

(3 Hours)

[Total Marks: 80]

N.B.: (1) Question No. 1 is **compulsory**.(2) Solve any **three** questions out of remaining **five**.(3) Figures to **right** indicate **full** marks.(4) Assume suitable **data** where **necessary**.

- Q1** Solve any **four** (20)
- What are the important features of differential amplifier, also states its types.
 - State De'sMorgan theorem & implement OR gate using NAND gate only.
 - ADD $(83)_{10}$ & $(34)_{10}$ in **BCD**.
 - Convert S-R flip flop to D flip-flop.
 - State advantages & disadvantages of multiplexer.
 - Explain VHDL format in brief.
- Q2.** A) Simplify the following using Quine-Mcclusky method (10)
- $$F(A,B,C,D) = \sum m(0,3,4,11,15) + d(1,2,5)$$
- B) Design & implement one digit BCD adder using IC 7483 (10)
- Q3.** A) Design **MOD- 11** ripple counter using suitable flip-flop. (7)
- B) Convert the following decimal number into binary, octal & hexadecimal
- $(555)_{10}$
 - $(138)_{10}$
 - $(79)_{10}$
- C) Why transistor biasing is required, state factors required for it (4)
- Q4** A) Draw truth table of full subtractor & realize using 3-8 decoder (10)
- B) Draw the circuit diagram of voltage divider bias circuit using CE configuration
- And explain how it stabilizes the operating point (10)
- Q5.** a) $Y = ABC + BC'D + A'BC$ & realize using gates (6)
- a) Explain parallel I/P serial output shift register (6)
- b) Minimize the following expression using **only one** 8:1 MUX.
- $$F(A,B,C,D) = \sum m(1,2,9,10,11,14,15)$$
- (8)
- Q6.** Write short notes on **any four** (20)
- BCD & excess-3 codes
 - Current mirror circuit
 - Ring counter
 - ALU
 - Modelling styles in VHDL