FINAL EXAM: ECE 6140 FALL 2011
NAME:
GT ID NO:

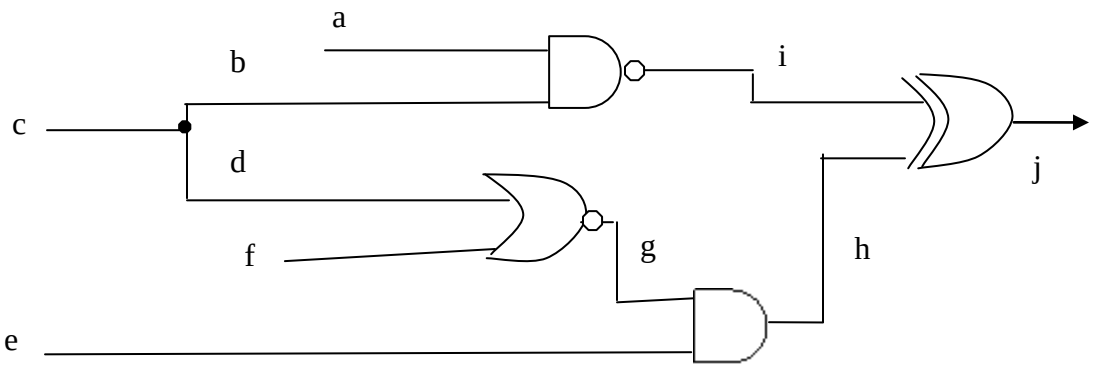


Figure 1. Test Ckt.

Prob 1 (10 points): For the fault set {a0, a1, b0, b1, c0, c1, d0, d1, e0, e1, f0, f1} in Figure 1 , perform deductive fault simulation with the input vector acfe = [1,1,0,1]. Give all the fault lists below.

La =

Lb =

Lc =

Ld =

Le =

Lf =

Lg

Lh

Li

Lj

The following faults are detected =

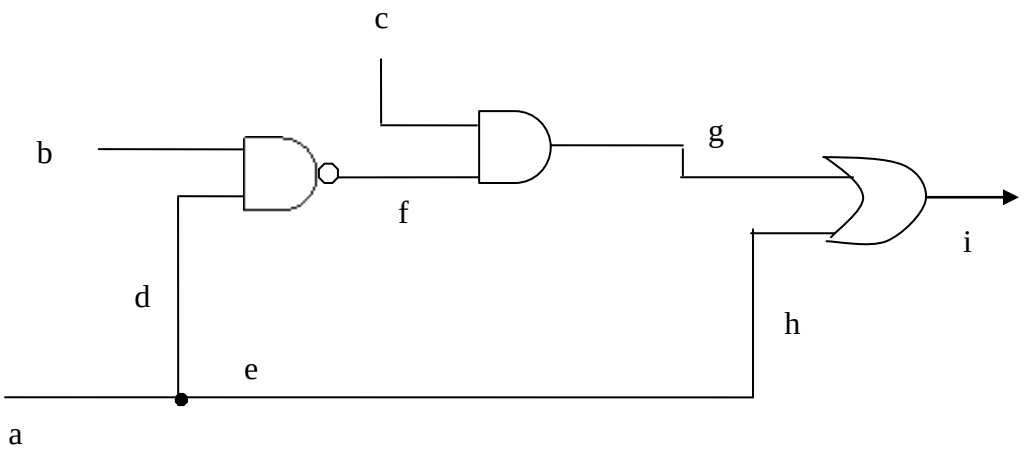


Figure 2. Test Ckt.

Prob 2 (10 points): For the circuit of Figure 2, identify *all* the redundant faults in the circuit if any or say that all faults are detectable.

Prob 3 (10 points): For the circuit of Figure 3:

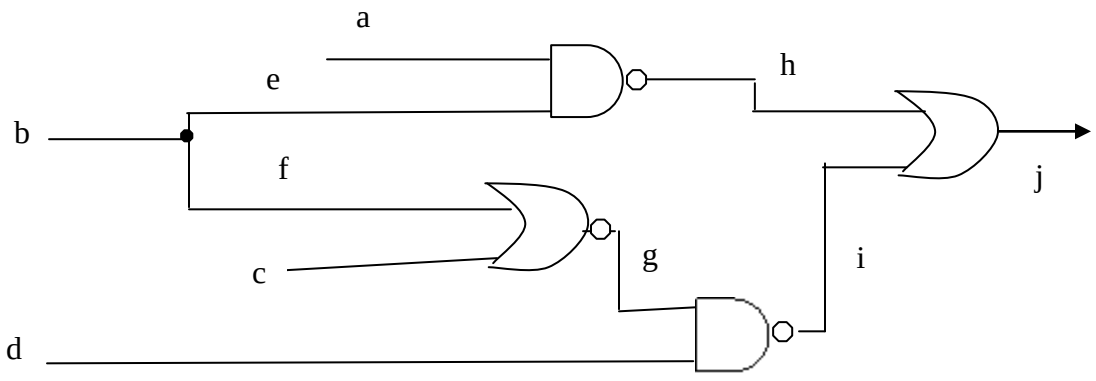


Figure 3. Test Ckt.

