student obj = new Student();    4) double val;

a) 1 and 2    b) 2 and 3    c) 3 and 4    d) All of them

xvi) Assertion ( A ) :Math.sqrt( ) cannot be used to find the square root of a negative number.
Reason ( R ): This function will result in NaN for a negative number.
a) Both Assertion A and Reason R are true and Reason R is the correct explanation of the Assertion A
b) Both Assertion A and Reason R are true and Reason R is not the correct explanation of the Assertion A
c) Assertion A is true and Reason R is false

d) Assertion A is false and Reason R is true

xvii) The following code is used to reverse a two-digit number, but it is jumbled up. Choose the correct sequence from the options :

(1) → *int z = y\*10 + x ;*
(2) → *int x = num / 10;*
(3) → *int num = 67;*
(4) → *int y = num − x \*10 ;*

    a) 1, 2, 3, 4       b) 3, 4, 1, 2       c) 3, 2, 1, 4       d) 3. 2, 4, 1

xviii) State the Exception that the following statement generates:
*char ch = "HOLIDAY".charAt(7) ;*
    a) No Exception is generated       b) NumberFormatException

    c) ArrayIndexOutOfBoundsException       d) StringIndexOutOfBoundsException

xix) Read the following extract and answer the question that follows :
*"Java provides entities called 'ACCESS MODIFIERS' that help us to restrict the scope or visibility of a package, class, constructor, method, variable or data member. They are also called 'VISIBILITY MODIFIERS' ".*
Which visibility modifier makes a class member only visible to the classes in the package and to the subclasses outside the package?
    a) Public       b) Private       c) Protected       d) Friendly

xx) State the maximum and minimum value generated by this code:
*int roll = 2 + (int)( Math.random()\*(7-2+1));*
    a) 2, 6       b) 1, 7       c) 2, 7       d) 1, 6

**Question 2:**

a) State the output for the following code : [2]

```
String s = "";
for( int x = 1 ; x < = 10 ; x ++)
{
    if (x % 2 != 0 )
      continue ;
    s = s + ( 10 − x ) + "@";
}
System.out.println( s );
```

b) Name the following: [4]
    (i) Makes several passes through an array, sorting it from back to front.
    (ii) Is used to search an element by dividing the array in halves.
    (iii) Keyword that allows execution of a method without the creation of an object
    (iv) Access Specifier that does not need a keyword

c) A student is trying to convert the string present in x to a numerical value, so that he can find the square root of the converted value. However, the code has an error. Name the error (syntax/logical/runtime). Correct the code so that it runs correctly. [2]

```
String x = "25";
int y = Double .parseDouble(x);
double r=Math.sqrt(y);
Sysem.out.println( r );
```

d) Consider the following code segment and answer the questions given below: [2]
*int x[ ] [ ] = { {2, 4, 5, 6 }, { 5, 7, 8, 1 }, { 34, 1, 10, 9 } };*

**Experts' Institute**
8-D, Kutchery Road Prayagraj. Ph:9415368884

JAVA Comp. Applications
Python Robotics & AI

(i)  What is the position of 34?

(ii)  What is the result of x[2][3] + x[1][2] ?

e)  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 "KING" , b = "KINGDOM";
    boolean x = a.compareTo( b );
    System.out.println( x );
}
```

f)  Consider the following and state the output of the code below : [2]
```
String x ="Computer Art Graphics" , y = "Artistic effects";
System.out.println( x.substring( 9, 12 )+ y.substring( 9 ).toUpperCase( ) );
```

g)  If y=10, then find z = (++y * (y++ + 5) ) [2]

h)  Convert following do-while loop into for loop. [2]
```
int i = 1; int d=5;
do
{ d=d*2;
  System.out.println(d);
  i++ ;
} while ( i<=5);
```

i)  Fill in the blanks : [2]

(i)  _____ keyword is used to refer to the current object.

(ii)  _____ is a 2-byte character code set used for internal representation of characters and Strings of different scripts.

## Section B( 60 marks)

Attempt any **four** questions from this section. A description of variables will be required with every program attempted.

**Question 3** [15]

Design a class *Sales* with the following description :

**Instance variables :**

*name, price, tunits, units , amt, net_amt* : to store the name of product, its price in decimals, total number of units of product in stock, total units to be purchased, amount to be paid in decimals, total amount to be paid

**Member Methods:**

Sales( … ) : Parameterized constructor to assign values to Data Members

void compute( ) :

➤  Calculate the total amount( amt = units*price ), if the total units of the product to be purchased are available in the stock

➤  Also a discount of 15% will be given if the total amount of purchase is more than 1 lakh

➤  Calculate the net amount to be paid by adding 4.5% tax on the amount after the discount

➤  Display the message "NOT AVAILABLE" if units to be purchased are more than the stock

➤  Also update the stock after reducing the units sold from the total

void show( ) : Displays the details of the product , net amount to be paid and current stock available

Write a main( ) to create an object to call the functions accordingly.

**Question 4** [15]

Write a program to specify the list of countries and the percentage of people owing computers in a subscripted variable. Using **Bubble sort** technique print the list in descending order of the percentage of people.

| Country | % of people with PC |
|---|---|
| India | 78.2 |
| Japan | 36.7 |
| USA | 89.7 |
| Germany | 42.3 |
| Singapore | 47.8 |
| UK | 37.8 |

**Question 5** [15]

Write a program to input 'n' integer elements in an array. Arrange the elements such that the smallest element is placed to the left side and the second smallest element to the right side and so on … until all the elements are placed.

For Example : Input : 25  36  15  2  26

        Output : 2  25  36  26  15

**Question 6** [15]

A natural number N is said to be a SMITH NUMBER if the sum of all the digits of N and the sum of all the digits of the prime factors of N are same.

For Example :

Input N : 666

Sum of all the digits = 18

Prime factors of N : 2, 3, 3, 37          Sum of the digits of prime factors = (2 +3+3+(3 + 7)) = 18

So 666 is a SMITH NUMBER.

Write a program to input a number and check whether it is a SMITH number or not.

**Question 7** [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 8** [15]

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

i) void STRING( String s, char ch ) – with one string argument and one character argument, prints the frequency of the character ch in the string s.

ii)void STRING( String s1, String s2 ) – with two string arguments , it displays the common characters in both the strings.

*****************************************