

22320

23124

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 answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (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) List the octal and hexadecimal numbers for decimal number 0 to 15.
 - b) Convert $(159)_{10} = (?)_8$
Convert $(380)_{10} = (?)_{16}$
 - c) Draw symbol, truth table of NAND gate.
 - d) Define min-term and max-term with respect to K-map.
 - e) List the types of DAC.
 - f) State two features of ADC IC0809.
 - g) List the types of semiconductor memories.

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2. Attempt any THREE of the following: 12

- a) Perform the subtraction using 2's complement methods.
 $(10110)_2 - (11010)_2$
- b) Explain the following characteristics with respect to logic families -
 - i) Power dissipation
 - ii) Fan-in and fan-out
 - iii) Noise margin
 - iv) Speed of operation
- c) Draw logic diagram of half adder using K-map simplification and write truth table.
- d) Describe the working of J-K flip-flop and state the race around condition.
- e) Give classification of memory and compare RAM and ROM.
(Any four points)

3. Attempt any FOUR of the following: 16

- a) Convert $(53)_{10} = (\text{BCD})$
 $(34)_{10} = (\text{Excess-3})$
 $(100111)_2 = (\text{Gray})$
 $(11010)_2 = (2\text{'s complement})$
- b) State and explain De-Morgan's theorems.
- c) Draw 16:1 mux tree using 4:1 mux.
- d) Describe the operation of R-S flip-flop using NAND gate.
- e) Describe the operation of 4 bit serial in serial out shift register.
- f) Draw and explain the block diagram of Programmable Logic Array (PLA).

4. Attempt any TWO of the following: 16

- a) Design 1:8 demultiplexer using 1:4 demultiplexer. Also write truth table.
- b) Explain the role of counters in digital circuits and design Mod-> counter using IC 7490.
- c) Draw and explain the block diagram of dual slope ADC. Also write its specifications.

5. Attempt any TWO of the following: 16

- a) Design basic logic gates using NAND and NOR gate.
 - b) Minimize the following expression using K-map.
$$f(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 7, 8, 9, 10)$$

Also explain SOP and POS form.
 - c) Draw and explain 4-bit universal shift register. Also explain the necessity of register in digital circuits.
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