

ICSE Paper 2018

Computer Applications

General Instructions:

- 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 [].
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Section-A [40 MARKS]

(Attempt ALL Questions)

Question 1.

- Define abstraction.
- Differentiate between searching and sorting.
- Write a difference between the functions `isUpperCase()` and `toUpperCase()`.
- How are private members of a class different from public members ?
- Classify the following as primitive or non-primitive data types :
 - char
 - arrays
 - int
 - classes

Solution:

- Abstraction is a process of hiding the implementation details and showing only functionality to the user.
- Searching is a technique which is used to search a particular element in an array or string. Sorting is a technique which is used to rearrange the elements of an array or string in a particular order either ascending or descending.
- The `isUpperCase()` method is used to check whether the given character is in upper case or not. It returns Boolean data type.

The toUpperCase() method is used to convert a character or string into upper case. It returns char or String type. •

(d) Scope of the private members is within the class whereas scope of the public members is global.

- (e) (i) char is primitive data type.
- (ii) arrays are non-primitive data type.
- (iii) int is primitive data type.
- (iv) classes are non-primitive data type.

Question 2.

(a) (i) int res = 'A'; [2]

What is the value of res ?

(ii) Name the package that contains wrapper classes.

(b) State the difference between while and do while loop. [2]

(r) System.out.print("BEST"); [2]

System.out.println("OF LUCK");

Choose the correct option for the output of the above statements

(i) BEST OF LUCK

(ii) BEST

OF LUCK

(d) Write the prototype of a function check which takes an integer as an argument and returns a character. [2]

(e) Write the return data type of the following function. [2]

(i) endsWith()

(ii) log()

Solution:

(a) (i) Value of res is 65.

(ii) Java.lang

(b)

| <i>while</i> | <i>do-while</i> |
|---|---|
| (i) The statements can be executed. | (i) The loop executes the statement at least once. |
| (ii) The condition is tested before execution | (ii) The condition is tested after execution. |
| (iii) The loop terminates if the condition becomes false. | (iii) If the condition is false, the computer keeps executing the loop. |

(c) (i) BEST OF LUCK is the correct option.

- (c) char check(int x)
- (e) (i) Boolean
- (ii) double

Question 3.

(a) Write a Java expression for the following :

$$\frac{\sqrt{3x+x^2}}{a+b}$$

(b) What is the value of y after evaluating the expression given below ?
`y += ++y+y-- -y;` when `int y=8`

(c) Give the output of the following : [2]

(i) `Math.floor(-4.7)`

(ii) `Math.ceil(3.4) + Math.pow(2,3)`

(d) Write two characteristics of a constructor. [2]

(e) Write the output for the following : [2]

`System.out.println("Incredible" + "\n" + "world");`

(f) Convert the following if else if construct into switch case [2]

`if (var == 1)`

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

`else if (var == 2)`

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

`else if (var == 3)`

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

`else`

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

(g) Give the output of the following string functions : [2]

(i) `"ACHIEVEMENT".replace('E', 'A')`

(ii) `"DEDICATE".compareTo("DEVOTE")`

(h) Consider the following String array and give the output [2]

`String arr[] = {"DELHI", "CHENNAI", "MUMBAI", "LUCKNOW", "JAIPUR"};`

`System.out.println(arr[0].length() > arr[3].length());`

`System.out.print(arr[4], substring(0,3));`

(i) Rewrite the following using ternary operator : [2]

`if (bill > 10000)`

`discount = bill * 10.0/100;`

`else`

`discount = bill * 5.0/100;`

(i) Give the output of the following program segment and also mention how many times the loop is executed : [2]

```
int i;
for (i = 5; i > 10; i++)
System.out.println(i);
System.out.println(i*4);
```

Solution:

(a) $\text{Math.sqrt}(3 * x + \text{Math.pow}(x, 2)) / (a + b)$;

(b) $8 + (9 + 9 + 7) = 8 + 25 = 33$

(c) $(0 - 5.0)$ (it) 12.0

(d) (i) Constructor has the same name as of class.

