ICSE 2023 EXAMINATION
SPECIMEN QUESTION PAPER
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 allowedfor writing the answers.

This Paper is divided into two Sections.

Allempt all questions from Section A and anyfour questions from Section B.

The intended marks for questions or parts ofquestions are given in brackets[].

SECTION A

(Attempt all questions from this Section.)

Question 1 [20]

Choose the correct answer and write the correct option.

(i) Wrapping up of data and methods together as one unit is termed as:

(a) Inheritance

(b) Polymorphism

(c) Encapsulation

(d) Abstraction

Answer:

(c) Encapsulation

(ii) The datatype which is specified that the method does not return a value is:

(a) Void

(b) void

(c) VOID

(d) boolean

Answer:

(b) void

(iii) The logical operator which is an unary operator:

(a) &&

(b) ||

(c) !

(d) >>

Answer:

(c) !

(iv) The Scanner class is a class.

(a) Primitive

(b) Derived

(c) Wrapper

(d) Super class

Answer:

(b) Derived (Pre-defined)

(v) Math.pow(625, 1/2) + Math.sqrt(144)

(a) 17.0

(b) 13.0

(c) 37.0

(d) 13.0

Answer:

(c) 13.0

(vi) The correct if statement for the following ternary operation statement is:

System.out.println(n%2 == 0? "true":"false");

(a)
```
if(n%2==0)
return true;
else
return false;
```

(b)
```
if(n%2==0)
return "true";
else
return "false";
```

(c)
```
if(n%2==0)
System.out.println("true");
else
System.out.println("false");
```

(d)
```
if(n%2==0)
System.out.println(true);
else
System.out.println(false);
```

Answer:

(c)
```
if(n%2==0)
System.out.println("true");
else
System.out.println("false");
```

(vii) Multiple branching statement of Java is:

(a) for

(b) while

(c) do... while

(d) switch

Answer:

(d) switch

(viii) The number of bytes occupied by the constant 45 are:

(a) Four bytes

(b) Two bytes

(c) Eight bytes

(d) One byte

Answer:

(d) One byte

(ix) do.. ...while loop is an

(a) entry controlled loop
(b) infinite loop
(c) exit controlled loop
(d) finite loop

Answer:

(c) exit controlled loop

(x) for(k=1;k<=2;k++)
{ for(m=l ;m<=4;m++)
{ System.out.println(m*2);
}
}

How many times the inner loop is executed?

(a) 4 times
(b) 8 times
(c) 2 times
(d) 16 times

Answer:

(b) 8 times

(xi) A method with the same name as of the class and with arguments and no return data type is turmed as:

(a) parameterized constructor
(b) default constructor
(c) non — parameterized constructor
(d) wrapper class method

Answer:

(a) parameterized constructor

(xii) int res='A'; What is the value of res?

(a) A
(b) 66
(c) 65
(d) 97

Answer:

(c) 65

(xiii) The style of expressing single line comment is:

(a) /* comment*/
(b) * comment
(c) // comment
(d) /* comment

Answer:

(c) //comment

(xiv) The method to check if a character is an alphabet or not is:

(a) isLetter(char)
(b) isAlpha(char)
(c) isUppercase(char)
(d) isLowercase(char)

Answer:

(a) isLetter(char)

(xv) The output of Double.parseDouble("71.25") +0.75 is:

(a) 72
(b) 72.0
(c) 71.0
(d) 71.75

Answer:

(b) 72.0

(xvi) The method to convert a string to upper case is:

(a) toUpperCase(char)
(b) toUPPERCASE(String)
(c) toUpperCase()
(d) toUpperCase(String)

Answer:

(c) toUpperCase()

(xvii) The output of the method "DETERMINATION".substring(2, 6) is:

(a) "TERM"
(b) term
(c) "Term"
(d) "TERMI"

Answer:

(a) TERM

(xviii) The array int x[10] occupies:

(a) 10 bytes
(b) 40 bytes
(c) 20 bytes
(d) 80 bytes

Answer:

(b) 40 bytes

(xix) The element in x[4] of the array {3, 5, 7, 12, 16, 18, 20, 35, 42, 89} is:

(a) 16
(b) 12
(c) 7
(d) 18

Answer:

(a) 16

(xx) Name the type of error that occurs for the following statement:
System.out.println(Math.sqrt(24 - 25));

(a) Syntax error
(b) run time error
(c) logical error
(d) no error

Answer:

(d) No error (NaN)

Question 2

(i) Evaluate the expression: [2]

Z += a++ +--b + ++a + --b;

where a=10, b=5, Z=10

Answer:

39

(ii) Write Java expression for: $|x^2 + xy|$ [2]

Answer:

Math.abs(Math.pow(x,2)+x*y)

(iii) Rewrite the following using ternary operators: [2]

```
if(x>y)
else
c= ‘A’;
else
c= ‘a’;
```

Answer:

c=x>y? ‘A’ : ‘a’;

(iv) Rewrite the following using for loop: [2]

```
int x=5;
while(x<=5)
{
x++;
}
System.out.println(x);
```

Answer:

```
int x=5;
for( ; x<=5; x++)
{
}
System.out.println(x);
```

(v) How many time the following loop will gets executed?

