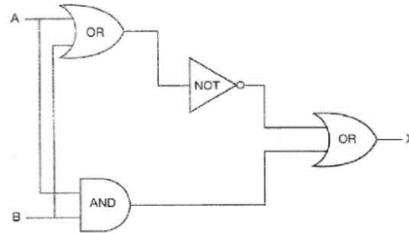# Digital Electronics (Tutorial 1)

1. Write Boolean Expression for the following circuit. Draw the Timing diagram for inputs A and B(10,11,01,10,00)

2. Use algebraic transformations to prove or disprove that the two circuits given in Fig.1 implement the same function(do not use truth table or kmap)
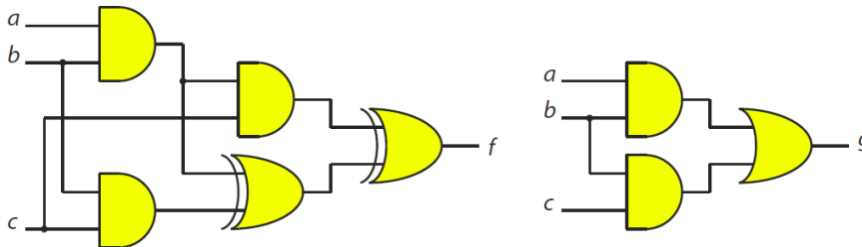

Fig. 1

3. Write Truth table for both circuits and verify their equality.
4. Draw logic diagrams to implement the following Boolean expressions:
   (a) $f = [(u + x')(y' + z)]$
   (b) $f = (u \oplus y)' + x$
   (c) $f = (u' + x')(y + z')$

5. Truthtable of output Y for inputs A, B and C are given.

A	0	1	0	1	0	1	0	1
B	0	0	1	1	0	0	1	1
C	0	0	0	0	1	1	1	1
Y	1	1	1	0	1	0	0	0

(i)Write Minterm list corresponding to output Y

(ii)Write Maxterm list corresponding to output Y

(iii)Write Canonical SOP expression for Y

(iv)Write Canonical POS expression for Y

(v)Reduce expression obtained from (iii) and draw circuit diagram

(vi)Reduce expression obtained from (iv) and draw circuit diagram

(vii)Compare the cost of ckt diagram from (v) and (vi)

Q 6.

Simplify the following Boolean functions T_1 and T_2 to a minimum number of literals:

A	B	C	T_1	T_2
0	0	0	1	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	0	1
1	0	1	0	1
1	1	0	0	1
1	1	1	0	1

Q 7.

Simplify the following Boolean expressions to a minimum number of literals:

(a)* $ABC + A'B + ABC'$ (b)* $x'yz + xz$

(c)* $(x + y)'(x' + y')$ (d)* $xy + x(wz + wz')$

(e)* $(BC' + A'D)(AB' + CD')$ (f) $(a' + c')(a + b' + c')$