

Question 1

Semester 1, 2015/16

SubjectCode: EE4008A/EE4221

Q3. A blending process shown in Fig. Q3 is to be programmed and controlled using programmable logic controller (PLC). If the liquid level is below the low level sensor (LSL), the pump (P-1) and the controlled valve (SV-3) should be switched off. If the liquid level is above the high level sensor (LSH), the controlled valves (SV-1) and (SV-2) should be closed. Design a ladder logic diagram to implement the described procedures. (10 marks)

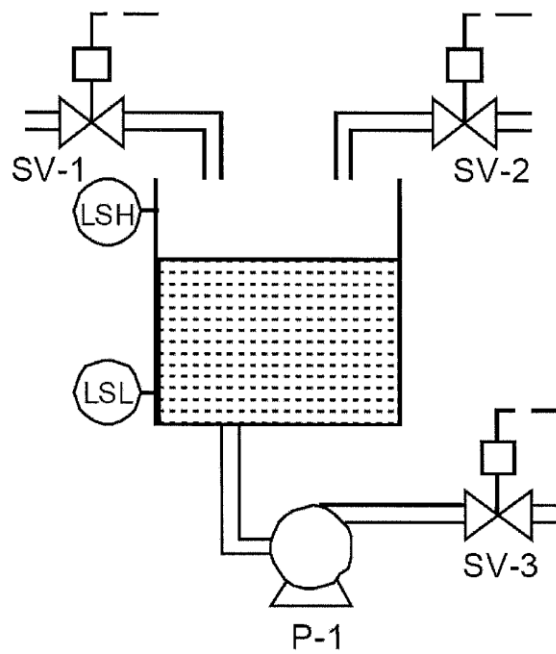
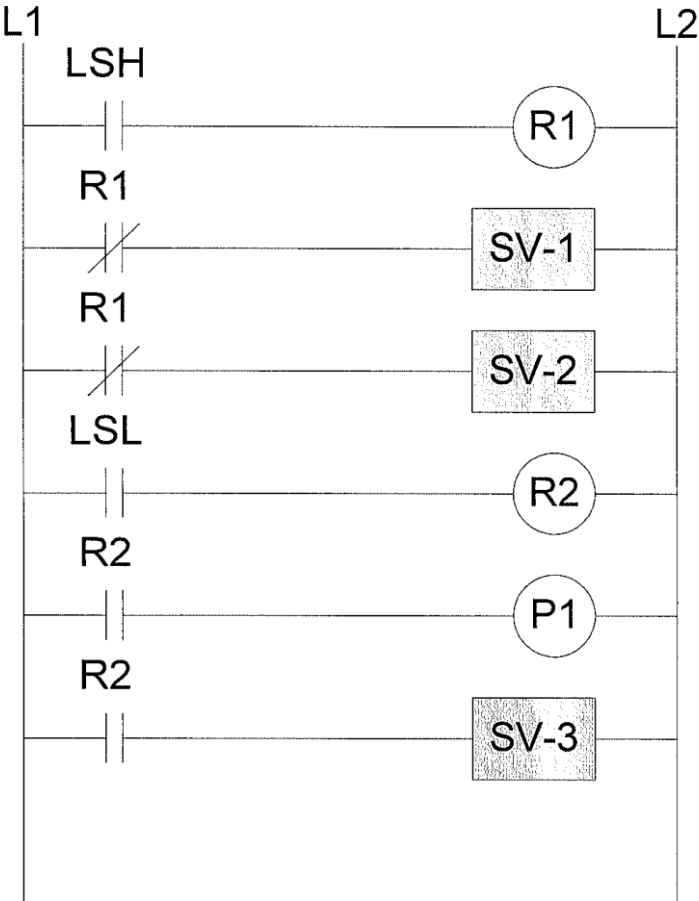


Fig. Q3

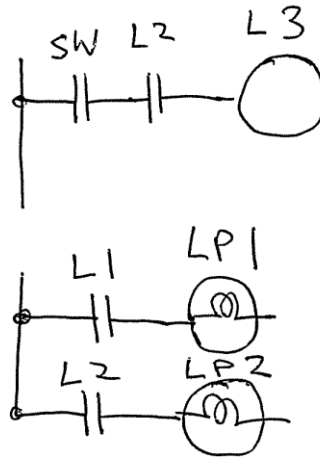
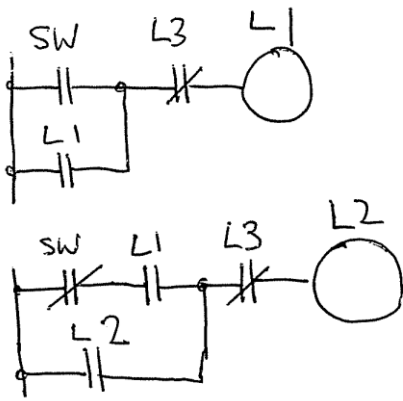
Question 1 solution



Question 2

A ladder network has one push button and two lamps. When the button is pushed lamp 1 will turn on; when the push button is released, lamp 1 and lamp 2 will both turn on. When it is pushed again, the circuit will reset, and all lamps will turn off. Design this ladder network.
(10 marks)

Question 2 solution



Add some explanations

Question 3

An Automatic Gate (shown in Fig. Q3) is located at the entrance of a residential car park. It can be opened or closed remotely by a single push button remote control. Its detailed operation is as follows:

- When the gate is fully closed and the remote button is pressed, the alarm will sound for 5 seconds, and then the motor will operate until the gate is fully opened.
- When the gate is fully opened and the remote button is pressed, the alarm will sound for 5 seconds, and then the motor will operate until the gate is fully closed.
- During the operation of the motor, any object that blocks the light sensor will cause the motor to stop immediately. When the blocked object is cleared and the remote button is pressed again, the alarm will sound for 5 seconds, and the motor will continue its operation until it is fully opened or closed.

