徽标, 公司名称

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**Module Code: EE5111 Selected Topics in Industrial Control & Instrumentation**

**Name: Jin Chengzhe**

**Student ID: A0224599N**

# Q1.

**（1）Find a state-space model for the above system.**

We know that , we can apply , , to state-space form equation and get the state-space model as

**(2) Design a PID controller for the system using the LQR technique, simulate the designed control system and show the step reponses of the designed control system.**

**(3) Discuss the effects of weightings Q and R on system performance and monitor the control signal.**

**2.**

The digram showing the connection of the devices to the PLC is as follow:

图示

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figure 1 PLC connection

The ladder diagram is as follows:

图示, 示意图

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figure 2 ladder diagram