Q. P. Code : 37943

(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 compliment 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.
