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 a wrapper class? Give any two examples. [2]

(b) State any one difference between: [2]

(i) pure and impure function.

(ii) pure and mixed expression.

(c) Explain the term "type-casting" with an example. [2]

(d) Explain the statement – "**An object is an instance of a class**" [2]

(e) What will be the output of the following code: [2]

```
int m=2,n=15;
for(int i=1;i<5;i++);
{
m++;
--n;
}
System.out.println("m="+m);
System.out.println("n="+n);
```

Question 2.

(a) State the output of the following program segment: [4]

```
String s1 = "TRANSITION";
String s2 = "MOCK TEST";
```

(i) System.out.println(s1.substring(0,3).concat(s2.substring(5));

(ii) System.out.println((int)s2.charAt(6));

(iii) System.out.println(s1.replace('T','F'));

(iv) System.out.println(s1.charAt(s1.indexOf('R')+s2.indexOf('T')));

This Paper consists of 5 printed pages and 1 blank page.

(b) Differentiate between **nextDouble()** and **hasNextDouble()** functions with an example. [2]

(c) Explain Function Overloading with an example. [2]

(d) What is the size in the memory required to store 15 elements in an Array A[] when: [2]
(i) A[] is of long data type
(ii) A[] is of character data type

Question 3.

(a) What is the difference between '**= =**' and '**equalsIgnoreCase( )**' [2]

(b) What are packages? Write the Java statement for importing a package named 'happy'. [2]

(c) Write a Java expression for $\frac{\sqrt{2\cos t}}{r.h}$ [1]

(d) What is the advantage of the **call by value** method over **call by reference** ? [2]

(e) State the output of the below function when m=36, n=54? What is the method computing? [3]

```
void calc(int m, int n)
  {
   while(n!=m)
     {
      if(n>m)
           n=n-m;
      else
          m=m-n;
     }
   System.out.println("Output = "+n);
  }
```

Question 4.

(a) The following program prints out the pattern given below: [4]

z
z y
z y x
z y x w

Some parts of the program are marked by ?1? , ?2? ,?3? , ?4? that must be replaced by statements so that the program works correctly.

```
void pattern()
{
char st;
for(int i=1; i<?1?;i++)
{
      st=?2?;
      for(int j=1;j<=?3?;j++)
         {
          System.out.print(st+" ");
          ?4?;
         }
      System.out.println();
     }
}
```

(b) Rewrite the following program segment using ternary operator : [2]

```
if(avg>= 40 && avg<=100)
  grade='P';
else
  grade='F';
```

(c) State the difference between the keywords '**throw**' and '**throws**'. [2]

(d) Write the function "**check**" which takes two integer arguments (x,y) and returns '**true**' if **x>y** otherwise returns '**false**' [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***

such that the logic of the program is clearly depicted.

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

Question 5.

Define a class Student takes in the name, Roll No. and the total marks of five subjects of 20 students Each student is assigned a stream based on the following criteria:-

Average marks	**Stream**
90 and above	Science with Computers
80 – 89	Science without Computers
70 – 79	Commerce with Maths
60 – 69	Commerce without Maths.

Write a program to declare the class 'Student' and calculate the average of every student and the stream assigned to them. Display the result in the format given below:

Name	**Roll No.**	**Total Marks**	**Average**	**Stream**
……..	……	…….	……	……
……..	……	…….	……	……

[15]

Question 6.

Write a program in Java to accept the name and contact numbers of 25 people. The program should ask the user for a contact number and search for it in the contact numbers array using the **Binary Search** technique. If the number is found, then the corresponding name is displayed otherwise a proper error message is displayed. [15]

Question 7.

Write a menu driven program to perform the following operations using switch-case:

(a) Input an integer number and print the greatest and the smallest digits present in the number.
Example:
Input: n=2943
Output: Greatest digit = 9 and Smallest digit = 2

(b) Input a line of text from the user and create a new word formed out of the first letter of each word and convert the new word into Uppercase.
Example:
Input: Mangoes are delivered after Midday
Output: MADAM [15]

Question 8.

The sum of two distances is calculated as:

Distance 1 =	10 feets	24 inches
Distance 2 =	5 feets	16 inches
Sum of Distances =	18 feets	4 inches

A class Distance has the following members:

Class Name	**:**	**Distance**
Data members	**:**	f1,f2 (integers to store the feet value of 2 distances) inc1,inc2 (integers to store the inch value of 2 distances)
Member methods	**:**	
Distance(int a, int b, int c, int d)	:	constructor to assign a to f1, b to inc1, c to f2 and d to inc2
void showDistance()	:	to display both the distances with suitable message
void sumDistance()	:	to find the sum of distances and print it.

Write a program in Java to input two distances and calculate their sum by applying proper adjustments. Display the final result with appropriate message. [Given 1 feet = 12 inches] [15]

Question 9.

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

(a) **void printSeries(int)** – to compute the series: $\mathbf{S} = \frac{x}{2} - \frac{x^2}{4} + \frac{x^3}{6} - \frac{x^4}{8} + \cdots + \frac{x^n}{2n}$

(b) **void printSeries(String s)** – to print the String in the following format:
Example: If s = "TIGER"
Output:
R
R E
R E G
R E G I
R E G I T [15]

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Question 10.

A class HiArm has been defined to find whether a given number is an Armstrong number or not. Some members of the class are given below:

Class name	**:**	**HiArm**
Data members/instance variables	**:**	
n	:	integer data to store the number.
Member functions/methods	**:**	
HiArm ( )	:	constructor to assign 0 to n
HiArm (int a)	:	constructor to assign a to n
int sumArm (int)	:	to find and return the sum of cube of digits of a number
void isArm ( )	:	to invoke sumArm ( ) and print whether the number is Armstrong or not

Then write the main( ) method to input a number and call the above functions as required to check whether it is an Armstrong number or not.

[**Note:** An Armstrong number is a number which is equal to the sum of the cube of its digits. Example of an Armstrong Number is $153 = 1^3+5^3+3^3 = 153$] [15]