

- P1. (10 points) Problem 2.4 in the textbook.
- P2. (10 points) Problem 2.7 in the book after replacing the first word “Determine” with the word “Show.” Use Boolean algebra for part (a). Use truth table method for parts (b) and (c).
- P3. (10 points) Draw logic circuits for the left hand side expressions for parts (a), (b) and (c) of Problem 2.7 in the book.
- P4. (20 points) Consider the logic function $f(a,b,c) = abc + ab'c + a'bc + a'b'c + ab'c'$.
- (a) (4 points) Draw the logic circuit for the function f given above.
 - (b) (4 points) Let the cost of a logic circuit be the total number of gates plus the total number of inputs to all gates in the circuit. (See pages 49-50 in the book for examples.) What is the cost of the circuit in (a)?
 - (c) (4 points) Simplify f using Boolean algebra as much as possible.
 - (d) (4 points) Draw the logic circuit for the simplified version of f in (c).
 - (e) (4 points) What is the cost of the circuit in (d)?
- P5. (20 points) A function f has four inputs $x, y, z,$ and w and one output such that the output is a 1 if and only if the number of 1s in the inputs is either one or three.
- (a) (4 points) Derive the truth table for f .
 - (b) (4 points) Write the canonical sum-of-products expression for f . Do not use the shorthand notation.
 - (c) (2 points) Write the canonical sum-of-products expression for f in shorthand notation.
 - (d) (2 points) Write the canonical sum-of-products expression for f' in shorthand notation.
 - (e) (4 points) Write the canonical product-of-sums expression for f . Do not use the shorthand notation.
 - (f) (2 points) Write the canonical product-of-sums expression for f in shorthand notation.
 - (g) (2 points) Write the canonical product-of-sums expression for f' in shorthand notation.
- P6. (10 points) Problem 2.10 in the book. Show steps.
- P7. (10 points) Problem 2.14 in the book. Show steps.
- P8. (10 points) Problem 2.18 in the book. Reason clearly.