Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKEUP EXAMINATIONS, MAY 2018

SUBJECT: INDUSTRIAL AUTOMATION & CONTROL [ELE 437]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 10 MAY 2018** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A. Explain with the example why derivative control is not recommended for a flow control process? ***(02)***

1B. PB is defined as the range of level over which the control valve will go from fully closed to fully open "in proportion" with level. if the tank level should fall to 20% we want the control valve fully closed (0% open), if the tank level rises to 60% full, control valve to be fully open (100% open)

a)determine the PB of the system

b) Determine practical feasibility of the same system when PB is 100% and 250 % ***(04)***

1C. Describe the various elements of an Industrial Automation Systems and how they are organized hierarchically in levels. ***(04)***

2A. With neat diagram explain three major elements of a PLC System and describe the most prominent advantages of the PLCs over hardwired Relay Contactor Logic ***(03)***

2B. Design the PLC ladder logic for the control circuit used to detect and fill the box passing through the conveyor ,where start and stop are the inputs when process starts boxes starts moving on the conveyor line sensed by proximity sensor (normally closed) and solenoid valves used to fill the content to the box indicated by fill relay ,once the box is full can be recognized by full relay ,solenoid valve should close again conveyor starts moving to carry to full the box away and empty box again to fill. (note start button is momentary closed push button and stop is normally closed switch) ***(05)***

2C. With neat waveforms and Circuit , Explain the working of an OFF delay timer, Fixed width delay ,Retentive and Non retentive Timer in process Application ***(02)***

3A. Write the advantage and disadvantage in incremental coordinate system compared to the absolute one in CNC Machine ***(03)***

3B. When would you recommend to use an air-to-close control valve? Give an example Sketch and discuss the plug shapes and ideal flow characteristics of three different types of control valves ***(04)***

3C. Explain why gear pumps usually operate at comparatively low pressure medium in the Hydraulic system ***(03)***

4A. Explain the Architecture of SCADA system considering a typical example of Chemical Industry ***(05)***

4B. Describe the types of Distributed Control system employed in Industrial Automation system ***(05)***

5B. Explain how data transfer takes place using MODBUS TCP/IP Network, in Industrial automation system ***(05)***

5C. List advantage and disadvantage of Flexible Manufacturing system ***(05)***

6A. Explain the features and general architecture of SMART Sensor ***(05)***

6B. Explain the different types of tasks undertaken by an RTOS. Which task is time critical Justify your answer in terms of utility of the system. ***(05)***