

(a) Show how to implement any Boolean function of 10 variables using a ROM module (of size 256 x 8 bits) and a 4-to-1 multiplexer. (i.e., draw a block diagram showing how to connect these modules, and clearly indicate/label inputs and outputs for each module).

(b) Consider the following circuit implementing single input ( $x$ ), single output ( $Z$ ) sequence detector. Assuming the initial state is always  $Q1\ Q2\ Q3 = 000$ , construct a *minimal* state table for a circuit that performs the same function as this circuit. What is the input pattern detected by this circuit?

*Note:* a minimal state table ~ state table with minimal number of states.