(ii) Constructor gets invoked when an object is created.

(e) Incredible

world

(f) `switch () {`

case 1:

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

`break; .`

case 2:

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

`break;`

case 3:

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

`break;`

`}`

(g) (i) ACHIAVAMANT

(ii) - 18

(h) false (at index 0, DELHI consists of 5 characters, at index 3, LUCKNOW consists of 7 characters. Therefore $5 > 7$ is false)

JAI (at index 4, JAIPUR exists and extract its three characters)

(i) $\text{discount} = \text{bill} > 100 ? \text{bill} * 10.0 / 100 : \text{bill} * 5.0 / 100$;

(j) 20. Loop will be executed for 0 times.

Section-B [60 Marks]

Attempt any four questions from this Section

The answers in this Section should consist of the Programs in either Blue J environment
or any

program environment with Java as the base.

Each program should be written using Variable descriptions/Mnemonic Codes so that
the logic of

the program is clearly depicted.

Flow-Charts and Algorithms are not required.

Question 4.

Design a class Railway Ticket with following description : [15]

Instance variables/s data members :

String name : To store the name of the customer

String coach : To store the type of coach customer wants to travel

long mobno : To store customer's mobile number

int amt : To store basic amount of ticket

int totalamt : To store the amount to be paid after updating the original amount

Member methods

void accept () – To take input for name, coach, mobile number and amount

void update () – To update the amount as per the coach selected

| Type of Coaches | Amount |
|-----------------|--------|
| First_ AC | 700 |
| Second_AC | 500 |
| Third _AC | 250 |
| sleeper | None |

void display() – To display all details of a customer such as name, coach, total amount and mobile number.

Write a main method to create an object of the class and call the above member methods.

Solution:

```
import java.io.*;
import java.util.Scanner; class RailwayTicket {
String name, coach;
long mobno;
int amt, totalamt;
void accept( ) throws IOException {
Scanner sc = new Scanner(System.in);
System.out.print("Enter Passenger's Name: ");
name = sc.next();
System.out.print("Enter Mobile Number:");
mobno = sc.nextInt();
System.out.print("Enter Coach (FirstAC/SecondAC/ThirdAC/sleeper):");
```

```

coach = sc.next( );
System.out.print("Enter basic amount of ticket.");
amt = sc.next( );
}
void update() {
if (coach.equals("First_AC"))
totalamt = amt + 700;
else
if (coach.equals("Second_AC"))
totalamt = amt + 500; .
else
if (coach.equals("Third_AC"))
totalamt = amt + 250;
else
totalamt = amt;
}
void display() {
System.out.println("\n\n Name : " +name);
System.out.println("Coach : " +coach);
System.out.println("Total Amount: " +totalamt);
System.out.println("Mobile No.: " +name);
}
public static void main (String args[ ]) throws IOException {
RailwayTicket t = new RailwayTicket();
t.accept();
t.update();
t.display();
}
}

```

Question 5.

Write a program to input a number and check and print whether it is a Pronic number [15] or not. (Pronic number is the number which is the product of two consecutive integers)

Examples : $12 = 3 \times 4$.
 $20 = 4 \times 5$
 $42 = 6 \times 7$

Solution:

```

import java.io.*;
import java.util. Scanner;
class Pronic]

```

```

public static void main(String argsQ) throws IOException {
Scanner sc = new Scanner(System.in);
System.out.print("Enter the number: ");
int n = sc.nextInt();
int i = 0;
while(i * (i + 1) < n) {
i++;
}
if(i *(i + 1) == n){
System.out.println(n + " is a Pronic Number.");
}
else {
System.out.println(n + " is not a Pronic Number.");
}
}
}
}

```

Question 6.

