Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

SIXTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER EXAMINATIONS, JUNE 2017

SUBJECT: PROGRAMMABLE LOGIC CONTROLLERS [ICE 3282]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Draw the scan cycle of PLC and explain each step in a scan cycle. **2**

1B. List the OSI layers and describe data link and physical layers of the field bus protocol. **4**

1C. A motor will be connected to a PLC and controlled by two switches. The GO switch will start the motor, and the STOP switch will stop it. If the STOP switch was used to stop the motor, the GO switch must be thrown twice to start the motor. When the motor is running, a light should be turned on. Write the ladder logic and instruction list for the above. **4**

2A. With an application, describe supervisory control. **4**

2B. Explain the following Siemen's instructions **3**

i) ATN
ii) LN
iii) GRT
iv) LEQ
v) NEG
vi) CONV

2C. In dangerous processes it is common to use two palm buttons that require an operator to use both hands to start a process (this keeps hands out of presses, etc.). To develop this there are two inputs that must be turned on within 0.25s of each other before a machine cycle may begin. Write a ladder logic and SFC for the above process. **3**

3A. Describe different types of latching techniques used in PLCs. **2**

3B. Illustrate the need of PLCs in process control industries with a suitable example. **4**

3C. Explain the different types of networking levels used in industries with PLC configuration. **4**

4A. Explain the PID controller block for Siemen's PLC and compare P, PI, PD and PID controllers with neat sketches. **3**

4B. With a neat flow chart, describe the linearization of process variable over a specified limits using look up table method. **4**

4C. Write a ladder logic to find the sum of the squares of the first 100 odd numbers. **3**

5A. With a neat diagram, describe fixed data logging system. **3**

5B. Illustrate Remote Terminal Unit (RTU) transmission mode technique of Modbus protocol. **4**

5C. A temperature control system consists of two thermostats with a setting of 400^0 C and 600^0 C to activate a heating element. Develop ladder logic and sequential function chart so that the temperature is maintained between 400^0 C to 600^0 C (i.e heating element remain ON up to 600^0 C in increasing mode and remain OFF up to 400^0 C in decreasing mode). **3**

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