

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VI • EXAMINATION – WINTER • 2014

Subject code: 161905**Date: 03-12-2014****Subject Name: Control Engineering****Time: 02:30 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) What is modern control theory? Compare modern control theory with conventional control theory. **07**
(b) Compare open loop control system with closed loop control system. **07**

- Q.2** (a) Write short note on: Analogue models of mechanical and electrical system. **07**
(b) List the basic types of control actions and explain the PID control action in detail. **07**

OR

- (b) What is FRL unit in pneumatic system? Write about pneumatic power sources. State various components used in pneumatic circuit. **07**

- Q.3** (a) Define programmable logic controller. What are the components of PLC? State the Advantages & Disadvantages of it. **07**
(b) Draw and explain detail block diagram of fuzzy logic controller. **07**

OR

- Q.3** (a) What does a block diagram represent? Explain it in detail. List its salient characteristics. **07**
(b) Explain and derive the transfer function for an armature controlled d.c. motor. **07**

- Q.4** (a) Obtain the mathematical equation and sketch the time response of a second order control system for a unit step input (for damping factor $= \xi < 1$). **07**
(b) Draw Proportional-Derivative (PD) hydraulic controller, explain its working and determine its transfer function. **07**

OR

- Q.4** (a) Write down advantages and disadvantages of hydraulic systems. **07**
(b) Draw equivalent mechanical and electrical systems to relate voltage or force current analogy. force **07**

- Q.5** (a) What is a signal flow graph? What are Properties of signal flow graph? State and explain Mason's gain formula for signal flow graph **07**
(b) What do you mean by stability of a control system? Explain Routh's stability criterion. **07**

OR

- Q.5** (a) What do you mean by micro-processor based digital control **07**
(b) Explain boiler feed control system using neat sketch. **07**
