Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, DECEMBER 2018

SUBJECT: INDUSTRIAL AUTOMATION & CONTROL [ELE-4015]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 01, December 2018** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. What are the different types of automation systems? Explain. ***(04)***

1B. Explain different industrial control systems. ***(03)***

1C. Describe the importance of information technology in industry. ***(03)***

2A. Explain the CPU architecture of a PLC with a neat diagram. ***(06)***

2B. A temperature control system consists of two temperature switches with a setting of 300 °C and 400 °C to activate a heating element. Develop a PLC circuit such that the temperature should be maintained in between 300 to 400 °C (i.e. the heating element remain ON up to 400 °C in increasing mode and remain OFF up to 300 °C in decreasing mode). ***(02)***

2C. An indicating light is to go on when a count reaches 13. The light is then to go off when a count of 20 is reached. Use reset to reset the values at any time. ***(02)***

3A. Consider the proportional-mode level-control system in Fig. 3A. Valve A is linear, with a flow scale factor of 10 m^3/h per percent controller output. The controller output is nominally 50% with a constant of Kp = 10% per %. A load change occurs when flow through valve B changes from 500 m^3/h to 600 m^3/h. Calculate the new controller output and off-set error. ***(03)***

3B. Describe the working of Globe valves with neat diagram. ***(02)***

3C. Explain the architecture of Distributed Control Systems, with a neat diagram. ***(05)***

4A. Explain the OSI model with illustration. ***(05)***

4B. What are the features of RS-232 standard for serial communication? ***(03)***

4C. What is the maximum bit transfer rate, signal voltages and cable length of RS-485 standard? ***(02)***

5A. How analog and digital data is transmitted using HART protocol? ***(04)***

5B. Write down the Modbus message frame structures. ***(03)***

5C. List and explain the elements in the physical layer of the foundation fieldbus. ***(03)***

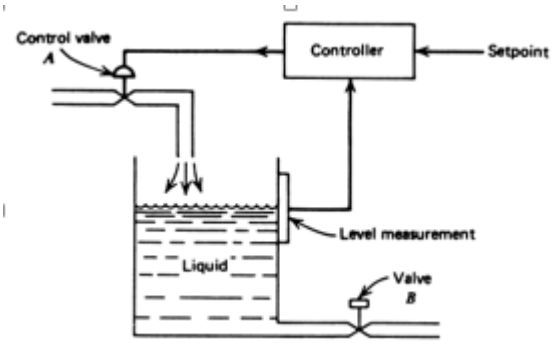

Fig. 3A