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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) Name any two basic principles of Object-oriented Programming. [2]
- (b) Write a difference between **unary** and **binary** operator. [2]
- (c) Name the keyword which: [2]
- (i) indicates that a method has no return type.
- (ii) makes the variable as a class variable.
- (d) Write the memory capacity (storage size) of **short** and **float** data type in bytes. [2]
- (e) Identify and name the following tokens: [2]
- (i) public
- (ii) 'a'
- (iii) ==
- (iv) { }

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

**Question 2.**

- (a) Differentiate between **if else if** and **switch-case** statements. [2]
- (b) Give the output of the following code: [2]
- ```
String P = "20", Q = "19";  
int a = Integer.parseInt(P);  
int b = Integer.valueOf(Q);  
System.out.println(a+""+b);
```
- (c) What are the various types of errors in Java? [2]
- (d) State the data type and value of **res** after the following is executed: [2]
- ```
char ch = '9';  
res= Character.isDigit(ch);
```
- (e) What is the difference between the **linear** search and the **binary** search technique? [2]

**Question 3.**

- (a) Write a Java expression for the following: [2]
- $$|x^2 + 2xy|$$
- (b) Write the return data type of the following functions: [2]
- (i) `startsWith()`
  - (ii) `random()`
- (c) If the value of **basic**=1500, what will be the value of **tax** after the following statement is executed? [2]
- ```
tax = basic > 1200 ? 200 : 100;
```
- (d) Give the output of following code and mention how many times the loop will execute? [2]
- ```
int i;  
for( i=5 ; i>=1 ; i-- )  
{  
    if(i%2 == 1)  
        continue;  
    System.out.print( i+ " ");  
}
```

- (e) State a difference between call by value and call by reference. [2]
- (f) Give the output of the following: [2]  
`Math.sqrt(Math.max(9,16))`
- (g) Write the output for the following: [2]  
`String s1 = "phoenix"; String s2 = "island" ;`  
`System.out.println (s1.substring(0).concat (s2.substring(2) ) );`  
`System.out.println(s2.toUpperCase());`
- (h) Evaluate the following expression if the value of  $x=2$ ,  $y=3$  and  $z=1$ . [2]  
 $v=x+ --z+ y++ +y$
- (i) `String x[] = { "Artificial intelligence", "IOT", "Machine learning", "Big data" };` [2]  
 Give the output of the following statements:  
 (i) `System.out.println(x[3]);`  
 (ii) `System.out.println(x.length);`
- (j) What is meant by a package? Give an example. [2]

### 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 name **ShowRoom** with the following description: [15]

Instance variables / Data members:

- |             |   |  |
|-------------|---|--|
| String name | - | To store the name of the customer          |
| long mobno  | - | To store the mobile number of the customer |
| double cost | - | To store the cost of the items purchased   |
| double dis  | - | To store the discount amount               |

double amount    -    To store the amount to be paid after discount

Member methods:

ShowRoom( )    -    default constructor to initialize data members

void input( )    -    To input customer name, mobile number, cost

void calculate( )    -    To calculate **discount** on the **cost** of purchased items, based on following criteria

Cost	Discount (in percentage)
Less than or equal to ₹ 10000	5%
More than ₹ 10000 and less than or equal to ₹ 20000	10%
More than ₹ 20000 and less than or equal to ₹ 35000	15%
More than ₹ 35000	20%

void display( )    -    To display customer name , mobile number , amount to be paid after discount.

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

### Question 5.

Using the **switch-case** statement, write a menu driven program to do the following: [15]

(a) To **generate** and print Letters from A to Z and their Unicode

Letters	Unicode
A	65
B	66
.	.
.	.
.	.
Z	90

(b) Display the following pattern using **iteration** (looping) statement:

```

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

```

### Question 6.

Write a program to input **15** integer elements in an array and sort them in **ascending** [15]  
order using the **bubble** sort technique.

### Question 7.

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

(a) void series (int x, int n) – To display the sum of the series given below:

$$x^1 + x^2 + x^3 + \dots x^n \text{ terms}$$

(b) void series (int p) – To display the following series:

$$0, 7, 26, 63 \dots p \text{ terms}$$

(c) void series ( ) – To display the sum of the series given below:

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} \dots \frac{1}{10}$$

### Question 8.

Write a program to input a **sentence** and convert it into uppercase and count and [15]  
display the total number of words starting with a letter 'A'.

Example:

Sample Input: ADVANCEMENT AND APPLICATION OF INFORMATION  
TECHNOLOGY ARE EVER CHANGING.

Sample Output: Total number of words starting with letter 'A' = 4.

**Question 9.**

A **tech number** has even number of digits. If the number is split in two equal halves, [15]  
then the square of sum of these halves is equal to the number itself. Write a program  
to generate and print all four digits tech numbers.

Example:

Consider the number 3025

$$\begin{aligned}\text{Square of sum of the halves of 3025} &= (30+25)^2 \\ &= (55)^2 \\ &= 3025 \text{ is a tech number.}\end{aligned}$$

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