

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VIII (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2182408****Date: 04/05/2017****Subject Name: Programmable Logic Controller for Power Electronics(Departmental Elective III)****Time: 10:30 AM to 01:00 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) What is PLC? State the need of PLC in automation. State advantages of PLC and List types of PLC. **07**
- (b) What is ladder programming? Enlist advantages of ladder programming. **07**
- Q.2** (a) List the input and output device used with PLC with their functions. **07**
- (b) Explain in short: a) Relay instruction b) Data handling instruction. **07**
- OR**
- (b) Define the following terms related to PLC: a) Scanning cycle b) Scanning c) Scanning time d) Speed of execution. **07**
- Q.3** (a) List the five standard PLC languages as defined by the International Standard for Programmable Logic Controllers, and give a brief description of each. **07**
- (b) Express the following equation in ladder logic program: **07**
1.  $F = BC + AC' + AB + BCD$
2.  $F(a,b,c) = \Sigma(0,1,4,5,6)$
- OR**
- Q.3** (a) Draw the timing diagram of retentive timer. Draw the timing diagram & write P.L.C. ladder logic equivalent of ON DELAY & DUAL OFF DELAY timer. **07**
- (b) Implement PLC ladder logic for **07**
1. 2 to 4 decoder
  2. 4:1 Multiplexer
- Q.4** (a) Explain the PLC Digital Bit Functions and Applications with suitable example. **07**
- (b) Explain PLC SKIP and MASTER CONTROL RELAY Functions with suitable example. **07**
- OR**
- Q.4** (a) Explain the PLC Sequencer Functions with suitable example. **07**
- (b) Explain PLC Data Move Systems with suitable example. **07**
- Q.5** (a) Detail the various registers available in PLC. Also explain one application of shift register in PLC operation **07**
- (b) Explain the structure of PLC ladder diagram. Draw the Ladder diagram to control a 3 phase induction motor using two pushbuttons. **07**
- OR**
- Q.5** (a) Explain the Timer and Counter functions in PLC with suitable Ladder diagram. **07**
- (b) Detail the various registers available in PLC. Also explain one application of shift register in PLC operation **07**

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