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.

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[ ].

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) { }

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** order using the **bubble** sort technique. [15]

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:

$x^1 + x^2 + x^3 + \ldots\ldots\ldots\ldots\ldots x^n$ terms

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

0, 7, 26, 63 …… p terms

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

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

Question 8.

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

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, 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.* [15]

Example:

Consider the number 3025

Square of sum of the halves of 3025 $= (30+25)^2$

$= (55)^2$

= 3025 is a tech number.