

**ICSE 2024 EXAMINATION
SPECIMEN QUESTION PAPER
COMPUTER APPLICATIONS
SOLUTION**

Prepared by Spondon Ganguli

*This Paper is divided into **two** Sections.*

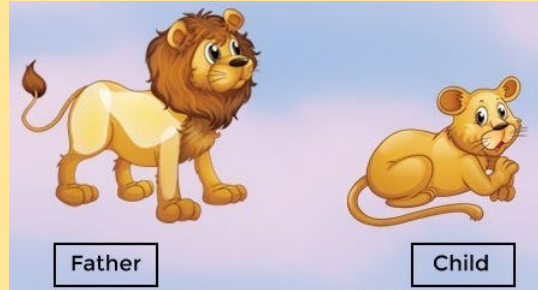
*Attempt **all** questions from **Section A** and **any**
four questions from **Section B**.*

SECTION A

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

Question 1.

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



(i) Name the feature of java depicted in the above picture.

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

Answer. (b) Inheritance

(Reason – In inheritance, the child inherits the properties of the parents, which is shown in the picture)

(ii) The expression which uses $> =$ operator is known as:

- (a) relational
- (b) logical
- (c) arithmetic
- (d) assignment

Answer. (a) relational

(Reason – greater than or equals to compare two operands and returns true or false, and thus it establishes a relation between the two operands)

(iii) Ternary operator is a:

- (a) logical operator
- (b) arithmetic operator
- (c) relational operator
- (d) conditional operator

Answer. (d) conditional operator

(Reason – the conditional operator is the only ternary operator in Java that works like an if-else statement and returns true or false)

(iv) When primitive data type is converted to a corresponding object of its class, it is called:

- (a) Boxing
- (b) Unboxing
- (c) explicit type conversion
- (d) implicit type conversion

Answer. (a) Boxing

(Reason – Automatic conversion of primitive data types into its equivalent Wrapper class object is known as boxing or autoboxing)

(v) The number of bytes occupied by a character array of 10 elements.

- (a) 20 bytes
- (b) 60 bytes
- (c) 40 bytes
- (d) 120 bytes

Answer. (a) 20 bytes

(Reason – 1 character occupies 2 bytes, so 10 characters will occupy 20 bytes)

(vi) The method of Scanner class used to accept a double value is:

- (a) nextInt()
- (b) nextDouble()
- (c) next()
- (d) nextInteger()

Answer. (b) nextDouble()

(vii) Among the following which is a keyword:

- (a) every
- (b) all
- (c) case
- (d) each

Answer. (c) case

(viii) The output of `Math.round(6.6) + Math.ceil(3.4)` is:

(a) 9.0

(b) 11.0

(c) 10.0

(d) 11

Answer. (b) 11.0

(Working: $7 + 4.0 = 11.0$)

(ix) Name the type of error, if any in the following statement:

```
System.out.print("HELLO")
```

- (a) logical
- (b) no error
- (c) runtime
- (d) syntax

Answer. (d) syntax

(Reason – the semicolon is missing at the end of the statement)

(x) Java statement to access the 5th element of an array is:

(a) X[4]

(b) X[5]

(c) X[3]

(d) X[0]

Answer. (a) X[4]

(Reason – index position starts from 0, so 5th element will be at index position 4)

(xi) The output of “Remarkable”.substring(6) is:

(a) mark

(b) emark

(c) marka

(d) able

Answer. (d) able

(Reason- substring(6) will extract characters starting from index position 6 to the end of the string)

(xii) Which of the following is the wrapper class for the data type char?

- (a) String
- (b) Char
- (c) Character
- (d) Float

Answer. (c) Character

(xiii) Name the package that contains wrapper classes:

(a) java.lang

(b) java.util

(c) java .io

(d) java.awt

Answer. (a) java.lang

(xiv) Constructor overloading follows which principle of Object Oriented programming?

