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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 170801 **Date: 09/05/2017**

Subject Name: Power Electronics and Industrial Drives

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)**	Make a comparison of SCR, BJT,MOSFET and IGBT based on the following parameters, 1) Power rating 2) Switching speed 3) Switching and conduction losses.	**07**
	(b)	Draw and explain the structure of power IGBT. Also explain principal of operation and I-V characteristics of power IGBT.	**07**
Q.2	**(a)**	Explain 1-phase full bridge inverter with 90 degree mode of conduction. Draw necessary Waveforms and equation.	**07**
	(b)	Briefly discuss the 180 degree operation of inverter circuit with appropriate waveforms.	**07**
		OR	
	(b)	Briefly discuss the 120 degree operation of inverter circuit with appropriate waveforms.	**07**
Q.3	**(a)**	Briefly discuss the operation of on off controller (Integral Cycle Controller) with neat sketch of its waveform.	**07**
	(b)	Briefly describe the operation of single phase cycloconverter with necessary waveform.	**07**
		OR	
Q.3	**(a)**	Classify power factor improvement methods for phase controlled rectifiers. Explain Any one.	**07**
	(b)	Draw and explain single phase full wave controlled rectifier with the inductive load using required waveforms and equations.	**07**
Q.4	**(a)**	Discuss the class B operation of Chopper Circuit	**07**
	(b)	Explain control mode of DC-DC converter drives	**07**
		OR	
Q.4	**(a)**	Discuss about choice of AC and DC drive in detail	**07**
	(b)	Discuss the rotor voltage control for slip ring induction motor.	**07**
Q.5	**(a)**	Comparison between voltage source inverter and current source inverter.	**07**
	(b)	Explain techniques of voltage control of single phase inverter. Explain single pulse width Modulation.	**07**
		OR	
Q.5	**(a)**	Discuss the operation of 3 phase half wave controlled rectifier with R-L load. Also Discuss the effect of free-wheeling diode in detail.	**07**
	(b)	Explain three phase cycloconverter and sinusoidal harmonic reduction techniques for cycloconverter.	**07**

****