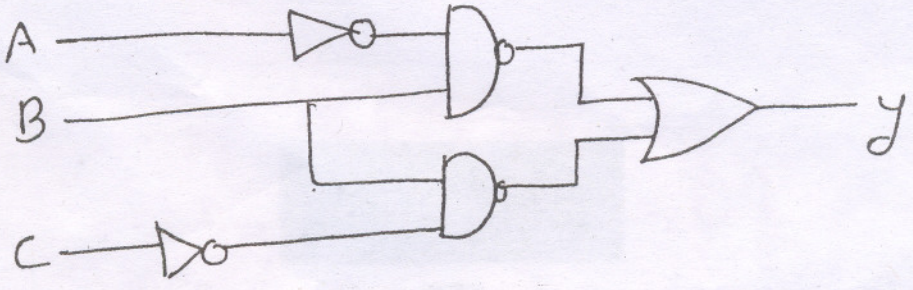
(3) Assume **suitable additional** data if **required.**

1. (a) Perform the following operations without converting to any other base. **6**
   (i) $(FE6)_H - (EFC)_H$
   (ii) $(324)_5 \times (21)_5$
   (iii) $(512)_8 + (277)_8$
   (b) Determine the truth table for the circuit shown below : **4**

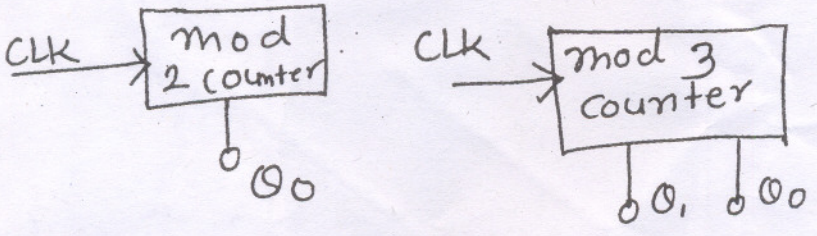


   (c) Convert SR flip-flop to D flip-flop. **5**
   (d) Implement following expression using only one 8:1 Multiplexer and few gates. **5**
   $F = \Sigma m\ (2, 3, 5, 6, 8, 11, 13, 14, 15)$

2. (a) Simplify the following equations using K Map. **10**
   (i) $A\overline{B}C\overline{D} + \overline{A}\overline{B}\overline{D} + AB\overline{C}D + A\overline{C}\overline{D} + \overline{A}B\overline{C}$
   (ii) $\overline{A}\ \overline{D} + A\overline{B}\ \overline{D} + \overline{A}\ \overline{C}D + \overline{A}CD$
   (b) Implement 32:1 multiplexer using two 16:1 multiplexer and OR gates. **10**

3. (a) Minimize the following expression using Quine McCluskey tabular method : **10**
   $F(A, B, C, D) = \Sigma m\ (1, 3, 5, 10, 11, 12, 13, 14, 15)$
   (b) Implement the Gray code to BCD code converter using basic gates only. **10**

4. (a) Design mod 10 asynchronous up counter with the help of necessary decoding logic. **5**
   (b) Give the timing diagram for the counter of part (a). **3**
   (c) Explain how to convert the above counter to count down. **3**
   (d) If the delay of a single FF is ions what will be the maximum clock frequency. **3**
   (e) Is glitch problem exist for above counter ? Discuss. **3**
   (f) Implement mod 6 counter using following two blocks. **3**



5. (a) Design a 3 bit synchronous 'even' counter to give sequence of even numbers. Using D FF. Take care of lock out condition while designing. **10**
   (b) Desing Full Subtractor circuit using active high I/p, active low O/p Decoder. **10**

6. (a) Design 4 bit ring counter using JK-FF, draw the timing diagram for the same. **10**
   (b) Compare TTL and CMOS logic families. **10**

7. (a) Design one bit BCD adder using IC 7483. **10**
   (b) Write short notes on (any **two**) :— **10**
   (i) Code converters
   (ii) Error detecting and correcting code
   (iii) ALU
   (iv) Priority Encoder.
