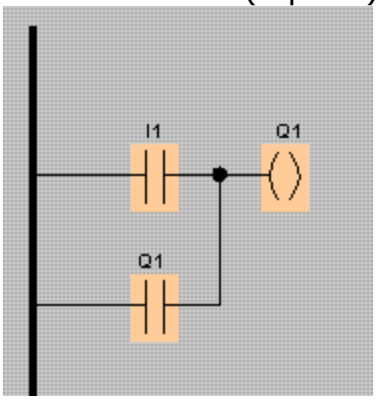
PLC
Worksheet

1. In general The start button for a motor is : (2 points)
   - Normally opened switch
   - Normally closed switch
   - Normally opened pushbutton
   - Normally closed pushbutton

2. Latch circuit is used to make sure that a motor is not running in 2 directions at the same time. (1 point)
   - True
   - False

3. According to the following program, once Q1 is switched ON, then it cant be switched off (1 point)




   - True
   - False

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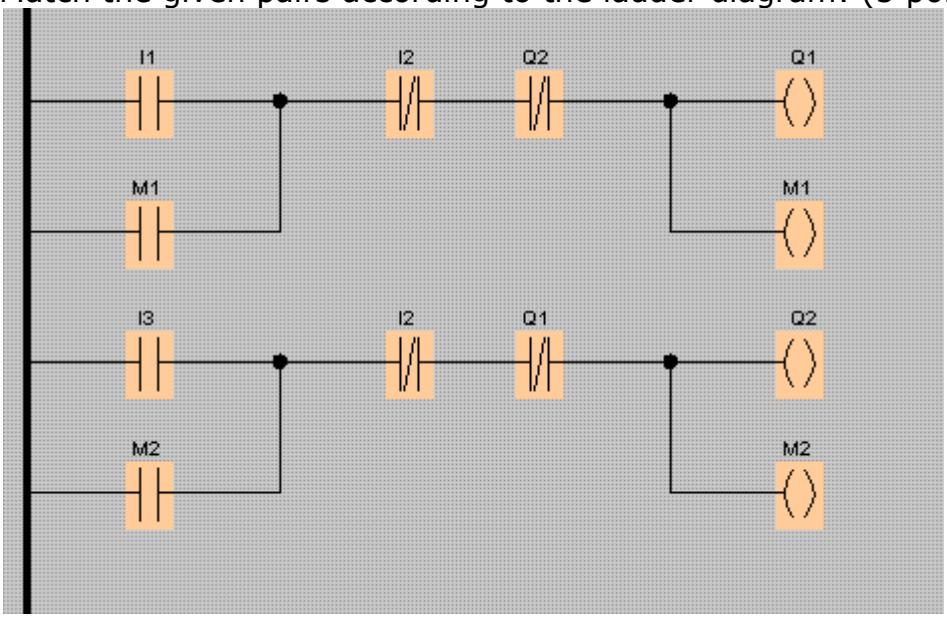
4. The following program is used to run a motor in 2 directions; Match the given pairs according to the ladder diagram: (5 points)




_____ Q1, Q2 relay coils

_____ Q1, Q2 break contacts

_____ I1, I3

_____ I2

_____ M1, M2

a. run the motor
b. represent the output
c. Interlock contacts
d. Memory Flags
e. stop the motor

