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 are keywords? Give any two examples. [2]

(b) What is an array? Write the general syntax for creating an array. [2]

(c) What is the difference between **subscript** and **subscripted variable**? [2]

(d) Name any two characteristic features of Java. [2]

(e) Mention two different styles of expressing a comment in a program. [2]

Question 2.

(a) Name the Java keyword that:

(i) is used for dynamic memory allocation to reference data types

(ii) is used to declare class variables. [2]

(b) State the difference between a Constructor and a Method. [2]

(c) Explain "**Call by reference**". [2]

(d) What is the difference between a **formal** and **actual** parameters? [2]

(e) Explain the use of the below given functions:

(i) endsWith()

(ii) random() [2]

Question 3.

(a) Detect errors if any in the below given statement and rewrite it correctly:

If(2x + 5 = 10 && x>0) [2]

(b) String s1="I LOVE"; [4]
String s2 = "JAVA FOR SCHOOL";
(i) System.out.println(s1.substring(0).concat(s2.substring(0,4))
(ii) System.out.println(s2.substring(2,10));
(iii) System.out.println(s2.replace('O', 'o'));
(iv) System.out.println(s2.charAt(s1.indexOf('V') + s2.indexOf('H')));

(c) Write a Java statement to:

(i) Extract the second last character of a word stored in the variable **wd**.

(ii) Check if the second character of a string '**str**' is in uppercase [2]

(e) What is the use of the keyword **import**? [2]

Question 4.

(a) State the output of the following program segment according to the inputs as mentioned: with each part: [4]

```
if(x++ == 11)
   System.out.print("RESULT IS 11");
else if(++x == 10)
   System.out.print("RESULT IS 10");
else if(- -x == 10)
   System.out.print("RESULT IS 10");
else
   System.out.print("RESULT IS NEITHER 10 NOR 11");
```

(i) x = 9 (ii) x = 10 (iii) x = 11 (iv) x = 12

(c) What will the following functions return when executed:

(i) Math.pow (2, Math.sqrt(36))

(ii) Math.rint(32.17) [2]

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

(e) Write the prototype of a function 'divide' that takes two integer values and returns the quotient in double type. [1]

(f) Name the package which contains the **Scanner** class? [1]

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. [15]

Define a class Employee having the following description:

Data members / instance variables:

pan	:	to store personal account number
name	:	to store the name
taxincome	:	to store the annual taxable income
tax	:	to store the tax that is calculated

Member functions:

Employee()	:	default constructor
void input()	:	to accept the pan number, name and taxable income
void calc()	:	calculate the tax for an employee according to the given conditions:

Total Annual Taxable Income	**Tax Rate**
Upto Rs. 100000	No tax
From Rs. 100001 to Rs. 150000	10% of the income exceeding Rs. 100000
From Rs. 150001 to Rs. 250000	Rs. 5000 + 20% of the income exceeding Rs. 150000
Above Rs. 250000	Rs. 25000 + 30% of the income exceeding Rs. 250000

void display() : output the details of the employee as per given format:

Pan Number	**Name**	**Taxable Income**	**Tax**
_____	_____	_____	____

Question 6. [15]

Write a Java program to accept a string. Extract the last character from it and form a new string after adding the extracted character at the first and last places in the given string. Print the entered and new string.

Sample Input : Java
Sample Ouptut : aJavaa (where '**a**' is the last character in the string Java)

Question 7. [15]

Write a menu driven program in Java:

(a) to input a number and check whether it is a NEON number or not

(b) to print the REPUNIT series: 1, 11, 111, 1111, ... upto 'n' terms

Note:

NEON: A number is said to be NEON, if sum of all the digits of the square of the number is equal to the number itself.
For example 9 is a NEON number
(Workings: Square of 9 = 81. Sum of digits of square: 8 + 1 = 9)

Question 8. [15]

Write a Java program to print the reverse of all the numbers in the range 'p' to 'q', where p<q (both inclusive). Print the output in the following format:

Number	**Reverse**
----------	----------
----------	----------
----------	----------

Question 9. [15]

Design a class to overload a function pattern() as follows:

(i) void pattern(char ch, int n) with one character and one integer argument and prints 'n' lines containing the character stored in 'ch' in the following pattern,
If ch = @ and n = 3, then output:
@
@@
@@@

(ii) double pattern(double x, double n) with two double arguments and returns the sum of the series,

$$S = \frac{x}{n} + \frac{x}{n-1} + \frac{x}{n-2} + \cdots + \frac{x}{2} \ldots + \frac{x}{1}$$

Question 10. [15]

Write a program to input an integer array **A[]** of **n** size. Store all even integers of array A[] from left to right and all odd integers from right to left in another array B[]. Print both the arrays.

Example : If A[] = {3, 6, 9, 5, 12, 14, 8, 18, 7, 21, 10, 4} then,
B[] = {6, 12, 14, 8, 18, 10, 4, 21, 7, 5, 9, 3}