

313303

12425

03 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) Give advantages of BCD codes (Any two).
 - b) List OR laws of boolean algebra.
 - c) Convert following equation into their standard / canonical form
$$Y = A\bar{B} + BC + \bar{A}C.$$
 - d) List modes of operation of shift register.
 - e) Give two applications of A/D converter.
 - f) Give any two applications of demultiplexer.
 - g) Simplify following expression with boolean laws,
$$Y = (A + B) (A + C).$$

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) State and prove De-Morgan's theorem with logic diagram.
 - b) Perform subtraction using 2's complement method
 $(85)_{10} - (98)_{10}$.
 - c) Draw block diagram of half adder. Write truth table and draw logic diagram.
 - d) Draw and explain 4 bit ring counter using D flip-flop.
- 3. Attempt any THREE of the following:** **12**
- a) Draw and explain working of clocked S-R flip flop using NAND gate.
 - b) Implement basic gates using NAND gate.
 - c) Draw and explain 4:2 priority encoder with block diagram, truth table and logic diagram.
 - d) Compare static RAM and Dynamic RAM (Write any four points).
- 4. Attempt any THREE of the following:** **12**
- a) Realize the following equations using NAND gate only.
 - i) $Y = AB + CD$
 - ii) $Y = A + B$.
 - b) Calculate the analog output for 4 bit weighted resistive type DAC for following inputs
 - i) 1011
 - ii) 1010.
 - c) Design 32:1 MUX using 8:1 MUX.
 - d) Draw and explain working of SAR ADC.
 - e) Draw and explain operation of 4:1 MUX.

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

- a) Explain BCD to 7 segment decoder using truth table, circuit diagram and realize code for 'a' and 'e' using K map.
- b) Design mod IO asynchronous UP counter with its truth table and timing diagram.
- c) Draw and explain operation of 4-bit SISO shift register using D flip-flop, with block diagram, truth table and waveform.

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

- a) Draw and explain 4 bit twisted ring counter using J-K flip-flop with circuit diagram and truth table.
 - b) Explain working of 3 bit R-2R ladder DAC with circuit diagram.
 - c) Do following conversions –
 - i) $(A26.48)_{16} \rightarrow (?)_{10}$
 - ii) $(172.95)_{10} \rightarrow (?)_8$
 - iii) $(0101\ 0011)_{BCD} \rightarrow (?)_2$
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