Due: November 11, 2004

1. (30 points) Draw schematics for the following functions using AND, OR and NOT gates. (Do not simplify the formulas.)
   (a) \(\overline{XY} + XY\overline{Z} + XYZ\)
   (b) \((X\overline{Y} + \overline{WZ})(W\overline{X} + Y\overline{Z})\)
   (c) \((X + Y)(\overline{X} + \overline{Y})\)

2. (30 points) Using the postulates and theorems of Boolean algebra in Table A-1 (p. 451), simplify the following formulas. Show all of your work.
   (a) \(WXYZ(WXY\overline{Z} + WXYZ + WX\overline{YZ} + WX\overline{Y}Z)\)
   (b) \(AB + AB\overline{C}D + AB\overline{DE} + AB\overline{C}E + \overline{C}DE\)
   (c) \(MNO + \overline{QPN} + PRM + \overline{QOMT} + MR\)

3. (40 points) For each CMOS circuit below,
   (a) Provide a truth table for the circuit’s function.
   (b) For diagram (a), write down the Sum-of-Products (SOP) Boolean formula for the truth table. For diagram (b), write down the Product-of-Sums (POS) Boolean formula.
   (c) Simplify the SOP or POS formula using the postulates and theorems of Boolean Algebra (p. 451). Show all work.
   (d) Draw the logic diagram of the simplified formula using AND, OR, NAND, NOR and NOT gates.