

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E –Ist SEMESTER–EXAMINATION – JULY- 2012****Subject code: 710305N****Date: 13/07/2012****Subject Name: Programmable Logic Controller****Time: 2:30 pm – 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Compare PLC with relay logic system and justify the superiority of PLC over relay logic system. **05**
 (b) Explain overall PLC system with the help of functional block diagram. **05**
 (c) Explain basic comparison functions of PLC. **04**

- Q.2** (a) Explain input and output modules of PLC by drawing block diagram of each. **07**
 (b) Which ladder construction limitations of PLC should be considered before programming the PLC? Explain each of them in brief with suitable example. **07**

OR

- (b) Explain following input analog devices to the PLC in brief, with the help of schematic diagrams: **07**
 (i) Potentiometer (ii) Thermocouple

- Q.3** (a) Prepare a list of the steps needed for large-process ladder diagram construction. **07**
 (b) Implement 16 X 1 multiplexer function using ladder logic diagram. **07**

OR

- Q.3** (a) Explain Input registers (single and group), holding register and output registers (single and group) of the PLC. **07**
 (b) Explain on delay, retentive on delay and off delay timers of the PLC with necessary timing diagrams. **07**

- Q.4** (a) Explain arithmetic functions of PLC. **07**
 (b) What are the differences between SKIP and MCR functions? Explain both functions with the help of suitable examples. **07**

OR

- Q.4** (a) Explain PLC data move functions (MOVE, BLOCK TRANSFER, TABLE-TO-REGISTER MOVE and REGISTER-TO_TABLE MOVE). **07**
 (b) Explain FIFO, FAL and ONE SHOT functions of PLC. **07**

- Q.5** (a) Explain SHIFT REGISTER and ROTATE functions of PLC. **07**
 (b) Implement following electrical control functions using PLC: **07**
 (i) Forward-Reverse Control (ii) Start-Stop-Jog Circuit

OR

- Q.5** (a) Justify the usefulness of PLC matrix function compared to coil-contact programming. Explain any one matrix function. **07**
 (b) List the process hardware with appropriate PLC address, Prepare event sequence, construct Ladder Logic Diagram and show I/O connection details for the following process: **07**
 A temperature control system consists of four thermostats. The system operates three heating units. Thermostats are set at 55, 60, 65 and 70 deg. Celsius. Below 55 deg. C, three heaters are to be on. A temperature between 55 and 60 deg. C causes two heaters to be on. For 60 to 65 deg. C one heater is to be on. Above 70 deg. C, there is a safety shutoff for all three heaters in case one stays on by mistake. A master switch turns the system on and off.
