Problem 1 (20 Points)

a. Mark all single stuck faults on Figure 1 below, taking one fault from each equivalence class.
b. Use the Boolean difference to determine all possible tests for the fault “primary input A stuck-at-0”.
c. Use the D-algorithm to obtain a test pattern T that detects the fault “line α stack-at-0” in the logic circuit.

![Figure 1](image.png)

Problem 2 (20 Points)

d. Mark all single stuck faults on Figure 2, taking one fault from each equivalence class.
e. Use the Boolean difference to determine all possible tests for the fault “primary input A stuck-at-0”.
f. Use the D-algorithm to obtain a test pattern T that detects the fault “line α stack-at-1” in the logic circuit.
Problem 3 (20 Points)
Consider Figure 3 in which 4 processes (p, q, r, and s) execute concurrently and exchange information by message passing. Consider the following global states

I. $GS_1 = \{LS_{p1}, LS_{q1}, LS_{r1}, LS_{s1}\}$
II. $GS_2 = \{LS_{p2}, LS_{q2}, LS_{r2}, LS_{s2}\}$
III. $GS_3 = \{LS_{p3}, LS_{q3}, LS_{r3}, LS_{s3}\}$
IV. $GS_4 = \{LS_{p4}, LS_{q4}, LS_{r4}, LS_{s4}\}$

Discuss whether each of the indicated global state is a consistent or inconsistent global state.