313303

12425

03 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) Give advantages of BCD codes (Any two).

b) List OR laws of boolean algebra.

c) Convert following equation into their standard / canonical form
$Y = A\overline{B} + BC + \overline{A}C$.

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,
$Y = (A + B) (A + C)$.

Marks

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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