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**COMPUTER APPLICATIONS****(Theory)****(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 allowed for writing the answers.*

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*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.**

- (a) Define abstraction. [2]
- (b) Differentiate between searching and sorting. [2]
- (c) Write a difference between the functions `isUpperCase( )` and `toUpperCase( )`. [2]
- (d) How are private members of a class different from public members? [2]
- (e) Classify the following as primitive or non-primitive datatypes: [2]
  - (i) `char`
  - (ii) `arrays`
  - (iii) `int`
  - (iv) `classes`

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**This Paper consists of 6 printed pages.**

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**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]

- (c) `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()`

**Question 3.**

- (a) Write a Java expression for the following: [2]

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

- (b) What is the value of **y** after evaluating the expression given below? [2]

`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;`
- (j) Give the output of the following program segment and also mention how many [2]  
times the loop is executed:  
`int i;  
for ( i = 5 ; i > 10; i ++ )  
System.out.println( i );  
System.out.println( i * 4 );`

**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 **RailwayTicket** with following description: [15]

Instance variables/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

(extra amount to be added in the amount as follows)

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.

**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:  $12 = 3 \times 4$

$$20 = 4 \times 5$$

$$42 = 6 \times 7$$

**Question 6.**

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

Sample input: we are in cyber world

Sample output: We Are In Cyber World

**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.

$$V = L \times B \times H$$

**Question 8.**

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

Pattern 1	Pattern 2	[15]
ABCDE	B	
ABCD	LL	
ABC	UUU	
AB	EEEE	
A		

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

**Question 9.**

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