

22323

23242

3 Hours / 70 Marks

Seat No.

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- 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) 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) List the applications of digital systems.
- (b) Define minterm and maxterm with example.
- (c) List two types of triggering methods for a flip-flop.
- (d) State the function of following pins of 8086 :
 - (i) $\overline{\text{TEST}}$
 - (ii) $\text{DT} / \overline{\text{R}}$
 - (iii) $\overline{\text{RD}}$
 - (iv) READY
- (e) Convert the decimal number $(25.4)_{10}$ into its equivalent binary.
- (f) List any four features of 8086 microprocessor.
- (g) List applications of D flip-flop.



2. Attempt any THREE of the following : 12

- (a) State and prove De-Morgan's theorem using truth table.
 (b) Minimize the following Boolean expression using K-map :

$$Y = \Sigma m(1, 3, 5, 7, 8, 10, 14)$$

Draw the logical diagram of minimized expression using logic gates.

- (c) Compare combinational and sequential logic circuits.
 (d) Draw logical diagram using gates and explain half adder.

3. Attempt any THREE of the following : 12

- (a) Subtract using 2's complement method :
 (1) $(11011)_2 - (1010)_2$
 (2) $(10111)_2 - (11000)_2$
 (b) Write an assembly language program to add the series of 5 numbers.

- (c) Convert the following into canonical SOP :

(1) $A + CD + BC$

(2) $\bar{A}(\bar{B} + C)$

- (d) Draw neat interfacing diagram in minimum mode of 8086. Explain the function of control signals used.

4. Attempt any THREE of the following : 12

- (a) Explain any two arithmetic and any two logical instructions of 8086 with example.
 (b) Design 8 : 1 MUX using 2 : 1 MUX and 4 : 1 MUX.
 (c) Draw logical diagram using NAND gates and explain JK flip-flop.
 (d) Draw 8086 architecture block diagram.
 (e) Simplify the following using K-map and realize using NAND-NAND gates

$$Y = \Sigma m(1, 3, 4, 5, 7, 9, 11, 13, 15)$$

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

(a) Explain the following instructions :

- | | |
|-----------|--------------|
| (i) XCHG | (ii) PUSH AX |
| (iii) AAA | (iv) DAA |
| (v) RCR | (vi) RCL |

(b) Convert the following :

$$(498.25)_{16} = (\quad)_{10}$$

$$(101100101)_2 = (\quad)_{16}$$

$$(B689D)_{16} = (\quad)_8$$

(c) Draw flag register format. Explain TF, DF, IF, CF, Flag registers.

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

(a) Explain how J-K flip-flop can be converted to D and T flip-flops. Draw the truth table of both D and T flip-flops.

(b) Draw symbol, truth table and logic equations of EX-OR and NOR gate.

(c) Identify the addressing modes used in following instructions :

- (1) MOV AH, 50 H [BX]
 - (2) INC [4210 H]
 - (3) MOV AX, BX
 - (4) ADC AX, 1234 H
 - (5) MUL AL, BL
 - (6) DIV BL
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