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

Answer. (b) Polymorphism

(Reason- Function overloading or constructor overloading is an example of polymorphism)

(xv) Which of the following is a valid Integer constant:

1. 4
2. 4.0
3. 4.3f
4. “four”

(a) Only 1.

(b) 1. and 3.

(c) 2. and 4.

(d) 1. and 2.

Answer. (a) Only 1

(Reason – Integer data is a positive or negative whole number without decimal value)

(xvi) The method `compareTo()` returns _____ when two strings are equal and in lowercase :

(a) true

(b) 0

(c) 1

(d) false

Answer. (b) 0

(Reason- `compareTo()` method compares two strings and returns the ASCII difference of the first two dissimilar characters in the two strings)

(xvii) Assertion(A): In Java, statements written in lower case letters or upper case letters are treated as the same.

Reason(R): Java is a case-sensitive language.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a 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
- (a) Assertion (A) is false and Reason (R) is true

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

(Reason- Case sensitive means upper-case letters and lower-case letters are two different characters in Java)

(xviii) Read the following text, and choose the correct answer:

A class encapsulate Data Members that contain the information necessary to represent the class and Member methods that perform operations on the data member.

What does a class encapsulate?

- (a) Information and operation
- (b) Data members and Member methods
- (c) Data members and information
- (d) Member methods and operation

Answer. (b) Data members and Member methods.

(Reason- Encapsulation means wrapping up of data and functions into a single unit called class)

(xix) Assertion(A): call by value is known as a pure method

Reason(R): The original value of the variable does not change as operation is performed on copied values.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a 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 false and Reason (R) is true
- (a) Assertion (A) is false and Reason (R) is true

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

(xx) What Will be the output for:

```
System.out.print(Character.toLowerCase('1'));
```

- (a) 0
- (b) 1
- (c) A
- (d) True

Answer. (b) 1

(Reason- no change will take place as the character itself is in lowercase)

Question 2

(i)	Write the Java expression for $(p + q)^2$	[2]
(ii)	Evaluate the expression when the value of $x = 2$: $x = x ++ + ++ x + x$	[2]

Answer.

(i) `int r = (p+q)*(p+q);` or `double r = Math.pow(p+q,2);`

**(ii) `x = x++ + ++x + x, x=2`
`x = 2 + 4 + 4 = 10`**

(iii)

The following code segment should print "You can go out" if you have done your homework (dh) and cleaned your room(cr). However, the code has errors. Fix the code so that it compiles and runs correctly.

```
boolean dh = True;boolean cr= true;  
  
if (dh && cr)  
  
System.out.println("You cannot go out");  
  
else  
System.out.println("You can go out");
```

[2]

Correct code:

```
boolean dh=true;  
boolean cr=true;  
if(dh && cr)  
System.out.println("You can go out");  
else  
System.out.println("You cannot go out");
```

(iv)

Sam executes the following program segment and the answer displayed is zero irrespective of any non-zero values are given. Name the error. How the program can be modified to get the correct answer?

[2]

```
void triangle(double b, double h)
{
    double a;a = 1/2 * b * h;
    System.out.println("Area="+a);
}
```

Answer.

Logical error, since $\frac{1}{2}$ being integer division gives 0 as the answer, the complete answer comes to 0.0

Correct code:

a = (double)1/2 * b*h; or a=1.0/2.0 * b*h;

(v)

[2]

How many times will the following loop execute? What value will be returned?

```
int x=2;

int y=50;

do{
  ++x;

  y -= x++;

}while(x<=10);

return y;
```

Answer.

**The loop will run 5 times.
The value returned is 15**

X	Y	++X	Y -= X	X++	X<=10
2	50	3	47	4	TRUE
4	47	5	42	6	TRUE
6	42	7	35	8	TRUE
8	35	9	26	10	TRUE
10	35	11	15	12	FALSE

(vi)	Write the output of the following String methods: (a) "ARTIFICIAL ".indexOf('I') (b) "DOG and PUPPY".trim().length()	[2]
(vii)	Name any two jump statements.	[2]

Answer.