Design this control system using a ladder network.

(20 marks)

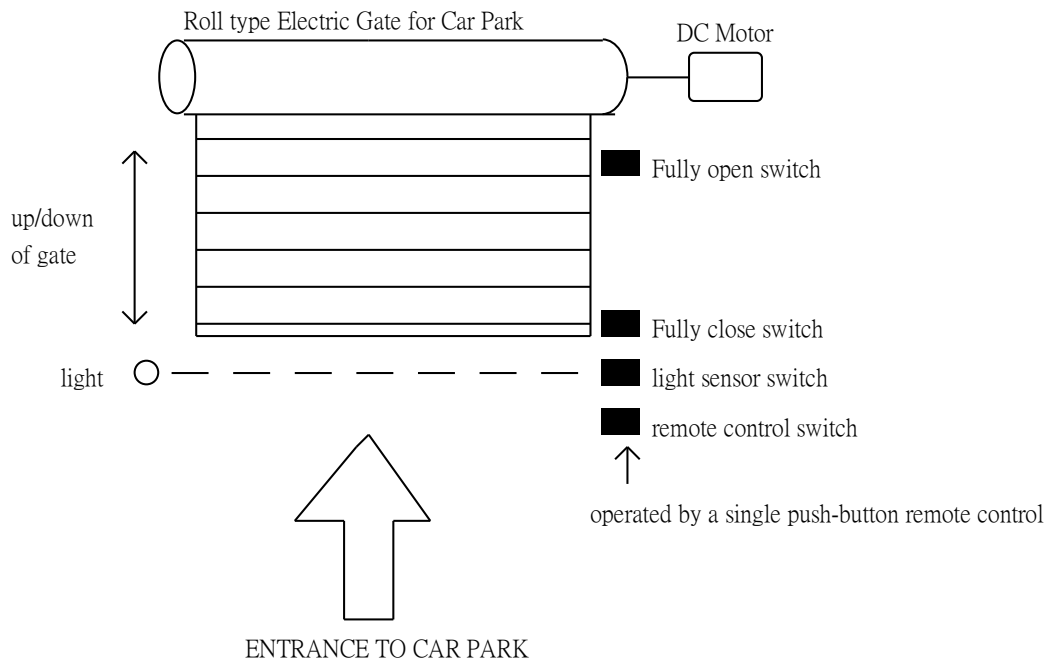
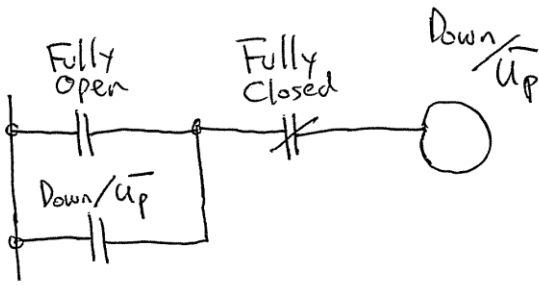
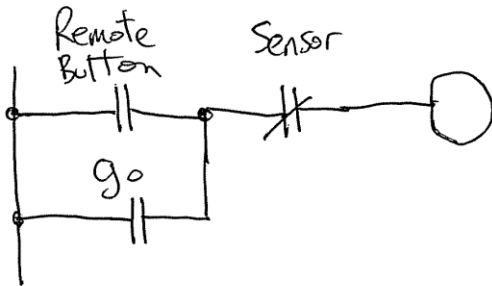


Fig. Q3

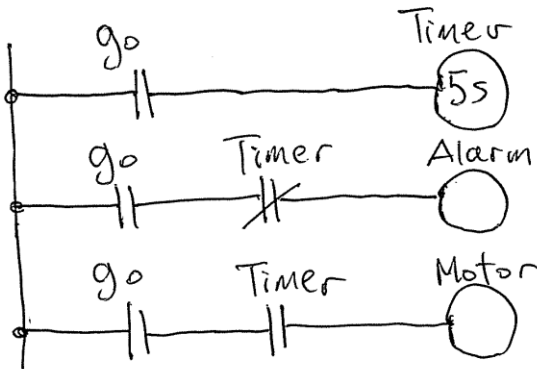
Question 3 solution



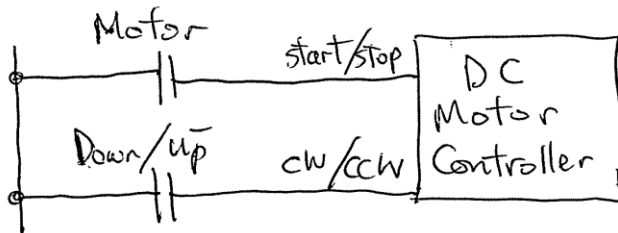
Motor Direction



go or no-go



go Sequence



Motor Control