Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (MECHATRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, DEC 2017

SUBJECT: PROGRAMMABLE LOGIC CONTROLLER [MTE 3104]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Data not provided may be suitably assumed

1A. Draw a block diagram showing the main units of PLC. Also, write a short note on each of them. **04**

1B. With respect to network topologies explain the following terms along with their advantages and disadvantages: **04**

i) Star Configuration
ii) Ring Configuration

1C. Explain the significance of Remote Terminal Unit (RTU). **02**

2A. With an example explain and compare SKIP function and MCR function in PLC. **03**

2B. An output ‘X’ is ON only if a count value is less than 31 or more than 38. Write the ladder logic for the same. **03**

2C Discuss about the I/O modules of PLC. Differentiate between Discrete modules and Analog modules. **04**

3A. With the required sketch, explain the OSI model utilization in PLC, layer by layer. **04**

3B. Elucidate the difference between the following with the help of required sketch: **04**

a) Sinking device with sourcing output module circuit
b) Sourcing device with sinking output module circuit

3C. Explain: **02**

(i) NEG
(ii) XPY
(iii) AVE
(iv) STD

4A. A conveyor is supposed to have exactly 45 parts on it. There are 3 indicating lights to indicate conveyor count status: **04**

- Less than 45-Yellow
- Exactly 45- Green
- More than 45- Red.

There are 2 sensors on conveyor. One is actuated by Parts entering the conveyor and other is activated by Parts exiting the conveyor.

4B. Discuss the terms: CIM, Plant Controller, Area Controller **06**

5A. Design ladder logic that uses normal timers and counters to measure time of 50 days. Note: Measure minutes, hours and days. **03**

5B. Mention and explain different communication media used for transfer of data signals between devices. **04**

5C. Explain the following with example using ladder logic: **03**

1) F-TRIG
2) MCR