

(3 Hours)

(Total Marks : 80)

Please check whether you have the right question paper.

- N.B.:**
- 1) Questions No. 1 is **compulsory**.
 - 2) Solve **any three** question out of remaining **five** questions.
 - 3) Assume suitable **data** if **necessary**.
 - 4) **Figures** to the **right** indicate **full marks**.
1. Solve any **four** out of five : (20)
 - a) Explain Input and Output characteristics of CE configuration of BJT.
 - b) Convert following decimal number to Binary, Octal, Hexadecimal and Gray code $(154)_{10}$.
 - c) Design EX-OR gate using only NOR gates.
 - d) Draw two truth tables illustrating the outputs of a full-adder, one table for the sum output
 - e) Convert S – R flip-flop to D flip-flop.
 2. a) Implement following using only one 8: 1 Multiplexer and few gates : (10)

$$f(A, B, C, D) = \sum m(1, 2, 3, 5, 6, 9, 10, 11, 14)$$
 - b) Using Quine McCluskey Method determine Minimal SOP form for (10)

$$f(A, B, C, D) = \sum m(1, 3, 5, 6, 8, 9, 12, 14, 15) + \sum d(4, 10, 13)$$
 3. a) Explain Collector to base bias Circuit with its stability factor. (10)
 - b) With neat diagram explain operation of ALU IC74181. (10)
 4. a) Design a Mod 10 synchronous counter using S-R Flip-flop. (10)
 - b) Minimize the following four variable logic function using K-map : (10)

$$f(A, B, C, D) = \sum m(0, 2, 3, 5, 6, 7, 8, 10, 11, 14, 15)$$
 and design using only NAND gates.
 5. a) Simplify following equation using Boolean algebra and Design using basic gates (10)

$$f(A, B, C) = A'B + BC' + BC + AB'C'$$
 - b) Explain Entity in VHDL and Write VHDL program for half subtractor circuit. (10)
 6. Solve the following (**Any Four**) : (20)
 - a) Explain working of Universal Shift Register.
 - b) Working of T flip flop.
 - c) Explain working of Differential Amplifier.
 - d) Write VHDL program for EX-NOR gate.
 - e) Explain working of Encoder and Decoder.
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