

(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) Why biasing is necessary in BJT amplifier?
 - b) Solve $(35)_{10} - (47)_{10}$ using two's complement method.
 - c) Define :
 - i) truth table
 - ii) standard SOP
 - iii) De-Morgan's theorem
 - iv) Duality theorem
 - v) universal gate
 - d) Define multiplexer and state its application.
 - e) Convert S-R flip-flop to T flip-flop.
2. a) Using Quine-Me-dusky method determine minimum SOP form for (10)
 $f(A, B, C, D) = \sum m(0, 1, 3, 7, 8, 9, 11, 15)$
- b) What do you mean by differential amplifier? What is its primary function? State different configurations of it, which one is popularly used. (10)
3. a) Draw & explain Ring counter using suitable waveforms. (10)
- b) Implement the following using only one 4:1 MUX and few gates : (10)
 $f(A, B, C, D) = \sum m(0, 1, 3, 4, 5, 7, 9, 10, 12, 15)$
4. a) Design MOD-9 Synchronous counter using J-K flip-flop. (10)
- b) Design four bit BCD adder using IC7483. (10)
5. a) What is shift register? Mention different modes of operation of shift register? (10)
- b) State and explain various VHDL data objects in brief. (10)
6. Solve the following (**Any Four**) : (20)
 - a) VHDL program format.
 - b) Difference between combinational circuit and sequential circuits.
 - c) Different biasing methods.
 - d) Race-around condition in flip-flop.
 - e) Current mirror circuit.
 - f) Arithmetic logic unit.