



3. : (1) Question No. 1 is compulsory.
(2) Attempt any four out of remaining six questions.

(a) Using 2's complement perform $(42)_{10} - (68)_{10}$. 4

(b) Perform the following operation - 4
 $(756)_8 - (637)_8 + (725)_{16}$
Express the answer in octal form.

(c) Convert $(341.13)_5$ to a base 7 number. 4

(d) Implement EX-NOR gate using only NOR gate. 4

2. (a) Simplify the following functions using K-maps and implement using gates - 10

(i) $f(A, B, C, D) = \bar{A} \bar{B} D + A B \bar{C} \bar{D} + \bar{A} B D + A B \bar{C} D$

(ii) $f(A, B, C, D) = \pi M(0, 2, 4, 10, 11, 14, 15)$

(b) Use the Quinn-McCluskey method to simplify the following function :- 10

$f(A, B, C, D, E) = \Sigma m(8, 9, 10, 11, 13, 15, 16, 18, 21, 24, 25, 26, 27, 30, 31)$

3. (a) Construct 16:1 multiplexer using 4 to 1 and 2 to 1 multiplexes. 10

(b) Design the BCD to gray code converter. 10

4. (a) Explain the operation of 4 bit bidirectional shift register with the help of neat diagram. 10

(b) Draw and explain the working of 4-bit ring counter with waveforms. 10

5. (a) Design a synchronous decade counter using J-K flip-flops. Explain its working with neat waveforms. 10

(b) Design a divide by 5 ripple counter using T flip-flop. 10

6. (a) Explain working of TTL NAND gate with neat diagram of discrete components. 10

(b) What are programmable logic devices ? How are they classified ? Explain with an example the process of realisation of any combination circuit in these devices. 10

7. Write short notes on :- 20

- (a) Noise Margin
- (b) Full adder
- (c) CMOS family
- (d) RAM and ROM