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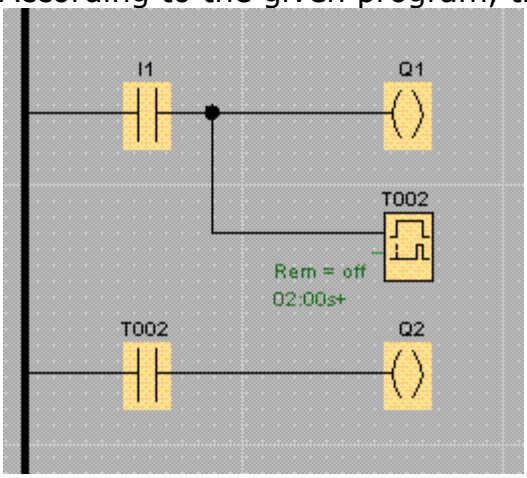
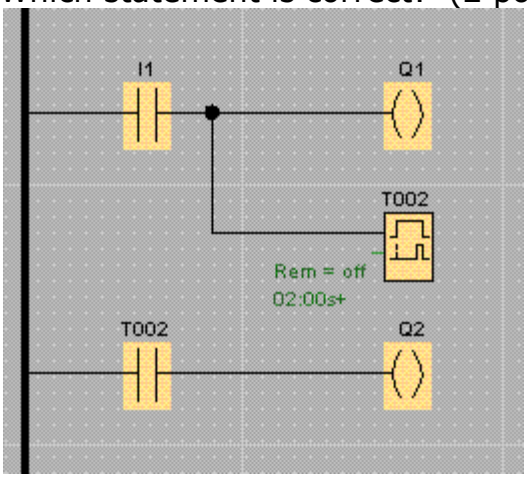
5. According to the given program, the timer used is (2 points)




- ON delay
- OFF delay
- ON-OFF delay
- Weekly timer

6. Which statement is correct: (2 points)




- Q1 starts then Q2
- Q2 starts then Q1
- Q1 and Q2 start with each other
- No relation between Q1 and Q2

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7. What is the difference between inductive sensor and fiber optic Sensor?

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8. Write the function for each one of the following conveyer belt machine

| No. | Part | Function |
|---|---|---|
| 1 | Conveyor Belt | |
| 2 | Branching Module | |
| 3 | Fiber optic diffuse type sensor | |
| 4 | Gear Box | |

9. Which sensor is the best for the entrance of car parks?

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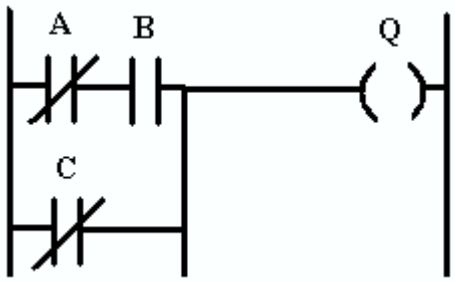
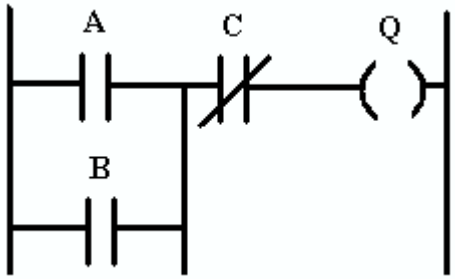
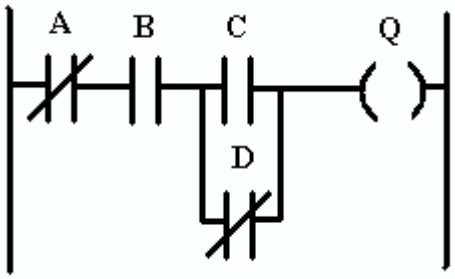
10. For the given Ladder diagrams write the expression:




**Q=**




**Q=**




**Q=**

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# Answers

1. Normally open pushbutton
2. False
3. True
4. B,C,A,E,D
5. Off delay
6. Q1 starts then Q2
7. Inductive sensor is used to detect metal parts only while fiber optic can be used to detect both metal and non metal parts
8. Conveyor belt: move items
   Branching arm: sorting
   Fiber optic sensor: detect metal and non metal
   Gear box: increase torque and reduce speed
9. Inductive sensor
10. $Q = (\bar{A}.B) + \bar{C}$
    $Q = (A + B).\bar{C}$
    $Q = \bar{A}.B.(C + \bar{D})$