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) What is JVM? [2]

(b) What are Unary and Binary Operators? Give examples of each. [2]

(c) What is an Infinite loop? Write an example of it using for-loop. [2]

(d) What will be the result of the following if n = 3.5 [2]

(i) Math.ceil(n)

(ii) Math.round(n)

(iii) Math.floor(n)

(e) If x = 6, y = 4 and z = 2.3, evaluate 'u' and 'v' after executing successively (i) and (ii):

(i) u = x + y / z;

(ii) v = (x++)*z + x; [2]

Question 2.

(a) Rewrite the following program segment using switch-case : [3]

```
char code;
if(code == 'B' || code == 'b')
        System.out.println("Businessman");
if(code == 'F' || code == 'f')
        System.out.println("Fighter");
if(code == 'E' || code == 'e')
        System.out.println("Employee");
if(code == 'I' || code == 'i')
        System.out.println("Intelligent");
```

(b) What is exception handling? Name any one way in which Java handles exceptions. [2]

(c) Which part of a function declaration differentiates between overloaded functions? [2]

(d) Write a Java expression for $\sqrt{(a+b)^2-(a+c)^3}$ [2]

(e) Name the Character Set followed by Java? [1]

Question 3.

(a) State the difference between 'break' and 'continue' keywords. [2]

(b) Write Java statements to: [5]

(i) replace all occurrences of character 'r' with 'h' in the String "Programmer"

(ii) initialize a character array **ch** with the characters of the word "Transition"

(iii) convert a character stored in variable **test** into Upper Case

(iv) write the prototype of a method that returns true/false and takes 2 strings as parameters

(v) input an integer using Scanner class object '**sc**'

(c) Write a for loop statement that initializes a loop variable k as 100, decrements it by 1 in every pass and executes the loop body infinite no. of times.? [1]

(d) Give the output in the following function and also write what mathematical operation it carries out if value of n = 10: [2]

```
void test1(int n)
{
 for(int i=1; i< = n; i++)
   {
    System.out.println (++i);
   }
 }
```

Question 4.

(a) Fill in the blank numbers from ?1? to ?5? in the following program that attempts to sort an array A[ ] of 15 integers in descending order using the Bubble sort technique: [5]

```
void BubbleSort ( int a[ ] )
    {
     int t =  __?1?__     ;
     for(int i = 0 ; i < __?2?__ ;  i++)
         {
          for(int j = 0 ; j < __?3?__ ;  j++)
            {
              if(____?4?____)
                 {
                   t = a[j];
                   ___?5?___
                   a[j+1] = t;
                 }
            }
         }
    }
```

(b) Write Java statements to:

(i) convert the String "543" into an Integer.

(ii) convert the double value 21.5 into a String [2]

(c) Given the following code, answer the questions that follow: [3]

```
class Academic
{
  int x,y;
  void access( )              {
        int a,b;
        Academic student = new Academic( );
        System.out.println("Object created");
                          }
 }
```

(i) What is the object name of class Academic?

(ii) Name the class variable used in this program.

(iii) Write the local variable used in this program.

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*** *such that the logic of the program is clearly depicted.*

Flow-Charts and Algorithms ***are not required.***

Question 5.

Create a class **SalaryCalculation** that is described as below:

Class Name **:** SalaryCalculation

Data members **:** name (String type data)
basicPay, specialAlw, conveyanceAlw, gross, pf, netSalary, AnnualSal
(All double type data)

Member methods **:**

(i) SalaryCalculation( ) - A constructor to assign name of employee (name), basic salary (basicPay) of your choice and conveyance allowance (conveyanceAlw) as ₹ 1000.00

(i) void SalaryCal( ) - to calculate other allowances and salaries as given:
specialAlw = 25% of basic salary.
gross = basicPay + specialAlw + conveyanceAlw.
netSalary = gross - pf.
AnnualSal = 12 months netSalary.

(i) void display( ) - to print the name and other calculations with suitable headings.

Write a program in Java to calculate all the details mentioned above and print them all. [15]

Question 6.

Write a program to accept a string. Convert the string to uppercase. Count and output the number of Consecutive letter pairs that exist in the string.

Sample Input: "IT WAS **NO**T TOU**GH** FOR **HI**M TO RESI**DE** **AB**OVE THE **HI**LL"

Sample Output: Number of consecutive pair of characters = 6 [15]

Question 7.

Using the switch statement, write a menu driven program to:

(i) Generate and display the following pattern:

```
1
2   4
1   3   5
2   4   6   8
1   3   5   7   9
```

(ii) Input a number and check whether it is an automorphic number or not. An automorphic number is a number which is present in the last digit(s) of its square. **Example:** 25 is an automorphic number as its square is 625 and 25 is present as the last digits

For an incorrect choice, appropriate error message should be displayed. [15]

Question 8.

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

(a) **void print (int x, int y)** – to print the odd numbers between the x and y.

(b) **void print (char ch1, char ch2)** – to print all the consonants between the 2 characters ch1 & ch2.

(c) **void print (char ch, int n)** – to print the character ch, n number of times in the given format:

Example: If ch = '$' and n = 4

Output:
```
$ $ $ $
$ $ $
$ $
$
```

Question 9.

Write a program in Java to input a number from the user and print the frequency of each digits present in it.

Example:

Input : 43457973

Output :

Digit	**Frequency**
4	2
3	2
5	1
7	2
9	1

[**Note:** Only those digits should be printed which are present in the number] [15]

Question 10.

Write a program in Java to accept the name and weight of 20 of your friends. Store the weight in a double type array **weight [ ]** and the name in a String type array **name [ ]**. Then sort the name of your friends in ascending order of their weights and finally print the result. [15]