Chapter 3 Static Logics Gates, AOIs, and Stick Diagrams

1. Convert the following logic expressions to CMOS AOI circuits and hand-draw the stick diagrams of the layouts. (20 points)

(a) G = $\bar{A}$

(b) G = $\overline{(A \cdot B)}$

(c) G = $\overline{(A + B)}$

(d) G = $A \cdot B$

(e) G = $\overline{(A + B) \cdot (C + D) \cdot E}$

(f) G = $\overline{(A \cdot B) + (C \cdot D)}$

(g) G = $\overline{(A \cdot B + C)} \cdot \bar{D}$

(h) G = $\overline{(A \cdot B)} + A \cdot B$

2. Implement XOR and XNOR gates using AOI logic in ElectricVLSI. Verify the logic using simulations. (20 points)

3. Use ElectricVLSI to design a 3-bit subtractor (2's complement). Use XOR gates as the control units. Use the C5 model file. Verify the logic by simulating at least three input combinations. (schematic only, no layout). (20 points)

4. Use ElectricVLSI to design a 3-bit subtractor (2's complement). Use MUXes as the control units. Use the C5 model file. Verify the logic by simulating at least three input combinations. (schematic only, no layout). (20 points)

5. Verify AOI logic for a Full Adder (Page 367) by hand using logic equations/theorems. Build it in Electric VLSI and verify the logic using simulations (use the C5 model file). (20 points)