There are 20 stuck-at faults in the circuit of Figure 3, 2 in each of the lines a thru j. Starting with all 20 faults, reduce the fault set using equivalent and dominant fault collapsing as follows (*read carefully*).

Using crosses (stuck at 0) and ticks (stuck at 1), show the set of faults in the Figure below *after only equivalent fault collapsing*:

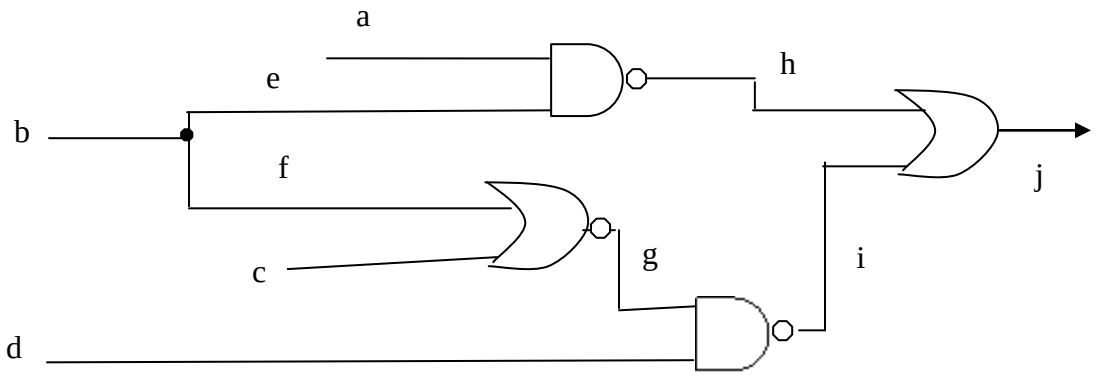


Figure 3a. Test Ckt after Equivalent fault collapsing

Now, using crosses (stuck at 0) and ticks (stuck at 1) again, show the set of faults remaining after performing equivalent *and* dominant fault collapsing in Figure 3b (i.e. perform dominant fault collapsing on the faults remaining in Figure 3a).

