

Problem #1 7-10

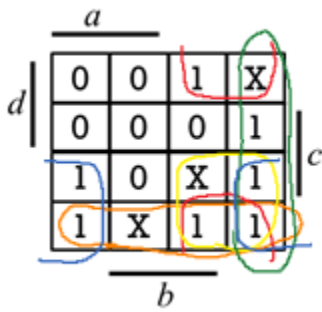
7)

Bar Value	Binary Representation
1.5	0000
2	0001
2.5	0011
3	0010
3.5	0110
4	0111
5	0101
5.5	0100
6	1100
7	1101
8	1111
9	1110

Used gray code because converting from analog to binary signal.

8)

a.



prime implicants:
 $\bar{a}\bar{c}, \bar{b}\bar{d}, \bar{a}\bar{b}, \bar{a}\bar{d}, \bar{c}\bar{d}$

b.

	<u>a</u>			
d	0	0	1	X
	0	0	0	1
	1	0	X	1
	1	X	1	1
	<u>b</u>			
	c			

non-essential prime
 implicants:
 $\overline{a}d, \overline{c}d$

c.

	<u>a</u>			
d	0	0	1	X
	0	0	0	1
	1	0	X	1
	1	X	1	1
	<u>b</u>			
	c			

minimum SOP:
 $F = \overline{a}c + \overline{b}d + \overline{a}b$

d.

	<u>a</u>			
d	0	0	1	X
	0	0	0	1
	1	0	X	1
	1	X	1	1
	<u>b</u>			
	c			

minimum POS:
 $F = (\overline{a} + \overline{d})(\overline{b} + \overline{c})$

$23_{10} = 10111_2$
 $0.15_{10} \cdot 2_{10} = 0.30_{10}$
 $0.30_{10} \cdot 2_{10} = 0.60_{10}$
 $0.60_{10} \cdot 2_{10} = 1.20_{10}$
 $0.20_{10} \cdot 2_{10} = 0.40_{10}$
 $0.15_{10} = 0.0010_2$

$31_{10} = 11111_2$
 $0.11_{10} \cdot 2_{10} = 0.22_{10}$
 $0.22_{10} \cdot 2_{10} = 0.44_{10}$
 $0.44_{10} \cdot 2_{10} = 0.88_{10}$
 $0.88_{10} \cdot 2_{10} = 1.76_{10}$
 $0.11_{10} = 0.0001_2$

10111.0010_2
 $+ 11111.0001_2$

 110110.0011_2

a)

$$4789$$

$$Y=0$$

$$Y=0 \cdot 9_{11} + 4_{11} = 4_{11}$$

$$Y=4_{11} \cdot 9_{11} + 7_{11} = 3A_{11}$$

$$Y=4_{11} \cdot 9_{11} + 7_{11} = 3A_{11}$$

$$Y=3A_{11} \cdot 9_{11} + 8_{11} = \boxed{32A_{11}}$$

b)

