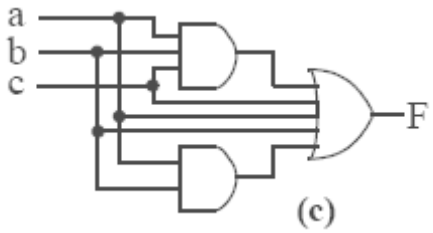
2.30.c.

F(a,b,c) = abc + ab + a + b + c



(c)

2.31

F = (ab’ + b)’

2.34.c

Inputs Outputs
a b c F
0 0 0 1
0 0 1 0
0 1 0 1
0 1 1 0
1 0 0 1
1 0 1 1
1 1 0 1
1 1 1 1

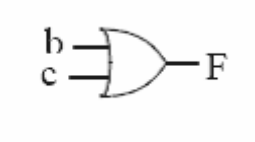
2.36

F = a’b’c + a’bc’ + a’bc + ab’c + abc’ + abc

2.37

F = a’b’c + a’bc’ + a’bc + ab’c + abc’ + abc
F = a’(b’c + bc’ + bc) + a(b’c + bc’ + bc)
F = a’(b’c + b(c’ + c)) + a(b’c + b(c’ + c))
F = a’(b’c + b) + a(b’c + b)
F = (a’ + a)(b’c + b)
F = b’c + b
F = (b’+b)(c+b)
F = (c+b)

2.44



2.47(a)

F(a,b,c) = a'bc + abc' + abc

2.50

The circuit in Figure 2.4 represents the equation H = ab + b'c. In canonical sum-of-minterms form, H = abc' + abc + a'b'c + ab'c, which is equivalent to G.

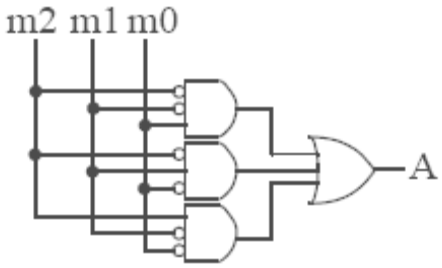
2.54

Step 1 - Capture the function

Inputs Outputs
m2 m1 m0 A
0 0 0 0
0 0 1 1
0 1 0 1
0 1 1 0
1 0 0 1
1 0 1 0
1 1 0 0
1 1 1 0

Step 2 - Convert to equations
A = m2'm1'm0 + m2'm1m0' + m2m1'm0'

Step 3 - Implement as a gate-based circuit



2.57

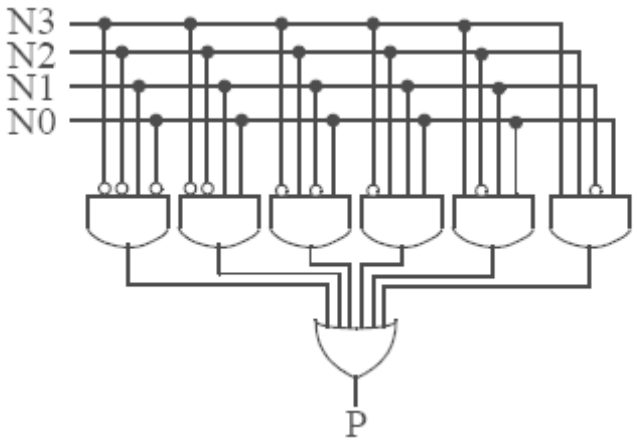
Step 1 - Capture the function

Inputs Outputs

N3 N2 N1 N0 P

0 0 0 0 0
0 0 0 1 0
0 0 1 0 1
0 0 1 1 1
0 1 0 0 0
0 1 0 1 1
0 1 1 0 0
0 1 1 1 1
1 0 0 0 0
1 0 0 1 0
1 0 1 0 0
1 0 1 1 1
1 1 0 0 0
1 1 0 1 1
1 1 1 0 0
1 1 1 1 0

Step 2 - Convert to equations
P = N3’N2’N1N0’ + N3’N2’N1N0 + N3’N2N1’N0 + N3’N2N1N0 + N3N2’N1N0 + N3N2N1’N0
Step 3 - Implement as a gate-based circuit



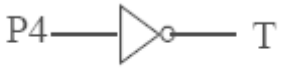
2.59 Step 1 - Capture the function

Skipped - we'll use an equation directly.

