CMPE 646 Final Exam

Name:

This exam has 5 pages and 15 questions.

You must show all of your work -- partial credit may be given to partially correct answers, while answers with no justification may not receive full points. Use the back of the exam sheets if you need extra space.

1) (10 pts) For path delay test, if the on-path input to a gate along a tested path changes from the *dominant* input state to the *non-dominant* input state of the gate, what are the constraints on the behavior of the off-path nodes in order for the test to be robust?

2) (10 pts) Launch-on-shift and launch-on-capture are two alternative strategies for performing delay test in a scan environment. Briefly explain how V2 is generated in each of these schemes.

3) (6 pts) Name 2 advantages of using RPG to generate test patterns.

4) (6 pts) Name (do NOT describe) 3 types of ATPG algorithms of the 5 discussed in class (exclude exhaustive).

5) (6 pts) How is a *D-cube* used in the *D-algorithm*, i.e., what phase(s) is it used in and what is its purpose?

6) (8 pts) Give one possible assignment to the nodes in the following circuit that would be consistent with the operations carried out by the *D-algorithm* for the SA1 fault shown.
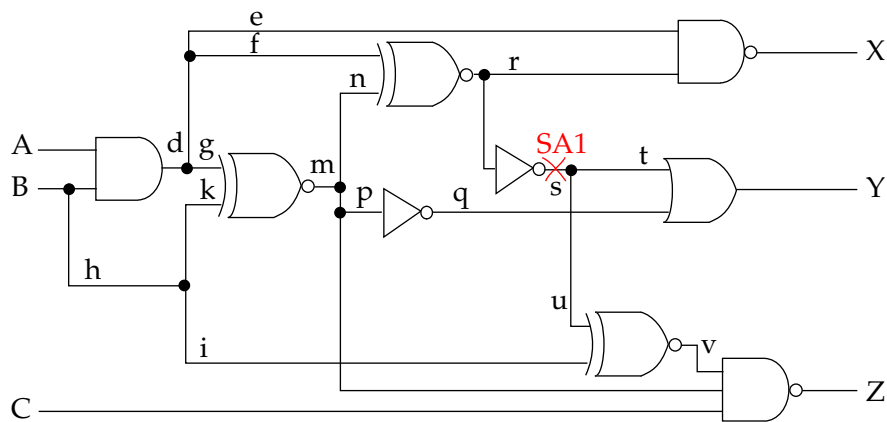

7) (6 pts) What supplementary information does PODEM make use of to help it make the best choice among a set of alternatives?

8) (6 pts) What purpose(s) does fault simulation serve for test engineers?

9) (6 pts) Briefly describe 3 DISadvantages of compiled simulation.

10) (6 pts) Fill in the fault lists associated with deductive fault simulation for the following circuit and test vector.
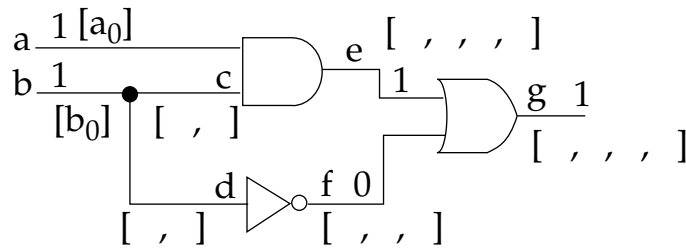

11) (6 pts) Deductive fault simulation is symbolic. What is concurrent fault simulation based on and name one advantage it has over deductive fault simulation?

12) (6 pts) Name the advantage of using the following NAND version of LSSD, i.e., how does it help reduce the adverse impact of scan on timing?
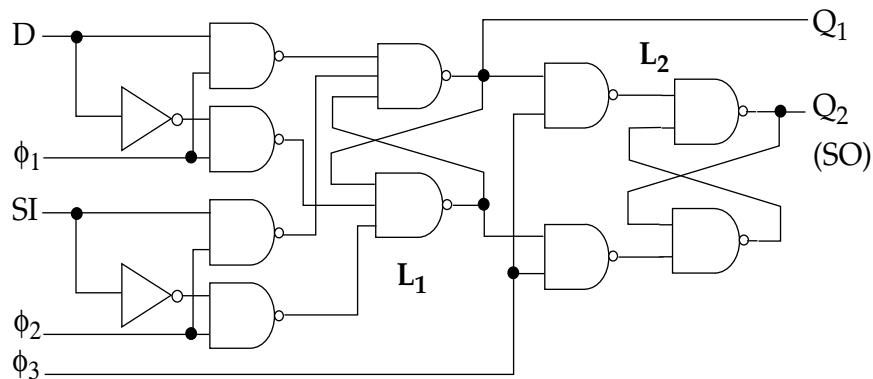
13) (6 pts) Give the polynomial implemented by the following LFSR. Is it *primitive*? What is the length of the test sequence produced before repetition begins given the initial state of $Y_1 Y_2 Y_3 = 001$?
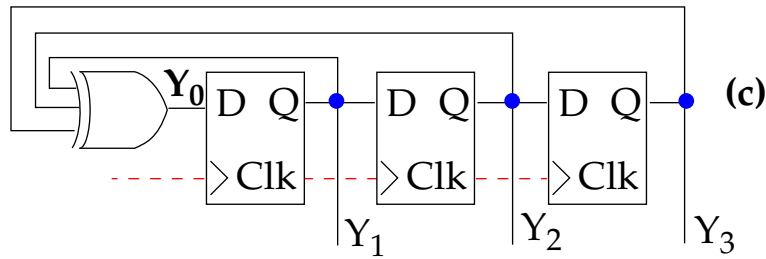
14) (6 pts) LFSRs perform division and multiplication using *modulo 2* addition and subtraction. Compute $Q(X)$ and $R(X)$ using the following polynomials:

$$\overset{\longleftarrow\ Q(X)}{X^3 + X^2 + 1 \sqrt{X^7 + X^5 + X^4 + 1}}$$

$\longleftarrow R(X)$

15) (6 pts) What fundamental change exists in the circuit diagram of an LFSR used for pattern generation versus one that is configured for response compaction?