22323

12223

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

(a) Compare TTL and CMOS Logic Families.

(b) Draw symbol of EX·OR gate and also write its truth table.

(c) State the role of preset and clear terminal in flip-flop.

(d) State the different triggering methods in digital circuits.

(e) Enlist the names of segment registers in 8086 Microprocessor.

(f) List any two addressing modes of 8086 with example.

2. Attempt any THREE of the following : **12**

(a) Perform binary subtraction using 2's complement method for $(12)_{10} - (08)_{10}$.

(b) Minimize the following expression using k-map and realize it using basic logic gates :

$$Y = \sum_m (1, 3, 4, 5, 6, 7)$$

(c) Convert following expression into canonical SOP form :

$$Y = A + BC + ABC$$

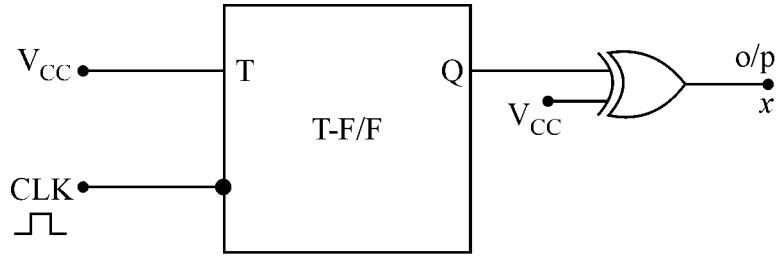
(d) Describe working of SR flip-flop using NAND gates with proper truth table.

3. Attempt any THREE of the following : **12**

(a) Convert the following into Binary and add them : $(A96)_{16} + (28B)_{16}$.

(b) Describe operation of full adder with proper truth table and logical diagram.

(c) Study the following circuit (Fig. 1) and draw waveforms for Q and *x*. Consider last value of Q = 1.



Last Value of Q = 1

Fig. – 1

(d) Write an assembly language program to find, whether the number is even or odd.

4. Attempt any THREE of the following : **12**

(a) Prove : (i) $A + AB = A$

(ii) $\overline{\overline{A}+\overline{B}+\overline{C}} = ABC$

(b) Design Half adder using k-map and implement using gates.

(c) Draw the symbol and truth table of D – flip-flop and T – flip-flop.

(d) State the use of OF, TF, AF and PF Flag in 8086.

(e) Describe concept of memory segmentation of 8086.

5. Attempt any TWO of the following : **12**

(a) (i) State and prove De' Morgans's theorems.

(ii) Reduce the following Boolean expression using Boolean Laws :

$Y = A\overline{B} + \overline{A}B + AB + \overline{A}\,\overline{B}$

(b) Explain maximum mode 8086 configuration with diagram.

(c) Write assembly language instructions of 8086 to

(i) Multiply 4H by 5H

(ii) Rotate content of AX by 4-bit towards left.

(iii) To perform logical OR operation of AX & BX.

6. Attempt any TWO of the following : **12**

(a) (i) Design 16:1 multiplexer using 8:1 multiplexer.

(ii) Draw circuit diagram of 1:4 DEMUX using logic gates. Write its truth table.

(b) Compare microprocessor 8086 with Pentium III on the basis of :

(i) Address and data bus

(ii) Clock Speed

(iii) Memory

(iv) Operation Modes

(c) (i) Explain XLAT and XCHG instructions of 8086 microprocessor.

(ii) Write an assembly language program to reverse the string.