Step 2 - Convert to equations

T' = P4

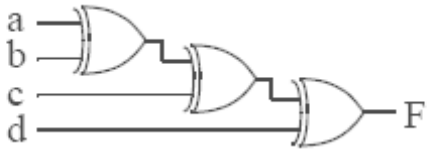
Step 3 - Implement as a gate-based circuit



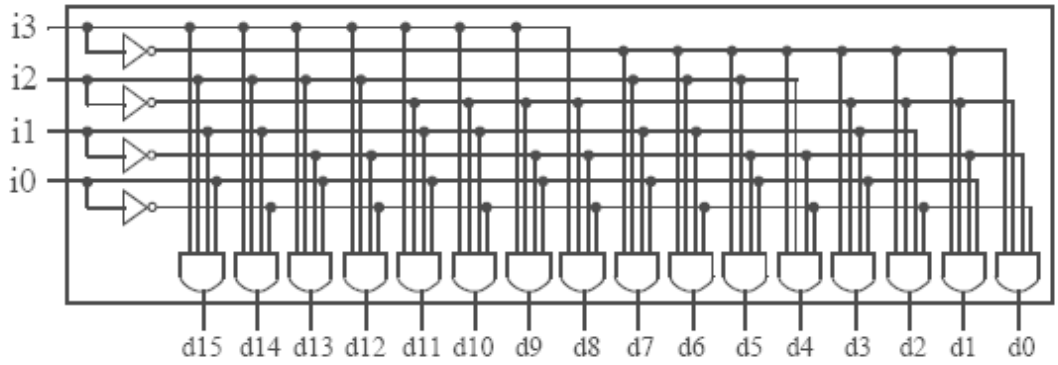
2.64

F = (a XOR b) + (c XOR d) + ac

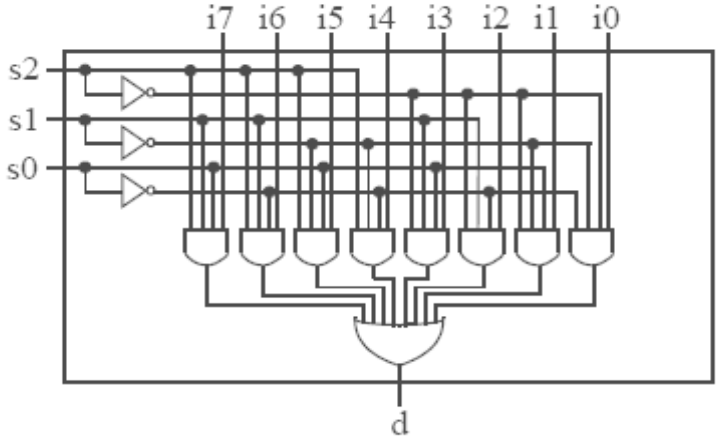
2.65



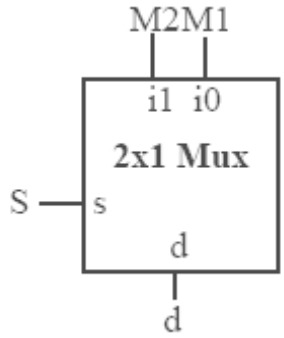
2.70



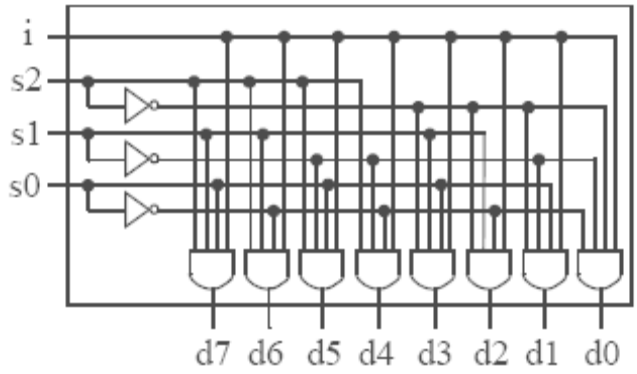
2.72



2.75



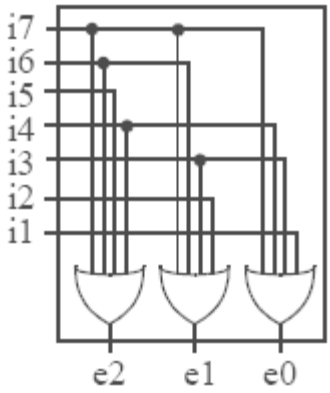
2.78



2.80

Inputs Outputs
i7 i6 i5 i4 i3 i2 i1 i0 e2 e1 e0
0 0 0 0 0 0 0 1 0 0 0
0 0 0 0 0 0 1 0 0 0 1
0 0 0 0 0 1 0 0 0 1 0
0 0 0 0 1 0 0 0 0 1 1
0 0 0 1 0 0 0 0 1 0 0
0 0 1 0 0 0 0 0 1 0 1
0 1 0 0 0 0 0 0 1 1 0
1 0 0 0 0 0 0 0 1 1 1

e2 = I7 + I6 + I5 + I4
e1 = I7 + I6 + I3 + I2
e0 = I7 + I5 + I3 + I1



2.81

Inputs Outputs
i3 i2 i1 i0 e1 e0
0 0 0 0 0 0
0 0 0 1 0 0
0 0 1 0 0 1
0 0 1 1 0 1
0 1 0 0 1 0
0 1 0 1 1 0
0 1 1 0 1 0
0 1 1 1 1 0
1 0 0 0 1 1
1 0 0 1 1 1
1 0 1 0 1 1
1 0 1 1 1 1
1 1 0 0 1 1
1 1 0 1 1 1
1 1 1 0 1 1
1 1 1 1 1 1

e1 = i3 + i2
e0 = i3 + i2’i1