You are expected to solve homework problems individually. If needed, you may seek help from your friends. However, do not copy. Show all steps with your solutions for full credit.

**Name: / 50**

1. (2 + 8+5+5 points) Construct a block diagram and function table for 8X1 Mux. Derive the Boolean expression and draw the logic diagram.
2. (10 points) Construct a 16 x 1 multiplexer with two 8 x 1 and one 2 x 1 multiplexers. Use block diagrams for the Mux.
3. (10+5+5 points) A combinational circuit is specified by the following Boolean functions. Design the combinational circuit using a Multiplexer and external gates,
   1. *F(A, B, C, D) =* ∑m(0, 2, 5, 11, 12, 13, 14, 15). Implement this function with 4X1 MUX and external gates if needed.
   2. *F(A, B, C, D) =*∑m(2, 5, 7, 8, 10, 11, 13, 15). Implement this function with 8X1 MUX and external gates if needed.
   3. F3 (A, B, C, D) =∑m(0, 2, 4, 6, 8, 9, 10, 15). Implement this function with 16X1 MUX and external gates if needed.