Lab Quiz 10

The following Verilog program applies to the questions on this quiz. Complete the PS-NS table and state transition diagram to determine the answers.

```
module mystery_sequence_generator(CLK, Q);
  input wire CLK;
  output reg [2:0] Q;

  reg [2:0] next_Q;

  always @ (posedge CLK) begin
    Q <= next_Q;
  end

  always @ (Q) begin
   next_Q[2] = Q[1]&~Q[0] | ~Q[2]&Q[1] | Q[2]&~Q[1]&Q[0];
   next_Q[1] = ~Q[1]&Q[0] | Q[2]&Q[1]&~Q[0];
   next_Q[0] = Q[2]&~Q[0] | ~Q[1]&~Q[0];
  end

endmodule
```

Q2	Q1	Q0	Q2*	Q1*	Q0*
0	0	0	0	0	1
0	0	1	0	1	0
0	1	0	1	0	0
0	1	1	1	0	0
1	0	0	0	0	1
1	0	1	1	1	0
1	1	0	1	1	1
1	1	1	0	0	0

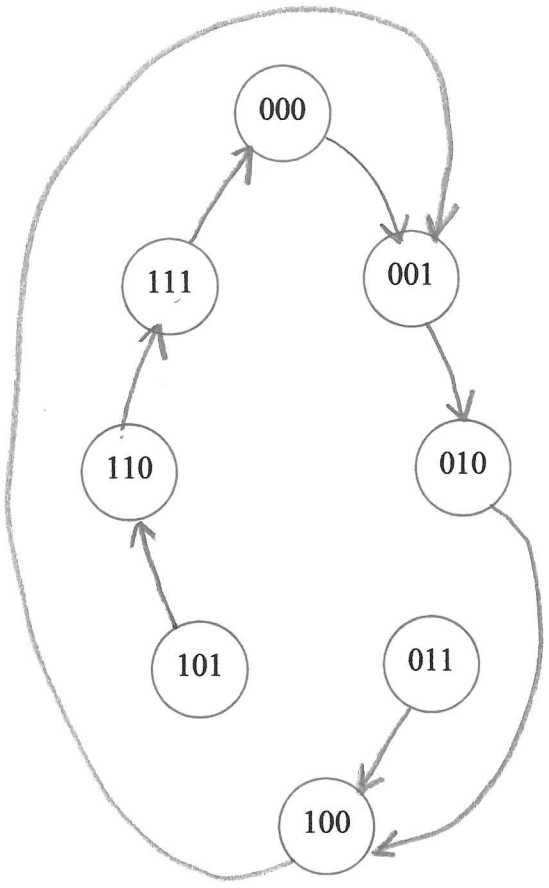
1. The number of states in the **periodic sequence** is:
   (A) 1 (B) 3 (C) 6 (D) 8 (E) none of these

2. **Another name** sometime used for the periodic sequence realized here is:
   (A) one hot
   (B) two hot
   (C) switchtail
   (D) twisted ring
   (E) none of the above

3. The **maximum** number of clock cycles needed for **self-correction** is:
   (A) ≤ 1 (B) 2 (C) 3 (D) 4 (E) ≥ 5

4. The number of **state variables** needed to **uniquely decode** each of the states in the periodic sequence is:
   (A) 0 (B) 1 (C) 2 (D) 3 (E) none of these

5. The "mystery sequence generator" is a:
   (A) binary UP counter
   (B) Gray code counter
   (C) Johnson counter
   (D) ring counter
   (E) none of the above



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