22320

22223

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.

(8) Preferably, write the answers in sequential order.

Marks

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

a) State the base of following number system:
Decimal, binary, octal, hexadecimal

b) Define counter.

c) Give any two applications of comparator.

d) Draw the symbol of D flipflop and write its truth table.

e) Name the types of RAM.

f) Define and draw logic symbol of demultiplexer.

g) List the basic types of shift register.

Marks

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

a) Convert the given binary into decimal, octal, hexadecimal and gray code:

$(10110101)_2$

b) Draw the block diagram of BCD to 7 segment decoder using IC 7447. Write truth table of it.

c) Define PLA. Draw its block diagram.

d) Implement full adder using two half adder.

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

a) Draw the OR gate and NOR gate using NAND gate only.

b) Compare TTL, ECL and CMOS logic families. (any four points)

c) Draw 4 bit twisted ring counter and explain working with truth table and waveforms.

d) A combinational circuit is defined as $F_1 = \sum m(3, 5, 7)$ and $F_2 = \sum m(4, 5, 7)$. Implement the circuit with a PLA having 3 inputs, 3 product terms and 2 outputs.

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

a) Define following terms :

i) Fan-in

ii) Fan-out

iii) Power dissipation

iv) Noise margin

b) Draw the block diagram of digital comparator IC 7485 and explain with the help of truth table.

c) Design 32 : 1 multiplexer using 8 : 1 multiplexer.

d) Explain the working of master salve JK flipflop with truth table and logic diagram.

e) Write applications of ADC and DAC.

Marks

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

a) Design nod-6 counter using IC 7490 and explain its design with working.

b) Explain classification of memories. What is flash memory?

c) i) State the rules of BCD addition. (2)

ii) Perform BCD addition of : (4)

$(972)_{10} + (348)_{10}$

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

a) Design synchronous decade counter using D' flipflop.

b) i) Minimize the following expression using K-map. (4)

$Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$

ii) Realize the minimized expression using basic gates. (2)

c) Reduce following boolean expressions using boolean laws.

i) $Y = A\overline{B} + \overline{A}B + AB + \overline{A}\overline{B}$ (2)

ii) $Y = A\overline{B}C + \overline{A}BC + ABC$ (2)

iii) $Y = ABC + \overline{A}BC + ABC$ (2)