Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VIII (OLD) EXAMINATION – WINTER 2018

Subject Code: 181702   **Date: 15/11/2018**

Subject Name: Motion Control

Time: 02:30 PM TO 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 are the advantages and disadvantages of Step motors? Explain the step motor performance characteristics in detail.	**07**
	(b)	Give the difference between the PLL and PLS systems. Derive the linearized model for the phase-locked servo systems.	**07**
Q.2	**(a)**	Explain Bipolar PWM DC motor amplifiers.	**07**
	(b)	Explain effect of lead angle in closed-loop control of Step motors.	**07**
		OR	
	(b)	Explain the effect of backlash and dead zone in incremental motion. Draw and explain the displacement and velocity waveforms for backlash with low and high friction.	**07**
			07
Q.3	**(a)**	Why Incremental encoders are needs? What are the types of it? Explain each parts of the Incremental encoder in details.	**07**
	(b)	Explain the role of speedup capacitor in active suppression controller.	**07**
		OR	
Q.3	**(a)**	Explain the working of position control system using with and without tachometer feedback.	**07**
	(b)	List the selection criteria of DC motor as Incremental motion application. Discuss at least any two criteria with justification.	**07**
Q.4	**(a)**	Draw and explain D.C. position control system with potentiometers as error detector.	**07**
	(b)	List out the selection criteria for Stepper motor. Explain step angle resolution and torque requirements.	**07**
		OR	
Q.4	**(a)**	Explain Resolvers and Magnetic pickups as Encoders.	**07**
	(b)	What do mean by Optimal control, suboptimal and non-optimal control for IMC? Explain it with appropriate mathematical justification.	**07**
Q.5	**(a)**	What is torsional resonance? Explain its effect in three-body structure. Explain the techniques for minimizing torsional resonance effect in brief.	**07**
	(b)	Enumerate the types of Pulse sources used in motion control. Explain the digital technique based Rate multiplier type pulse sources in detail.	**07**
		OR	
Q.5	**(a)**	Draw and explain bidirectional four-phase single and two phase on logic sequencer circuit with waveform of output phase for each pulses.	**07**
	(b)	Why over drive circuits are required for Step motors? Explain dual voltage control circuit	**07**

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