What is the output of the same? [2]

```
int counter=1;
do
{
System.out.println(counter);
}
while(counter++<>5);
```

Answer:

The loop will gets executed: 5 times

The output:

1
2
3
4
5

(vi) "MISSISSIPPI".replace('S',t).toLowerCase() [2]

Answer:

mittittippi

(vii) "REDUCE".compareTo("REVOLT")+ "ANTARTICA".lastIndexOf('A') [2]

Answer:

-10

(viii) Define boxing with an example. [2]

Answer:

Converting a primitive value like int to reference value and store into its correspoding wrapper class like Integer is boxing.

Eg: int a=5; Integer x = new Integer(a);

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

```
class sample
{   int a, b;
    sample(int x, int y)
    {   a=x; b=y;
    }
    void calculate()
    {   int z;
        z = a+b;
        System.out.println(z);
    }
}
```

(a) Name the global variables.

(b) What are the method variables?

Answer:

(a) int a, b;

(b) int z; (local variable). int x, int y (method argument variable)

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

int x [ ] = {23, 45, 67, 12, 45, 89, 24, 12, 9, 7}

(a) What is the size of the array?

(b) What is the position of 89?

Answer:

(a) 10 bytes

(b) Position 6. Index: 5

SECTION B

Question 3 [15]

Define a class with the following specifications:

Class name:	employee
Member variables:	eno – employee number
	ename — name of the employee
	age — age of the employee
	basic — basic salary
	[Declare the variables using appropriate data types]
Member methods:	
void accept() -	accept the details using Scanner class
void calculate() -	to calculate the net salary as per the given specifications
	net = basic+da+hra – pf
	hra = 18% of basic
	da = 17.45% of basic
	pf = 8.10% of basic
	if the age of the employee is above 50 he/she
	gets an additional allowance of Rs. 5000/-
void print() -	to print the details as per the given format:
	eno name age basic net
void main() –	to create an object of the class and invoke the methods

```
import java.util.*;
public class employee
{
    int eno;
    String ename;
    int age;
    double basic;
    public static void accept()
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter number, name, age and basic of an employee");
        eno=sc.nextInt();
        ename=sc.nextLine();
        age=sc.nextInt();
        basic=sc.nextDouble();
    }
    public void calculate()
    {
        double hra,da,pf,net;
        hra=18/100.0*basic;
        da=17.45/100*basic;
        pf=8.1/100*basic;
        net=basic+hra+da-pf;
        if(age>50)
            net=net+5000.0;
    }
    public void print()
    {
        System.out.println("Eno\tName\tAge\tBasic\tNet");
        System.out.println(eno+"\t"+ename+"\t"+age+"\t"+basic+"\t"+net);
    }
    public static void main()
    {
        employee ob=new employee();
        ob.accept();
        ob.calculate();
        ob.print();
    }
}
```

Variable Description

Variable	Datatype	Description
eno	int	To store employee number
ename	String	To store employee name
age	int	To store age
basic	double	To store basic salary

Question 4 [15]

Define a class to overload the method print as follows:
void print() – to print the format:
1
2 3
4 5 6
7 8 9 10
boolean print(int n) – to check whether the number is a Dudeny number
A number is a Dudeney number if cube of sum of digits of the number is equal to the number itself.
Eg: $512 = (5+1+2)^3 = 8^3 = 512$
void print(int a, char ch) – if ch = s or S print the square or print the cube of the number.

```
import java.util.*;
public class Overload
{
    public static void print()
    {
        int k=1;
        for(int i=1;i<=4;i++)
        {
            for(int j=1;j<=i;j++)
                System.out.print(k++ + "   ");
            System.out.println();
        }
    }
    public boolean print(int n)
    {
        int i=n,d,s=0;
        while(i>0)
        {
            d=i%10;
            s=s+d;
            i=i/10;
        }
        if(s*s*s==n)
            return true;
        else
            return false;
    }
    public void print(int a,char ch)
    {
        if(ch== 's'||ch== 'S')
            System.out.println("Square: "+a*a);
        else
            System.out.println("Cube: "+a*a*a);
    }
```

```
    public static void main()
    {
        Scanner sc=new Scanner(System.in);
        print();
        System.out.println("Enter a number");
        int n=sc.nextInt();
        print(n);
        System.out.println("Enter a number and a character");
        int a=sc.nextInt();
        char ch=sc.next().charAt(0);
        print(a,ch);
    }
}
```

