22323

12425 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.

1. Attempt any FIVE of the following :

- (a) Define 1's complement and write example of it.
- (b) Define Multiplexer and list types of Multiplexer.
- (c) List the types of triggering.
- (d) Draw the format of 8086 Flag register.
- (e) Convert $(65.43)_8$ to binary number.
- (f) Classify the general purpose and segment register of 8086.
- (g) State the function of STC and AAA instructions of 8086 microprocessor.

2. Attempt any THREE of the following :

- (a) Describe Gray to binary and binary to Gray code conversion with example.
- (b) Minimize the following expression using K-map and realize it using basic logic gates : $Y = \Sigma m(1, 3, 4, 5, 6, 7)$



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- (c) Describe concept of memory segmentation of 8086.
- (d) Describe working of JK flip-flop using NAND gates with truth table.
- (e) Compare Combinational and Sequential logic circuits.

3. Attempt any THREE of the following :

(a) Reduce the following Boolean expression using laws of Boolean algebra and realize using basic logic gates :

 $Y = (A + BC) (B + \overline{C}A)$

- (b) Describe operation of full adder with truth table and logical diagram.
- (c) Draw the block schematic of D flip-flop. Explain its working with Truth table.
- (d) Write an assembly language program to find, whether the number is even or odd.

4. Attempt any THREE of the following :

- (a) Draw and describe minimum mode of 8086.
- (b) Design 4 : 1 Multiplexer using NAND gates only.
- (c) Describe addressing modes of 8086 with example.
- (d) Design half adder circuit using K-maps.
- (e) Write a program to add two 16 bit numbers.

5. Attempt any TWO of the following :

- (a) Describe characteristics of Digital IC.
- (b) Describe the physical address generation of 8086 with example.
- (c) Write assembly language instructions of 8086 to :
 - (1) Divide 20H by 5H.
 - (2) Rotate content of AX by 4-bit towards Right side.
 - (3) To perform logical AND operation of AX & BX.

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6. Attempt any TWO of the following :

- (a) (1) Implement the logical expression $Y = A\overline{B}C + \overline{A}BC + AB\overline{C}$ using 8 : 1 Multiplexer.
 - (2) Draw circuit diagram of 1 : 4 DEMUX using logic gates. Write its truth table.
- (b) State the names of universal logic gates and design basic gates using universal gates.
- (c) Write function of following instructions :
 - (i) MOV AX, 2345 H
 - (ii) MOV AX, [4172H]
 - (iii) MUL, AL, BL
 - (iv) ADD AX, [SI]
 - (v) ADD AX [SI] BX [04]
 - (vi) INC [4712H]

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