

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER- II(New course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2720317**Date: 14/12/2015****Subject Name: PROGRAMMABLE LOGIC CONTROLLER****Time: 2:30 pm to 5:00 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) Explain following with diagrams in context of PLC: **07**
 i) Isolation
 ii) Sourcing and Sinking

(b) Draw a basic architecture of PLC. Give comparison between packaged PLC and modular PLC. State the classification of PLC based on I/O count. **07**

Q.2 (a) Brief about plc memory organization in detail. Determine memory size needed for a programmable controller system with 450 input points and 250 output points (assume 40% spare memory capacity). **07**

(b) Brief about sensors and actuators connected with PLC. **07**

OR

(b) Discuss important specifications of PLC. **07**

Q.3 (a) What is Scan cycle? State the advantages and disadvantages of PLC system. **07**

(b) Explain different types of Counters available with typical PLC. **07**

OR

Q.3 (a) How wire size is selected for the instruments connected with PLC? **07**
 Calculate the backplane current requirements for the PLC system with the following modules 6 DC I/P modules, 3 DC O/P modules, 2 analog input modules, and 2 analog output modules mounted in a PLC rack. Assume the rack power supply & backplane power bus are both rated at 5 amps. (Backplane current requirement AI -400 mA, AO- 400 mA, DI 6 200 mA, DO 6 250 mA.)

(b) How PLC is programmed? State the demerits of Ladder diagram programming. What is PLC redundancy? **07**

Q.4 (a) Explain any two data handling functions of PLC. **07**

(b) Implement PLC logic for **07**
 i) De Morgan's theorems
 ii) Multiplexer

OR

Q.4 (a) A small electric furnace has two heating elements that are energized in stages 3 minute apart. That is when furnace is turned on, the first heating element comes on right way, and second element comes on 3 minute later. A temperature sensor will shut down the furnace if it goes too hot. Draw the ladder diagram for control circuit. Show typical wiring for the PLC system used for above application. **07**

(b) i) Explain SKIP and MCR (Master Control Relay) in PLC. **07**

ii) In a certain bank, each of three officers has a unique key to the vault. The bank rules require that two out of three officers be present when the vault is opened. Draw the ladder diagram for a rely logic circuit that will unlatch the door and turn on the light when two of three keys are inserted.

Q.5 (a) Brief about sequencer functions of PLC. Explain cascading sequencer with an example. **07**

(b) Explain bit/word shift instructions of PLC with suitable example. **07**

OR

Q.5 (a) Explain PLC BCD output module with example. Also show typical wiring diagram for BCD output module. **07**

(b) Brief about Matrix functions of PLC. **07**
