313303

24225

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 answer 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) Write the base of the following number systems. Decimal, Binary, Octal and Hexadecimal.

b) Draw symbol and write the truth table of NAND gate.

c) State the necessity of multiplexer.

d) Write excitation table of T-Flip-Flop.

e) List any four features of SSD memory.

f) Design half subtractor circuit.

g) State the difference in logic of EX-OR and EX-NOR gate.

P.T.O.

Marks

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

a) Convert the following –

i) $(429)_{10} = (?)_{BCD}$

ii) $(2.45)_{10} = (?)_{2}$

iii) $(AF)_{16} = (?)_{8}$

iv) $(1011010)_{2} = (?)_{16}$

b) State and prove De Morgan's theorems.

c) Describe function of full adder circuit with its truth table, K-map simplification and logic diagram.

d) What is modulus of counter? Design MOD-7 counter.

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

a) What is Race around condition? How can it be overcome?

b) Realize the logic operations of AND, OR, NOT gates using only NAND gates.

c) Design 16:1 multiplexer using 4:1 multiplexers.

d) Draw the block diagram and explain the working of successive approximation method of ADC.

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

a) State Duality theorem. Prove that AND laws and OR laws are dual of each other.

b) Give any two specifications of DAC. Draw the circuit diagram of weighted resistor DAC and give the expression for output.

c) Draw the logical circuit diagram of BCD to 7-segment decoder and write its truth table.

d) Compare weighted resistor DAC and R-2R DAC. (Any four points)

e) Minimize the following expression using K-map.

$F(A, B, C, D) = \pi (1, 4, 6, 9, 11, 12, 14, 15)$.

Marks

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

a) Define SOP form and POS form of Boolean expression. Convert F(A, B, C) = Σm(1, 4, 5, 6, 7) in standard POS form.

b) Design a mod-10 asynchronous counter. Draw the timing diagram.

c) Compare combinational and sequential logic circuit. (Any six points)

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

a) Design 3-bit synchronous counter and draw output waveform.

b) Compare the following. (Any three points) –

i) Volatile with Non-volatile memory

ii) SRAM with DRAM memory.

c) Convert the following –

i) $(5C7)_{16} = (?)_{10}$

ii) $(2598)_{10} = (?)_{16}$

iii) $(10110)_2 = (?)_{10} = (?)_{16}$.