Variable Description

Variable	Datatype	Description
i, j, k	int	To print series
n, i, d, s	int	To check Dudeney number
a	int	To accept a number to print square or cube
ch	char	To accept a character to check to print square or cube

Question 5 [15]

Define a class to accept 10 integers and arrange them in descending order using bubble sort. Print the original array and the sorted array.

```
import java.util.*;
public class Integers
{
    public static void main()
    {
        Scanner sc=new Scanner(System.in);
        int a[] = new int [10];
        int i,j,temp;
        for(i=0;i<10;i++)
        {
            System.out.println("Enter integer");
            a[i]=sc.nextInt();
        }
        System.out.println("Original Array");
        for(i=0;i<10;i++)
            System.out.print(a[i]+"\t");
        for(i=0;i<10-1;i++)
        {
            for(j=0;j<10-1-i;j++)
            {
                if(a[j]<a[j+1])
                {
                    temp=a[j];
                    a[j]=a[j+1];
                    a[j+1]=temp;
                }
            }
        }
```

```
        System.out.println("Sorted Array");
        for(i=0;i<10;i++)
            System.out.print(a[i]+"\t");
    }
}
```

Variable Description

Variable	Datatype	Description
a	int	Array to store integers
i, j, temp	int	To generate array index and sort array elements

Question 6 [15]

Define a class to accept values into a double array of size 20 and print the range of the array, range is the difference between the largest and the smallest elements of the array.

```
import java.util.*;
public class Array
{
    public static void main()
    {
        Scanner sc=new Scanner(System.in);
        double a[] = new double[20];
        int i;
        for(i=0;i<20;i++)
        {
            System.out.println("Enter number");
            a[i]=sc.nextDouble();
        }
        double large=a[0], small=a[0];
        for(i=0;i<20;i++)
        {
            if(a[i]>large)
                large=a[i];
            else if(a[i]<small)
                small=a[i];
        }
        double range=large-small;
        System.out.println("Largest: "+large);
        System.out.println("Smallest: "+small);
        System.out.println("Range: "+range);
    }
}
```

Variable Description

Variable	Datatype	Description
a	double	Array to store numbers
i	int	To generate array index
large, small	double	To store largest and smallest elements
range	double	To store range or the array

Question 7 [15]

Define a class to accept a string and print it in reverse, also print number of vowels in the string.

Eg : S = "BEAUTIFUL" Output- "LUFITUAEB"

No. of vowels = 5

```
import java.util.*;
public class Strings
{
    public static void main()
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter a string");
        String s=sc.nextLine();
        s=s.toUpperCase();
        String rev= "";
        int l= s.length();
        int c=0;
        for(int i=l-1;i>=0;i--)
        {
            char ch=s.next().charAt(0);
            rev=rev+ch;
            if(ch== 'A'|| ch== 'E'|| ch== 'I'|| ch== 'O'|| ch== 'U')
                c++;
        }
        System.out.println("Reverse: "+rev);
        System.out.println("No. of vowels: "+c);
    }
}
```

Variable Description

Variable	Datatype	Description
s	String	To accept a string
rev	String	To sore reverse
l	int	To store length
i	int	To generate index
c	int	To count vowels

Question 8 [15]

Define a class to accept the names of 10 students in an array and check for the existence of the given name in the array using linear search, if found print the position of the name, if not found print the appropriate message. Also print the names which begins with the word "SRI".

```
import java.util.*;
public class Array
{
    public static void main()
    {
        Scanner sc=new Scanner(System.in);
        String name[] = new String[10];
        int i;
        System.out.println("Enter names in capital letters");
        for(i=0;i<10;i++)
        {
            name[i]=sc.nextLine();
        }
        System.out.println("Enter a search name");
        sname=sc.nextLine();
        boolean flag=false;
        for(i=0;i<10;i++)
        {
            if(name[i].equalsIgnoreCase(sname))
            {
                flag=true;
                break;
            }
        }
        if(flag==true)
            System.out.println("Name found at position : "+(i+1));
        else
            System.out.println("Searched name not found");
        System.out.println("Names begins with SRI");
        for(i=0;i<10;i++)
        {
            if(name[i].startsWith("SRI"))
                System.out.println(name[i]);
        }
    }
}
```

Variable Description

Variable	Datatype	Description
name	String	Array to store names
sname	String	To store search name
i	int	To generate index
flag	boolean	To store search result (true/false)