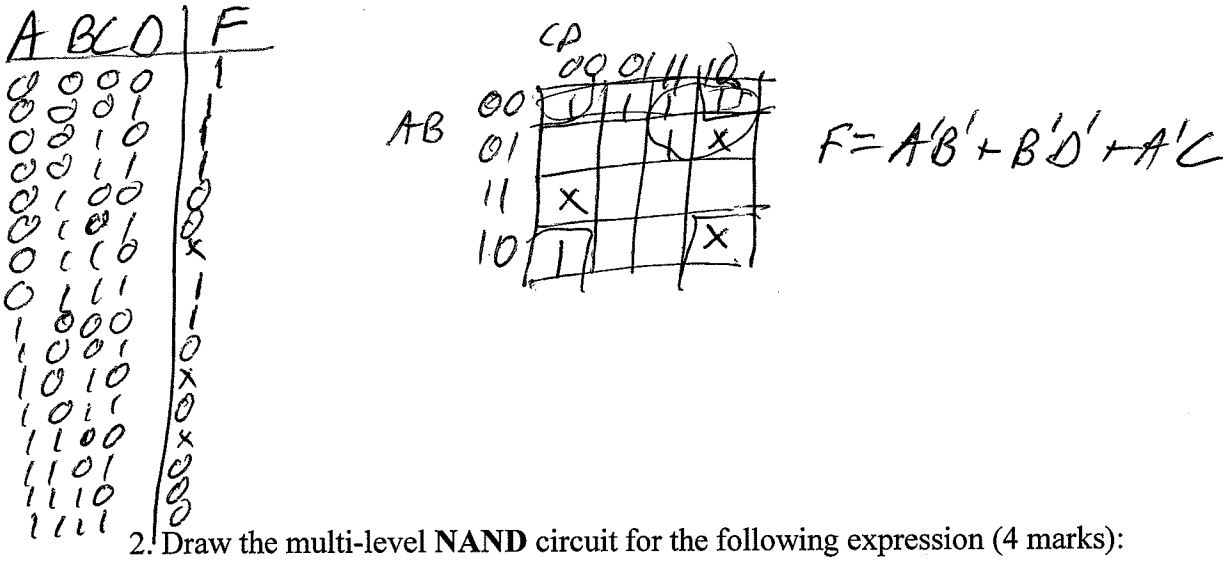
EECE256 Quiz 2 – section 102

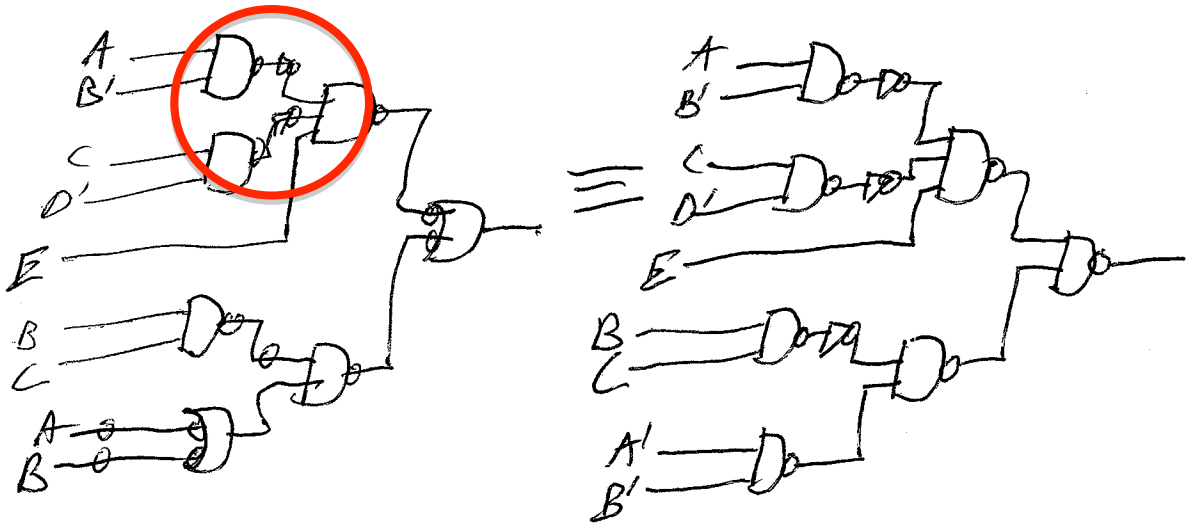
1. Simplify the following Boolean function with the associated don't care conditions using a Karnaugh map: (4 marks)

$F(A,B,C,D) = \sum(0,1,2,3,7,8)$; $d(A,B,C,D) = \sum(6,10,12)$



2. Draw the multi-level **NAND** circuit for the following expression (4 marks):

$F(A,B,C,D,E) = (AB' + CD')E + BC(A+B)$

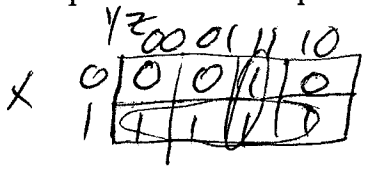


3. A **GTE3** circuit is one whose output is equal to 1 if the binary value of the input variables is **greater than or equal to 3**. Show the following:

a) the truth table for a 3 input version of this circuit: (4 marks)

X Y Z	GTE3
0 0 0	0
0 0 1	0
0 1 0	0
0 1 1	1
1 0 0	1
1 0 1	1
1 1 0	1
1 1 1	1

b) A simplified Boolean equation of this circuit (2 marks)



$GTE3 = YZ + X$

c) A logic diagram of this circuit (2 marks)

4. A 3 input combinational circuit is defined by the following three Boolean functions:

F1 = (y +x')z
F2 = yz'+x'y' + y'z'
F3 = (x + y')z

Design the circuit with a decoder and external gates. Show your design. (4 marks)

$F1 = yz + x'z$

$F2 = yz' + x'y' + y'z'$

$F3 = xz + y'z$

x	y	z	F1	F2	F3
0	0	0	0	1	0
0	0	1	1	1	1
0	1	0	0	1	0
0	1	1	1	0	0
1	0	0	0	0	0
1	0	1	0	1	1
1	1	0	0	1	0
1	1	1	1	0	1