

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VIII (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2180807****Date: 29/04/2017****Subject Name: Industrial Automation****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 an Industrial Automation? Explain generalized automation and production systems and their classification. **07**
- (b) Draw a block diagram of a PLC. Explaining the functions of each block in brief. **07**
- Q.2** (a) Explain ladder diagram elements and its applications. **07**
- (b) Explain Direct Digital Control in detail with suitable diagram. **07**
- OR**
- (b) What is a controller mode? Explain characteristics of two position and multi-position discontinuous controller modes. **07**
- Q.3** (a) Define following terms with respect to Process control: **07**
- (1) Offset (2) Variable Range (3) Neutral Zone (4) Control Lag (5) Dead Time (6) Cycling (7) Error.
- (b) Explain PI Controller with suitable application. **07**
- OR**
- Q.3** (a) Define following Process characteristics: **07**
- (1) Process Equation (2) Process Lag (3) Process Load (4) Self-Regulation.
- (b) Explain various types of I/O Modules and Explain the Layout of I/O separately connected to PLC. **07**
- Q.4** (a) Explain SCADA with suitable diagram. **07**
- (b) Explain DCS in brief. **07**
- OR**
- Q.4** (a) Explain following discontinuous controller modes **07**
- (i) Two position mode (ii) Multi position mode
- (b) Explain Timer and Counter instructions with timing diagram for PLC. **07**
- Q.5** (a) Explain Hydraulic System. Give Application, Advantage and Disadvantage of Hydraulic system. **07**
- (b) An integral controller is used for speed control with a set point of 12 rpm within a range of 10 to 15 rpm. The controller output is 22% initially. The constant  $K_i = -0.15\%$  controller output per second per percentage error. If the speed jumps to 13.5 rpm, Calculate the controller output after 2 sec for a constant  $ep$ . **07**
- OR**
- Q.5** (a) Give the Introduction about CNC machine. List out the industries affected by CNC. Also explain advantage of CNC. **07**
- (b) Develop ladder diagram for bottle filling conveyor belt. **07**

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