Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER – I EXAMINATION – SUMMER 2017

Subject Code: 2714502 **Date:10/05/2017**

Subject Name: Solid State DC Drives

Time:02:30 p.m. to 05:00 p.m. **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 four quadrant operation of motor which driving a hoist load.	**07**
	(b)	What are the main factors which decide the choice of DC drive for a given application?	**07**
Q.2	**(a)**	For type-A dc chopper with RLE load and continuous load current condition shows that per unit ripple current is maximum when duty cycle is 0.5. Also draw the necessary waveforms and circuit diagram.	**07**
	(b)	Explain class D type chopper control DC motor drive.	**07**
		OR	
	(b)	Explain the armature control and flux control of dc motors and also explain constant torque and constant power operation.	**07**
Q.3	**(a)**	Discuss the dynamic braking of separately excited DC motor? During braking, separately excited motor can be converted as self excited generator, why?	**07**
	(b)	Draw circuit diagram, waveform and write the equations for 1-phase full controlled converter, separately excited dc motor drive where current of the armature is assumed to be discontinuous mode.	**07**
		OR	
Q.3	**(a)**	Draw equivalent circuit and output voltage waveform of an ideal dual converter. Derive necessary condition of firing angles.	**07**
	(b)	Explain multi phase chopper drive.	**07**
Q.4	**(a)**	Explain the principle of phase control. Obtain the equation of output voltage of phase controlled DC motor drive.	**07**
	(b)	Describe the working of a three phase full converter fed DC separately excited motor with relevant waveforms and expressions.	**07**
		OR	
Q.4	**(a)**	Explain different types of control strategies for chopper drive.	**07**
	(b)	Develop a transfer function of separately excited DC motor with speed control loop. Give the limitation of only speed control loop.	**07**
Q.5	**(a)**	What are the reasons for using load equalization in an electrical drive? Why current sensing is required in electrical drives? What are the common methods of current sensing?	**07**
	(b)	Explain close loop control of DC motor with block diagram.	**07**
		OR	
Q.5	**(a)**	How does a phase locked loop speed control scheme operate? Where do you use it?	**07**
	(b)	With neat schematic Block diagram describe the Micro-computer control of 4 quadrant DC drives with flow chart.	**07**

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