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**

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