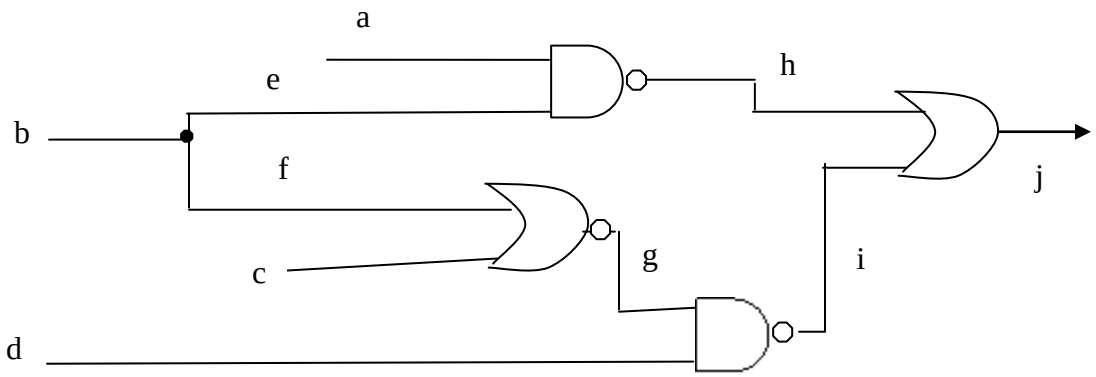
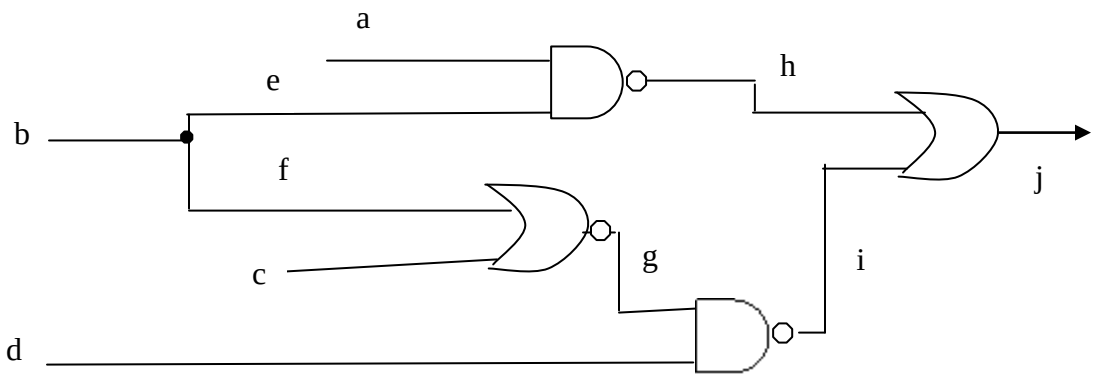
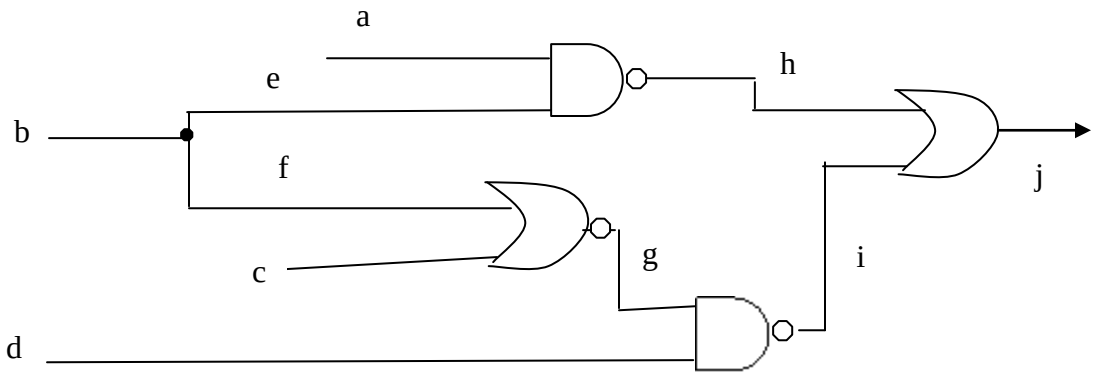


Figure 3b. Test Ckt after Equivalent *and* Dominant fault collapsing

You may use the figures below for rough work:



Rough Work:



Rough Work:

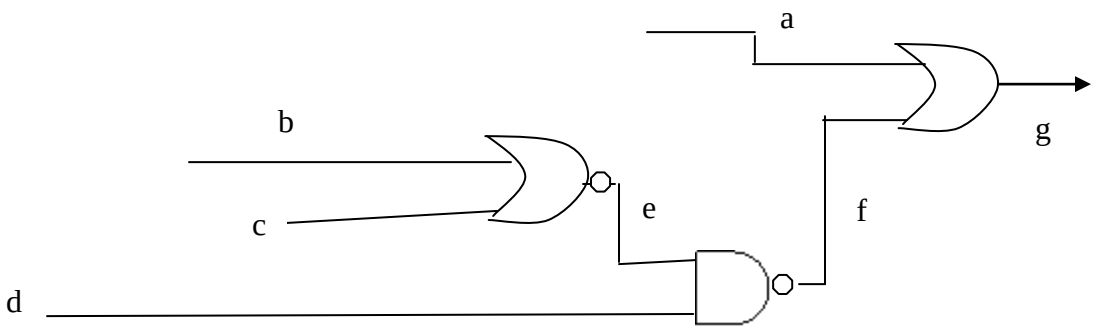


Figure 4. Test Circuit.

Prob 4 (10 points): Give a list of *ALL* the test vectors that detect the AND type bridging fault between lines d and a in Figure 4.

PROB 5 (10 points): Consider an LFSR for which $P^*(x) = x^3+x+1$.

(a) What is the signature (remainder) for a data sequence for which $G(x) = x^6 +x^4+x+1$.

R(x) =

(b) Draw the LFSR below.

(c) Give one erroneous data sequence (erroneous generator polynomial for data sequence) that will give the *same* signature as the data sequence in part (a) above.

PROB 6 (10 points) A FSM has two flip flops with outputs A and B and inputs D(A) and D(B) respectively. The FSM has an input I and one output Z. The equations for the FSM are given below (XOR = Exclusive-OR).

D(A) = A OR B
D(B) = A XOR I
Z = B

(XOR = exclusive OR, OR = logical OR)
Initially, at t=0, A(0) = B(0) = 0.
Starting with the above initial states, find a test sequence of *minimal* length that detects the fault D(A) stuck-at-0.