This question paper contains 4 printed pages.]

8479 *Your Roll No.* .....

B. Tech. (EEE) / II A

Paper-EEE–203–DIGITAL ELECTRONICS

Time : 3 Hours *Maximum Marks : 70*

(Write your Roll No. on the top immediately on receipt of this question paper.)

*Question No. 1 is compulsory. Answer any **four** from the rest. Each question carry equal marks.*

1. (a) What do you mean by edge triggered Flip-flop ? State the advantage of it. 2×7

   (b) What is universal logic ? Implement the truth table of a half substracter using it.

   (c) State and explain De-Morgan's theorem.

   (d) Convert $(524)_{10}$ in to Ex-3 code and binary code.

   (e) Simplify $\overline{\bar{x}.(\overline{\bar{y}+xz})+xy}$.

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(f) Give the voltage level range used to specify high and low logic in TTL, ECL & CMOS Logic circuits.

(g) What is Multiplexer ? State its use.

2. (a) With neat diagram explain the operation of a serial adder. Compare with combinational adder. 7

(b) Draw the logic circuit of a 4 bit Johnson ring counter and explain its operation and use. 7

3. (a) Design a synchronous counter, which shall count in BCD. Why this counter is known as divide by 10 counter. 10

(b) What is the difference between a Synchronous counter and Asynchronous counter ? 4

4. (a) Give the classification of Logic families and discuss the characteristics of it. Give a comparison table for these characteristic for ECL, TTL, CMOS and I²L Logic family. 10

(b) Draw the circuit diagram of a TTL NAND Gate circuit and state the case of totem pole connection. 4

5. (a) Give the state transition table for S-R and J-K Flip Flop. How state transition take is different from Truth Table ? Does preset and clear input affects the truth table of a FF ? 7

(b) Design a Mod-8 Asynchronous counter using S-R Flip-Flop. Show its timing diagram. 7

6. (a) With neat sketch of a RAM cell explain reading and writing operation. What is advantage of R/W memory? 7

(b) What is PROM, & E-PROM ? Draw a diode ROM circuit which stores the sum and carry of a full-adder. The inputs of a full-adder decides the address of the ROM word. 7

7. (a) Simplify the Boolean function $Y = \sum (m_2, m_3, m_6, m_7, m_9, m_{10}, m_{12}, m_{13}, m_{15})$. If m_1 and m_{14} are don't care terms, then what is the change in the circuit. 7

(b) Express $\overline{A}.C + \overline{B}\,\overline{C} + AB$ in cannonical form. 3

(c) Derive the truth table for the Boolean expression $Y = (A + \overline{B})(B + \overline{C})(C + \overline{A})$ 4

8. (a) Draw the circuit for a 3:8 decoder and explain its operation. 7

(b) Draw the circuit for converting three bit gray code to Binary code. Why gray code is known as reflective code ? 7