

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 str1 = 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+1));
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

ABCDE

ABCD

ABC

AB

A

Pattern 2

B

LL

UUU

EEEE

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 named = new String[N];
int totalmarksG = 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.nextInt0;
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]);
}
}
}
```