Write a program in Java to accept a string in lower case and change the first letter of every word to upper case. Display the new string. [15]

Sample input: we are in cyber world

Sample output : We Are In Cyber World

Solution:

```

import java.io.*;
import java.util.Scanner;
class ChangeLetter {
public static void main(String args[ ]) throws IOException {
Scanner sc = new Scanner(System.in);
System.out.print("Enter String in lowercase:");
String str 1 = sc.next( );
str1 = "" +str1;
String str2 = " ";
for (int i = 0; i<str1.length( ); i+ +) {
if(str1 ,charAt(i) == " ") {
str2 = str2 + " " +Character. toUpperCase(str1.charAt(i+l));
i+ + ;
}
else
str2= str2 + str1.charAt(i);
}
System.out.println(str2.trim( ));
}
}
}

```

```
}  
}
```

Question 7.

Design a class to overload a function volume() as follows : [15]

(i) double volume (double R) – with radius (R) as an argument, returns the volume of sphere using the formula.

$$V = \frac{4}{3} \times \frac{22}{7} \times R^3$$

(ii) double volume (double H, double R) – with height(H) and radius(R) as the arguments, returns the volume of a cylinder using the formula.

$$V = \frac{22}{7} \times R^2 \times H$$

(iii) double volume (double L, double B, double H) – with length(L), breadth(B) and Height(H) as the arguments, returns the volume of a cuboid using the formula.

Solution:

```
class ShapesVolume {  
    public static double volume (double R) {  
        double V = 4.0 / 3, * 22.0 / 7 * Math.pow(R, 3);  
        return V;  
    }  
    public static double volume(double H, double R) {  
        double V = 22.0 / 7 * R * R * H ;  
        return V;  
    }  
    public static double volume (double L, double B, double H) {  
        double V = L * B * H;  
        return V;  
    }  
}
```

Question 8.

Write a menu driven program to display the pattern as per user's choice. [15]

| Pattern 1 | Pattern 2 |
|------------------|------------------|
| ABCDE | B |
| ABCD | LL |
| ABC | UUU |
| AB | EEEE |
| A | |

For an incorrect option, an appropriate error message should be displayed.

Solution:

```
import java.io.*;
import java.util.Scanner;
class Pattern {
public static void main(String args[]) throws IOException {
Scanner sc = new Scanner(System.in);
System.out.println(":::MENU:::")
System.out.println(" 1. To display ABCD Pattern");
System.out.print(" 2. To display Word Pattern");
System.out.print("Enter your choice:");
int ch= sc.nextInt();
switch(ch) {
case 1:
for (char i = 'E'; i >= 'A'; i--){
for(char j = 'A';j <=i;j ++){
System.out.print(j);
}
System.out.println();
}
break;
case 2:
String S = "BLUE";
for (int i = 0; i < S.length(); i+ +) {
for(int j = 0; j < =i; j + +) {
System.out.print(S.charAt(i));
}
System.out.println();
}
break;
default:
System.out.println("Invalid Input");
break;
}
}
}
```

Question 9.

Write a program to accept name and total marks of N number of students in two single subscript array name[] and total marks[]. [15]

Calculate and print:

(i) The average of the total marks obtained by N Number of students.

[average = (sum of total marks of all the students)/N]
(ii) Deviation of each student's total marks with the average.
[deviation = total marks of a student – average] ‘

Solution:

```
import java.io.*;
import java.util. Scanner;
class NameMarks {
public static void main(String args0) throws IOException {
Scanner sc = new Scanner(System.in);
System.out.print("Enter number of students:");
int N = sc.nextInt( );
String name[] = new String[N];
int totalmarks[] = new int[N];
double deviation[ ] = new double[N];
double sum = 0;
for (int i = 0; i < N; i+ +) {
System.out.print("Enter Name of the Student:");
name[i] = sc.next( );
System.out.print("Enter Marks:");
totalmarks[i] = sc.nextInt();
sum = sum + totalmarks [i];
}
double average = sum / N;
System.out.println("The average of the total marks of " +N+" number of students:"
+average);
for (int i = 0; i < N; i+ +) {
deviaddon[i] = total marks (i) – average;
System.out.println("Deviation of" + name[i] + "s marks with the average:" +deviation[i]);
}
}
}
```