Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC- SEMESTER–IV - EXAMINATION – SUMMER 2017

Subject Code: X40902 **Date:29/05/2017**

Subject Name: Power Electronics-I

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)**	Describe construction, characteristics and working of a SCR.	**07**
	(b)	List and explain various turn on methods for thyristor. Also give list of gate triggering methods.	**07**
Q.2	**(a)**	Draw and explain the circuit diagram of TRIAC using DIAC.	**07**
	(b)	What is snubber circuit? Why is it needed? Draw such circuit for a SCR and give guidelines for selecting it's components.	**07**
		OR	
	(b)	Explain series and parallel operation of thyristors.	**07**
Q.3	**(a)**	Explain two transistor analogy of thyristor in detailed.	**07**
	(b)	Discuss thermal modeling of thyristor. Why di/dt protection is required?	**07**
		OR	
Q.3	**(a)**	List out control strategies adopted to control the output voltage in chopper. Explain 'Step-down Chopper'	**07**
	(b)	Explain dual converter based DC drives.	**07**
Q.4	**(a)**	Draw and explain three phase half wave rectifier with R-L load with necessary waveforms.	**07**
	(b)	Enlist different types of power factor improvement techniques for AC to DC converters. Explain any one technique.	**07**
		OR	
Q.4	**(a)**	Using relevant circuit diagram and waveforms, explain regenerative braking control in DC machines using chopper circuit.	**07**
	(b)	Explain UJT as relaxation oscillator with necessary equations.	**07**
Q.5	**(a)**	Discuss constant H.P and constant Torque operation of speed control of motors.	**07**
	(b)	Explain Buck regulator with necessary circuit diagram & waveforms.	**07**
		OR	
Q.5	**(a)**	Draw and explain the circuit diagram of TRIAC using DIAC.	**07**
	(b)	Compare MOSFET with SCR in terms of basic structure, V-I characteristics, ratings, control principle, applications.	**07**

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