COMPUTER SCIENCE

(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, Sections A and **B.***

*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 (20 Marks)

*Attempt **all** questions.*

Question 1

(a) (i) Name universal gates.

  (ii) State one advantage of batch processing.   [2]

(b) (i) Represent the given Boolean function through a logic circuit

  diagram:

  $F(X,Y,Z) = X \cdot (Y\,\overline{Z} + \overline{Y}\,Z)$

  (ii) What is the Boolean expression for $X \oplus Y$?   [2]

(c) (i) Name the high level language which was developed by IBM.

  (ii) Convert the number $(1288)_{10}$ into an octal number,   [2]

(d) (i) Convert $(101110)_2$ into a Hexadecimal number.

  (ii) Multiply 1001011 by 1101.   [2]

(e) Differentiate between *Logical* error and *Execution* error.   [2]

Question 2

(a) Write an algorithm to find the sum of two numbers.   [2]

(b) Name *two* conditional statements and explain.   [2]

(c) Explain any *two* looping statements.   [2]

(d)   Write the full form of the following:

    (i)   ASCII

    (ii)   COBOL   [2]

(e)   How does a data file different from a program file?   [2]

SECTION B (60 Marks)

*Attempt **any four** questions from this Section.*

Each program should be written in such a way that it clearly depicts the logic of the problem.

*This should be achieved by using **Mnemonic Names** and **Comments** in the program.*

*Students have the option of using **BASIC** or **C++** for solving the given problems.*

Question 3

Write a program in BASIC or C++ to calculate the interest and total amount to be paid by entering the amount of loan and the number of years, either by simple interest method or by compound interest method, as per the choice of user.

For Simple Interest,

    Interest = (Amount * Rate * Number of Years) / 100

    and Total amount = Amount + Interest

For Compound Interest,

$$\text{Total amount} = \text{Amount} \left(1 + \frac{\text{Rate}}{100} \right)^{\text{No.of years}}$$

    Interest = Total amount – Amount.   [15]

Question 4

Write a program in BASIC or C++ for the following:

(a)   Input any word in lower case and display its output in uppercase.

(b)   Total number of alphabets present in the word input.

    For example, if

    Lower case : snowy

    Upper case: SNOWY

    Total number of alphabets : 5.   [15]

Question 5

Write a program to store elements in an array of size 4 × 4 and perform the following.   Find the sum of:

(a)   each row and display

(b)   each column and display

(c)   all the elements of the array.   [15]

Question 6

Using BASIC or C++ program, read N numbers in a single dimensional array and calculate the highest and the least number along with their corresponding positions.

For example, if

    INPUT : 8, 4, 5, 1, 7

    OUTPUT,

    Highest : 8   Position : 1

    Lowest : 1   Position : 4   [15]

Question 7

A cricket team has the following table of batting figures for a series of test matches for *N* number of players.

Player's Name	Runs Scored	Innings	Times Not-out
Sachin	982	11	2
Dhoni	779	14	3
Robin	775	14	1
--	--	--	--
--	--	--	--
--	--	--	--

Write a program in BASIC or C++ to create a sequential file named AVG.DAT and do the following:

(a)   Store the given data.

(b)   Read the figures to calculate and display the batting average of each player. Also, print the above format.   [15]

Question 8

(a)   Develop a program using user-defined function to convert a temperature from Fahrenheit scale Celsius scale using the formula C = (5/9) * (F – 32).

(b)   Write a program in BASIC or C++ using FOR Loop to print any number in reverse order.

        Hint : Number entered : 1 2 3 4 5

                Reverse order   : 5 4 3 2 1   [15]