**(vi) (a) 3
(b) 13**

(vii) break and continue

(viii)

Predict the output of the following code snippet:

```
String a="20";  
String b="23";  
int p=Integer.parseInt(a);  
int q=Integer.parseInt(b);  
System.out.print(a+"*"+b);
```

[2]

Answer.

20*23

(ix)	<p>When there is no explicit initialization, what are the default values set for variables in the following cases?</p> <p>(a) Integer variable</p> <p>(b) String variable</p>	[2]
(x)	<pre>int P []={ 12,14,16,18}; int Q[]={ 20,22,24};</pre> <p>Place all elements of P array and Q array in the array R one after the other.</p> <p>(a) What will be the size of array R []?</p> <p>(a) Write index position of the first and last element?</p>	[2]

(ix) (a) 0
(b) null

(x) (a) 7
(b) Index position of the first element = 0
Index position of the last element = 6

SECTION B

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

Question 3

Define a class called with the following specifications:

Class name: Eshop

Member variables:

String name: name of the item purchased

double price: Price of the item purchased

Member methods:

void accept(): Accept the name and the price of the item using the methods of Scanner class.

void calculate(): To calculate the net amount to be paid by a customer, based on the following criteria:

void display(): To display the name of the item and the net amount to be paid. Write the main method to create an object and call the above methods.

Price	Discount
1000 – 25000	5.0%
25001 – 57000	7.5 %
57001 – 100000	10.0%
More than 100000	15.0 %


```
import java.util.Scanner;
class Eshop
{
    String name;
    double price;
```

```
    public void accept()
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the name and price of the item");
        name=sc.nextLine();
        price=sc.nextDouble();
    }
```

```
    public void calculate()
    {
        double dis;
        if(price<1000)
            dis=0.0;
        else if(price<=25000)
            dis=5.0*price/100;
        else if(price<=57000)
            dis=7.5*price/100;
        else if(price<=100000)
            dis=10.0*price/100;
        else
            dis=15.0*price/100;
```

```
double net=price-dis;
System.out.println("Discount="+dis+"\nNet amount="+net);
}

public void display()
{
    System.out.println("Name of the item="+name);
    System.out.println("Price of the item="+price);
    calculate();
}

public static void main(String args[])
{
    Eshop obj=new Eshop();
    obj.accept();
    obj.display();
}
}
```

Output:

Enter the name and price of the item

Laptop

35000

Name of the item=Laptop

Price of the item=35000.0

Discount=2625.0

Net amount=32375.0

Question 4.

Define a class to accept values in an integer array of size 10. Sort them in an ascending order using the selection sort technique. Display the sorted array.

Solution:

```
import java.util.*;
class SelectionSort
{
    public static void main(String ar[])
    {
        Scanner sc=new Scanner(System.in);
        int array[]=new int[10];
        int i,j,temp;
        System.out.println("Enter 10 elements for the array");
        for(i=0;i<10;i++)
        {
            array[i]=sc.nextInt();
        }
        for(i=0;i<9;i++)//outer loop of the sorting process
        {
            int small=array[i];           //assigning the key element for the sort
            int p=i;
```

```
for(j=i+1;j<10;j++)           //inner loop of the sorting process
{
    if(array[j]<small)         //finding the smallest element
    {
        small=array[j];
        p=j;
    }
}
temp=array[i];
array[i]=array[p];
array[p]=temp;
}
System.out.println("Array elements after the sorting:");
for(i=0;i<10;i++)
{
    System.out.print(array[i]+" ");
}
}
```

Output:

Enter 10 elements for the array

10 12 4 15 4 11 27 20 19 3

Array elements after the sorting:

3 4 4 10 11 12 15 19 20 27

Question 5. Define a class to accept a string and convert it into uppercase. Count and display the number of vowels in it.

