

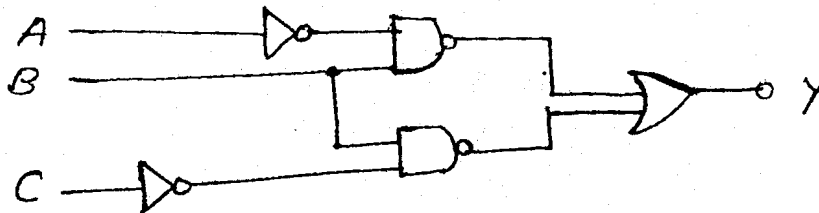
(3 Hours)

[Total Marks : 100]

N.B. : (1) Question No. 1 is compulsory.

(2) Attempt any four questions out of remaining six questions.

1. (a) Convert $(650.17)_8$ into decimal, binary and hex. 6
 (b) Explain ALU with the help of block diagram. 6
 (c) State and explain distributive and associative law for boolean equation. 4
 (d) Determine the truth table for the circuit given below-- 4



2. (a) Design 16 : 1 MUX using 4 : 1 MUX. 10
 (b) Simplify using K-map, obtain SOP equation and realise only by using NAND gates. 10
 $f(A, B, C, D) = \pi M(1, 2, 3, 8, 9, 10, 11, 14) + d(7, 15)$
3. (a) Using Quine McCluskey method, determine the minimal SOP form for : 10
 $F(A, B, C, D, E, \bar{F}, G) = \sum m(20, 28, 38, 39, 52, 60, 102, 103, 107)$
 (b) Design a BCD adder using 4-bit binary adders and explain. 10
4. (a) What is shift register ? Explain 4 bit bidirectional shift register. 10
 (b) Design a MOD-6 synchronous up-counter and explain its operation. 10
5. (a) Implement the following expression using 8 : 1 MUX. 10
 $f(A, B, C, D) = \sum m(0, 1, 3, 6, 9, 11, 12, 13, 15)$
 (b) Explain with a neat diagram 2 input TTL NAND gate in detail. 10
6. (a) Convert T flip-flop to D flip-flop. 10
 (b) Compare the different logic families with respect to the following parameters : 10
 Fan in, Fan out, Noise margin, speed and power dissipation.
7. Write short notes on :- 20
 (a) Decade Counters
 (b) Demorgan's theorems
 (c) Race around condition.