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)   Define *encapsulation*.

(b)   Explain the term *object* using an example.

(c)   Define a *variable*.

(d)   What is a *wrapper class*? Give an example.

(e)   What is the purpose of the *new* operator?   [10]

Question 2

(a)   State the two kinds of *data types*.

(b)   Write the corresponding expressions for the following mathematical operations:-

(i) $a^2 + b^2$

(ii) $z = x^3 + y^3 - \dfrac{xy}{z}$

This Paper consists of 4 printed pages.

(c)   Define an *impure function*.

(d)   Differentiate between *if* and *switch* statements.

(e)   What will be the output for the following program segment?

String s = new String("abc");

System.out.println(s.toUpperCase( ));   [10]

Question 3

(a)   What is meant by *private visibility of a method*?   [2]

(b)   Find and correct the errors in the following program segment:-

int n[ ] = (2,4,6,8,10);

for (int i = 0; i < = 5; i++)

System.out.println("n[" + i + "]=" + n[i]);   [2]

(c)   Explain *function overloading* with an example.   [4]

(d)   Find the output of the following program segment, when:

    (i)   val = 500

    (ii)   val = 1600

int val, sum, n = 550;

sum = n + val > 1750? 400 : 200;

System.out.println(sum);   [2]

(e)   What is a *default constructor*?   [2]

(f)   What will be the output for the following program segment?

int a = 0, b = 30, c = 40;

a = $^{--}$b + c^{++} + b;

System.out.println(" a =" + a);   [2]

(g)   Differentiate between *compareTo*( ) and *equals*( ) methods.   [2]

(h)   What is a *package*? Give an example.   [2]

(i)   Explain the function of a *return* statement.   [2]

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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 4

Write a program to calculate and print *the sum of odd numbers* and *the sum of even numbers* for the first *n* natural numbers.

The integer *n* is to be entered by the user. [15]

Question 5

A cloth showroom has announced the following festival discounts on the purchase of items, based on the total cost of the items purchased:-

Total cost	Discount (in Percentage)
Less than Rs.2000	5%
Rs. 2001 to Rs. 5000	25%
Rs.5001 to Rs.10000	35%
Above Rs.10000	50%

Write a program to input the total cost and to compute and display the amount to be paid by the customer after availing the discount. [15]

Question 6

Consider the following statement:-

"January 26 is celebrated as the Republic Day of India".

Write a program to change *26* to *15*, *January* to *August*, *Republic* to *Independence* and finally print "August 15 is celebrated as the Independence Day of India". [15]

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Question 7

Write a program that outputs the results of the following evaluations based on the number entered by the user.

(i)   Natural logarithm of the number

(ii)   Absolute value of the number

(iii)   Square root of the number

(iv)   Random numbers between 0 and 1.   [15]

Question 8

The marks obtained by 50 students in a subject are tabulated as follows:-

Name	Marks
•	•
•	•
•	•

Write a program to input the names and marks of the students in the subject. Calculate and display:-

(i)   The subject average marks (subject average marks $= \dfrac{subject\ total}{50}$)

(ii)   The highest mark in the subject and the name of the student.

        (The maximum marks in the subject are 100)   [15]

Question 9

Write a program to accept 15 integers from the keyboard, assuming that no integer entered is a zero. Perform *selection sort* on the integers and then print them in *ascending order*.   [15]