Input: robotics

Output: ROBOTICS

Number of vowels: 3

Solution:

```
import java.util.Scanner;
class VowelCount
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter a word");
        String str=sc.next().toUpperCase();           //string converted to upper case
        int len=str.length();
        int count=0;

        for(int i=0;i<len;i++)
        {
            char c=str.charAt(i);                     //extracting each character from the string
            if(c=='A' || c=='E' || c=='I' || c=='O' || c=='U')
                count++;
        }
        System.out.println(str+"\nNumber of vowels: "+count);
    }
}
```

Question 6. Define a class to accept values into a 3×3 array and check if it is a special array. An array is a special array if the sum of the even elements = the sum of the odd elements.

Example:

```
A[][]={{ 4 ,5, 6}, { 5 ,3, 2}, { 4, 2, 5}};  
Sum of even elements = 4+6+2+4+2 =18  
Sum of odd elements= 5+5+3+5=18
```

Solution:

```
import java.util.*;  
class SpecialArray  
{  
    public static void main(String ar[])  
    {  
        Scanner sc=new Scanner(System.in);  
        int arr[][]=new int[3][3];  
        int i, j, even=0,odd=0;  
        System.out.println("Enter the elements for the array");  
        for(i=0;i<3;i++)  
        {  
            for(j=0;j<3;j++)  
            {  
                arr[i][j]=sc.nextInt();  
            }  
        }  
        for(i=0;i<3;i++) //outer loop for the rows  
        {  
            for(j=0;j<3;j++) //inner loop for the columns
```

```
{  
    if(arr[i][j]%2==0)                //checking for even elements  
        even+=arr[i][j];  
    else  
        odd+=arr[i][j];  
}  
}
```

```
System.out.println("Even elements sum="+even+"\nOdd elements sum="+odd);
```

```
if(even==odd)  
    System.out.println("It is a special array");  
else  
    System.out.println("It is not a special array");  
}  
}
```

Output:

Enter the elements for the array

4 5 6 5 3 2 4 2 5

Even elements sum=18

Odd elements sum=18

It is a special array

Question 7. Define a class to accept a 3-digit number and check whether it is a duck number or not. Note: A number is a duck number if it has zero in it.

Example 1: Input: 2083
Output: Invalid

Example 2: Input: 103
Output: Duck number

Solution:

```
import java.util.Scanner;
class DuckNumber
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter a 3-digit number");
        int n=sc.nextInt();
        if(n>=100 && n<=999)           //checking for 3-digit number
        {
            int m=n;//temporary storage for the loop
            int p=1;
            while(m>0)                 //loop for extracting digits from m
            {
                int r=m%10;           //extracting each digit from the number
                p*=r;                  //multiplying the digits
                m=m/10;                //storing the remaining number
            } //end of while loop block
        }
    }
}
```



```
        if(p==0)
            System.out.println("Duck number");
        else
            System.out.println("Not a duck number");
    } //end of outer if block
else
    System.out.println("Invalid number");
}
}
```

Question 8

Define a class to overload the method display as follows:

void display(): To print the following format using nested loop

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

void display(int n): To print the square root of each digit of the given number

Example: n = 4329

output – 3.0

1.414213562

1.732050808

2.0

Solution:

```
class Overload
{
    public void display()    //function without any parameter
    {
        for(int i=1; i<=5; i++) //outer loop for the rows
        {
            for(int j=1; j<=i; j++) //inner loop for the columns
            {
                System.out.print(j+" ");
            }
            System.out.println();
        }
    }
    public void display(int n) //function with one parameter
    {
        while(n>0) //loop to extract each digit from n
        {
            int r=n%10;
            System.out.println(Math.sqrt(r));
            n=n/10;
        }
    }
}
```

Thank You

For patience watching

&

All the best for your examinations.