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) Mention any two rules for naming identifiers. [2]

(b) How do we invoke a constructor? Explain with an example. [2]

(c) Write a Java statement to create an object named '**jfs**' of a class '**Computer**' that invokes a parameterized constructor that accepts two integer type values. [2]

(d) How is the concept of Data Abstraction implemented in Java? [2]

(e) Write the expression for the absolute value of $\sqrt{2a^3 + 3b^4}$. [2]

Question 2.

(a) Assign the constant value of pi (i.e. 3.142) to a variable mentioning its appropriate data type. [2]

(b) Name the Java keyword that:

(i) is used to finish the execution of a method.

(ii) is used to implement the concept of inheritance. [2]

(c) If **int A[ ] = {9,8,0,4,5,6,6,8,1,5};** What are the values of 'm' and 'n'?.

```
m = Math.max(Math.pow(A[1],A[2]) , Math.sqrt(A[3]));
n = Math.pow(Math.min(A[1],A[7]), A[3]);
```

[2]

(d) What is the difference between a **String object** and **StringBuffer object**? [2]

(e) Write a Java statement to check whether two string object 's1' and 's2' are equal or not, using **compareTo()** function. [2]

Question 3.

(a) Rewrite the following code fragment without break and continue.

```
while(ch != '*')
{
  if(ch == '?')
      break;
  if(ch != '\n')
      continue;
  line++;
}
```
[3]

(b) What will be the result of the following code:

```
String s1 = "Feeling Sleepy";
String s2 = "Watching Television";
```

(i) System.out.println(s1.compareTo(s2));
(ii) System.out.println(s1.concat(" Still ").concat(s2)); [2]

(c) State the difference between **Selection Sort** and **Bubble Sort**. [2]

(d) Find the errors in the following code snippet and correct them:

```
boolean true = a;
If(false)
  System.Out.Println("Nothing in here")
else
  System.out.println(Correct this mistake);
```
[3]

Question 4.

(a) State the purpose and return datatype of the following wrapper class functions:
(i) toString(long n)
(ii) parseLong(String s) [2]

(b) Identify the following as valid or invalid identifier names. State reasons.
(i) _123 (ii) break
(iii) T$ (iv) var.1 [2]

(c) Analyze the following program segment and answer the following questions:

```
class JavaForSchool
{
      public void methodInfo()
      {
            char a = 'A', b = 'a';
            int c = a++ + b;
      }
}
```

(i) What value is stored in '**c**' after the method gets executed?
(ii) What is the value stored in '**a**' after the execution of the method?
(iii) Define the main() method which calls the above method.
(iv) Modify methodInfo() so that the resultant '**c**' is displayed on the screen. [4]

(d) What is the scope of the keyword '**protected**' in accessing a method. [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. [15]

An **Emirp** number is a number which is prime backwards and forwards.

Example: 13 is an Emirp number since 13 and 31 are both prime numbers.
Write a program to accept a number and check whether it is an Emirp number or not.

Question 6. [15]

Define a class **WordOp** having the following description:

Data members/instance variables:

str	:	to store a word
max	:	to store the highest alphabetical character present in the word
min	:	to store the lowest alphabetical character present in the word

Member functions:

WordOp()	:	default constructor
void input()	:	to accept the word in UPPERCASE
void calcMaxMin()	:	to find the highest and the lowest character present in the word.
void display()	:	to display the word along with the highest and the lowest character **Example:** If word is "TWEAK" Highest Character = W Lowest Character = A

Question 7. [15]

Design a class to overload a function **volume()** as follows:

(i) double volume(double r) with one double argument, returns the volume of a sphere using the formula:
volume = $\frac{4}{3}\pi r^3$

(ii) double volume(double r, double h) with two double arguments, returns the volume of a cone using the formula:
volume = $\frac{1}{3}\pi r^2 h$

(i) double volume(double l, double b, double h) with three double arguments, returns the volume of a cuboid using the formula:
volume = *l x b x h*

Question 8. [15]

The production (P) of crude oil of a country in millions of barrels may be estimated by the following set of equations, where ***t*** represents the time duration in years:

$P = 5 + 3t$ for $0 \leq t \leq 3$
$P = 14 + (t - 5/2)^2$ for $t > 3$

Write a program in Java to input a year from the user and find and print the production for every year from the year 2000 to the inputted year.

Print the output in the following format:

Year	**Production**
----------	----------
----------	----------
----------	----------

Question 9. [15]

A cloth showroom has announced the following seasonal discounts on purchase of items:

Purchase Amount (₹)	**Discount**	
	Mill Cloth	**Handloom Items**
0 - 1000	-------	5 %
1001 - 2000	5 %	7.5 %
2001 - 3000	7.5 %	10 %
Above 3000	10 %	15 %

Write a Java program to input the purchase amount and Item Code viz : **M** or **m** for Mill Cloth and **H** or **h** for Handloom Items.

Calculate the discount amount. Find the net balance to be paid excluding the discount.
Print the Purchase Amount, Item Type, Discount and the net amount to be paid.

Question 10. [15]

Write a program to input an integer array **A[]** of **n** size. Sort the array in ascending order. Then input another number from the user and replace all the numbers less than that inputted number by their reverse.

Example : If A[] = {38, 25, 16, 91, 5, 12} then,
array after sorting is {5, 12, 16, 25, 38, 91}
If the number entered = 20 then,
after replacing all the numbers less than 20 with their reverse,
final Output is {5, 21, 61, 25, 38, 91}