Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – SUMMER 2016

Subject Code:181702 **Date:05/05/2016**

Subject Name:Motion Control

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)**	Explain the effect of backlash and dead zone during transmission of rotational motion in control application. How it will minimize to improve the performance?	**07**
	(b)	Describe the function of following device in incremental motion control system (Any two) (i) Potentiometer (ii) Encoder (iii) Resolver	**07**
Q.2	**(a)**	Distinguish variable magnetic flux dc motor versus constant magnetic flux motor as incremental motion motor.	**07**
	(b)	Discuss following primary performance characteristic of DC motor as incremental motion control device (any three) (i) Motor efficiency (ii) Armature inertia (iii) Armature inductance (iv) Current to torque relationship (v) Reluctance Torque Distribution (vi) Viscous Damping Coefficient.	**07**
		OR	
	(b)	Obtain transfer function $\Omega_1(s)/T_g(s)$ of two body structure. Draw and describe electrical analog circuit and pole-zero representation of two body structure.	**07**
Q.3	**(a)**	Evaluate performance of linear bipolar output versus linear bridge output of bi-directional servo amplifier.	**07**
	(b)	Explain the working of PWM amplifier in conjunction with DC servo application.	**07**
		OR	
Q.3	**(a)**	Draw and describe position control system with tachometer feedback.	**07**
	(b)	Obtain liberalized model for phase locked servo system and describe its working.	**07**
Q.4	**(a)**	Define following step motor performance characteristic in engineering term (i) Resolution (ii) Single step response (iii) Accuracy (iv) Dynamic Torque (v) Pull in Torque (vi) Static Torque (vii) Reluctance	**07**
	(b)		**07**
		OR	
Q.4	**(a)**	Explain any two electrical step motor in details (i) Variable reluctance Step Motor (ii) Permanent magnet Step Motor (iii) Hybrid Step Motor.	**07**
	(b)	Explain any two controls of pulse sources oscillators (i) Gated oscillator and pulse dropping (ii) Linear ramp (iii) RC ramp (iv) Digital technique	**07**
Q.5	**(a)**	Draw active suppression scheme and explain the working and requirement of active suppression controller.	**07**
	(b)	List the selection criteria of step motor and discuss at least any four in details.	**07**
		OR	

Q.5	**(a)**	Which direction sensing method gives good closed loop performance for step motor? Explain it with all necessary details.	**07**
	(b)	Draw block diagram of variable unit time delay speed control system and explain it with all necessary details.	**07**

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