

313303

24225

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 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.

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

5. Attempt any TWO of the following: 12
- a) Define SOP form and POS form of Boolean expression. Convert $F(A, B, C) = \Sigma m(1, 4, 5, 6, 7)$ 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) $(10110)_2 = (?)_{10} = (?)_{16}$.
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