

ECE 238 – Quiz 3

Name:.....

Date:.....

1- Consider the following code:

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1  entity asm is
2  port(
3      clk      : in std_logic;
4      x        : in std_logic;
5      z        : out std_logic;
6      y        : out std_logic
7  );
8  end asm;
9  architecture behavioral of asm is
10 type state_type is (a, b);
11 signal state, next_state : state_type;
12 begin
13 p1: process (clk)
14 begin
15     if (clk = '1') then
16         state <= next_state;
17     end if;
18 end process;
19 p2: process (start, state)
20 begin
21     case state is
22     when a =>
23         if x = '1' then
24             next_state <= b;
25         else
26             next_state <= a;
27         end if;
28     when b =>
29         if x = '0' then
30             next_state <= a;
31         else
32             next_state <= b;
33         end if;
34     end case;
35 end process;
36 p3: process (state)
37 begin
38     case state is
39     when a =>
40         z <= '0';
41     when b =>
42         z <= '1';
43     end case;
44 end process;
45 p4: process (state, x)
46 begin
47     case state is
48     when a =>
49         if x = '1' then
50             y <= '1';
51         else
52             y <= '0';
53         end if;
54     when b =>
55         if x = '1' then
56             y <= '0';
57         else
58             y <= '1';
59         end case;
60 end process;
61 end behavioral;

```

- (a) Draw the state diagram.
- (b) Draw the ASM diagram.
- (c) Is z a Moore output? Why?
- (d) Is y a Moore output? Why?
- (e) Complete the timing diagram.

