

Please write clearly show your work and present your solutions in the order asked.

(20 pt)

1. Implement the logic function $\overline{C_o} = \overline{AB + AC_i + BC_i}$ using a complementary pull-up and pull-down network.

(20pt) 2) Use a 6-variable Karnaugh Map (2D) to derive a simplified boolean function from this truth table using the Sum of Products method.

A	B	C	D	E	F	Out	A	B	C	D	E	F	Out
0	0	0	0	0	0	0	1	0	0	0	0	0	1
0	0	0	0	0	1	0	1	0	0	0	0	1	0
0	0	0	0	1	0	0	1	0	0	0	1	0	1
0	0	0	0	1	1	0	1	0	0	0	1	1	1
0	0	0	1	0	0	0	1	0	0	1	0	0	0
0	0	0	1	0	1	0	1	0	0	1	0	1	0
0	0	0	1	1	0	0	1	0	0	1	1	0	0
0	0	0	1	1	1	x	1	0	0	1	1	1	1
0	0	1	0	0	0	0	1	0	1	0	0	0	0
0	0	1	0	0	1	x	1	0	1	0	0	1	0
0	0	1	0	1	0	1	1	0	1	0	1	0	1
0	0	1	0	1	1	1	1	0	1	0	1	1	1
0	0	1	1	0	0	0	1	0	1	1	0	0	0
0	0	1	1	0	1	1	1	0	1	1	0	1	0
0	0	1	1	1	0	1	1	0	1	1	1	0	0
0	0	1	1	1	1	1	1	0	1	1	1	1	1
0	1	0	0	0	0	0	1	1	0	0	0	0	0
0	1	0	0	0	1	0	1	1	0	0	0	1	0
0	1	0	0	1	0	1	1	1	0	0	1	0	1
0	1	0	0	1	1	1	1	1	0	0	1	1	1
0	1	0	1	0	0	0	1	1	0	1	0	0	0
0	1	0	1	0	1	0	1	1	0	1	0	1	0
0	1	0	1	1	0	0	1	1	0	1	1	0	0
0	1	0	1	1	1	1	1	1	0	1	1	1	1
0	1	1	0	0	0	0	1	1	1	0	0	0	1
0	1	1	0	0	1	x	1	1	1	0	0	1	1
0	1	1	0	1	0	1	1	1	1	0	1	0	1
0	1	1	0	1	1	1	1	1	1	0	1	1	1
0	1	1	1	0	0	0	1	1	1	1	0	0	1
0	1	1	1	0	1	1	1	1	1	1	0	1	1
0	1	1	1	1	0	1	1	1	1	1	1	0	1
0	1	1	1	1	1	1	1	1	1	1	1	1	1

3) (10 p) Convert the following numbers from the bases as indicated.

a.) dead (hex) __ (binary)

b.) beef (hex) __ (binary)

c.) 10010101011 (binary) __ (hex)

d.) 1A7 (hex) __ (decimal)

4)

a) (10) List all 3bit signed numbers 2's complement binary notation and in decimal .

b)(10) in binary notation for 3bit unsigned numbers (where the result should be in 3 bit 2's complement notation) calculate

i) -2×-1

ii) 2×-1

iii) 3×-1

iv) 2×2

v) 2×-2

(30) 5)

(10) a) Derive the truth table for multiplication of two numbers where each number is represented in 2's complement notation.

(20) b) Find the sop and draw the circuit diagram the 2's complement two bit multiplier. (Each input and output should be two bits)

In []: