ET401 – Quiz 3
Fall 2019

The following questions refer to the counters and timers found in the PLC Fiddle simulator. These are shown in the figure below. Consider the case where the counters are to count up or down by 5, the timers are to time up or down for 5 seconds.

1. To make the counting up work, what is set to 5 before counting starts?
   - a. EN
   - b. ACC
   - c. PRE
   - d. Q
   - e. None of the above

2. To make the counting down work, what is set to 5 before counting starts?
   - a. EN
   - b. ACC
   - c. PRE
   - d. Q
   - e. None of the above

3. To make the timing-on-delay work, what is set to 5?
   - a. EN
   - b. ACC
   - c. PRE
   - d. Q
   - e. None of the above

4. To make the timing-off-delay work, what is set to 5?
   - a. EN
   - b. ACC
   - c. PRE
   - d. Q
   - e. None of the above

5. For all five components, which statement is true?
   - a. TGR and EN are always the same
   - b. ACC always increments up toward PRE
   - c. PRE always increments toward ACC
   - d. Before the counting/timing is done, Q is always low
   - e. None of the above
6. The “TT” for a counter could be constructed with which of the following logical expressions?
   a. ACC < PRE
   b. ACC > PRE
   c. 0 < ACC < PRE
   d. Q = 0
   e. None of the above

7. The following is true for both the TON and the TOF:
   a. Q is low whenever TT is high
   b. Q goes high when TT goes low
   c. Q goes low when TGR goes low
   d. Q goes high when TGR goes low
   e. None of the above

8. For which of the timers is it true that when TT is high, Q is also high?
   a. TON
   b. TOF
   c. TON and TR
   d. TON and TOF
   e. None of the above

9. Which of the timers needs a separate reset?
   a. TON
   b. TOF
   c. TR
   d. TON and TOF
   e. None of the above

10. For which counter or timer is it true that when ACC < PRE, Q is high?
    a. CTU
    b. CTD
    c. TON
    d. TOF
    e. TR
Questions 11-20 refer to the plots of the time-sequence diagrams below.

11. If 1 and 2 are inputs to a function block, what logical function is performed by the block if 3 is its output?
   
   a. AND
   b. OR
   c. NAND
   d. XOR
   e. None of the above

12. If 1 and (NOT 2) are inputs to a function block, what logical function is performed by the block if 4 is its output?
   
   a. OR
   b. AND
   c. XOR
   d. NOR
   e. None of the above

13. If 1 and (NOT 2) are inputs to a function block, what logical function is performed by the block if 5 is its output?
   
   a. OR
   b. NAND
   c. NXOR
   d. NOR
   e. None of the above

14. If 4 and 5 are inputs to a function block, and that function block produces a result that is always low, what is that function block?
   
   a. OR
   b. AND
   c. XOR
   d. NXOR
   e. None of the above

15. The snaggle-tooth output 6 is produced by inputs 1 and 2 going into what type of function block?
   
   a. OR
   b. XOR
   c. NOR
   d. NXOR
   e. None of the above

16. If 1 and 3 are inputs to a function block, what logical function is performed by the block if 5 is its output?
   
   a. OR
   b. NAND
   c. NXOR
   d. NOR
   e. None of the above
17. 3 NAND 5 produces which curve?
   a. 1
   b. 2
   c. 4
   d. 6
   e. None of the above

18. 5 NAND 6 produces which curve?
   a. 1
   b. 3
   c. 4
   d. 7
   e. None of the above

19. What two curves input to an XOR block produce a result that is always high?
   a. 1 and 6
   b. 2 and 7
   c. 5 and 6
   d. 4 and 5
   e. None of the above

20. You could get 1 in which way below?
   a. (NOT 6) AND 7
   b. 3 XOR (NOT 7)
   c. 4 AND (NOT 5)
   d. 6 AND (NOT 7)
   e. None of the above

21. The function-block network below has its inputs perturbed in the standard way. i.e. \( A = 0/1/0/1 \) and \( B = 0/0/1/1 \).

   What will be the corresponding values for C?
   a. 0/0/0/1
   b. 0/1/1/1
   c. 1/0/0/1
   d. 1/1/1/0
   e. None of the above

22. What will be the corresponding values for D?
   a. 0/0/0/1
   b. 0/1/1/1
   c. 1/0/0/1
   d. 1/1/1/0
   e. None of the above

23. What will be the corresponding values for E?
   a. 0/0/0/1
   b. 0/1/1/1
c. 0/0/0/0
  d. 1/1/1/1
  e. None of the above

The function-block network below has its inputs perturbed in the standard way. i.e. A = 0/1/0/1 and B = 0/0/1/1.

24. What will be the corresponding values for C?
   a. 0/0/0/1
   b. 0/1/1/1
   c. 0/0/0/1
   d. 1/1/1/0
   e. None of the above

25. What will be the corresponding values for D?
   a. 0/1/0/1
   b. 0/0/1/1
   c. 1/0/1/0
   d. 1/1/0/0
   e. None of the above

26. What will be the corresponding values for E?
   a. 0/0/0/1
   b. 1/0/0/0
   c. 0/1/1/0
   d. 1/0/0/1
   e. None of the above