22323

24225

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

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

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

(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) State any two Boolean law with expression.

(b) Define and draw the logical symbol of demultiplexer.

(c) Draw the circuit of one-bit memory cell.

(d) State the function of Segment register.

(e) Define basic gates with their symbols.

(f) Give example of any two types of addressing mode.

(g) List features of 8086 Microprocessor.

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

(a) Implement a two input OR gate using NAND gates only.

(b) Convert the given SOP form into POS form :

$Y(A, B, C, D) = (\bar{A} \cdot BC) + (B \cdot \bar{C}\bar{D}) + (\bar{A}\bar{B})$

(c) Explain J-K flip-flop with the help of neat diagram. Write its Truth Table.

(d) Explain rules to simplify Boolean expression using K-map.

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

(a) Explain with justification NOR gate as universal gate.

(b) Write an assembly language program to perform addition of two 16-bit numbers.

(c) Draw waveforms for positive and negative edge triggering with proper labelling. Identify two situations where these triggering can be used.

(d) Simplify Y = F(A, B, C, D)

$= \Sigma m\,(1, 2, 8, 9, 10, 12, 13) + d(4, 5)$

using K-map and write expression.

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

(a) Interpret the following program and specify output for following situations :

MOV BX, 55F9H

MOV AX, 3A69H

(1) Masking of higher Nibble of AX

(2) Rotate left through carry contents of BX by 4 position.

(3) Shift left contents of AX, by 6 position.

(4) Add AX, BX

(b) Describe the construction of half-adder using K-map.

(c) Compare combinational & sequential circuit.

(d) Explain the process of physical address calculation with suitable example.

(e) Reduce the Boolean expression & draw logical diagram for reduced expression $Y = ABC + \bar{A}\bar{B}C + AB\bar{C} + \bar{A}\bar{B}\bar{C}$

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

(a) Given the following logic diagram in fig (1). Write truth table. Identify equivalent gate for the obtained truth table :

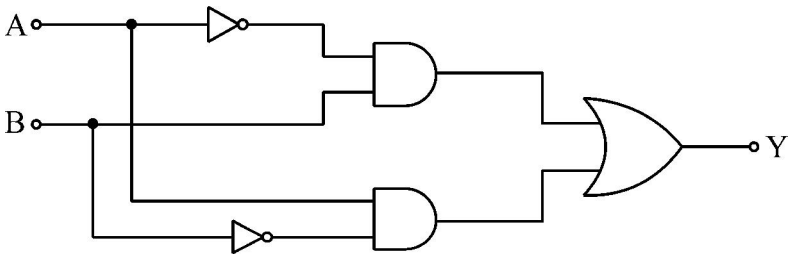

fig (1)

(b) Draw Flag register format of 8086 Microprocessor. Explain TF, DF, CF, IF Flags.

(c) Write an assembly language program for finding smallest number from the array of ten number. (Assume suitable data)

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

(a) Draw architectural block diagram of 8086 Microprocessor and describe the function of each block.

(b) Design half subtractor using NOR gate only. Write truth table.

(c) Differentiate between CISC & RISC and justify each of them in practice.