Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (OLD course)• EXAMINATION – SUMMER 2015

Subject Code: 712902N **Date: 12/05/2015**

Subject Name: Power Processing Circuits

Time: 10:30 am to 1:00 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 construction and working of MOSFET. Also compare it with Power BJT in all respect.	**07**
	(b)	Discuss about driving circuit for power Bipolar Junction Transistor switch.	**07**
Q.2	**(a)**	Explain working of Buck-boost DC-DC converter with neat diagram.	**07**
	(b)	A semi controlled bridge converter is supplied with single phase 240V, 50 Hz source, feeds a load with ripple free current. The load resistance is R_L=30 ohm. Find (1) Average load voltage (2) RMS input current for a firing angle Ŭ=45.↔	**07**
		OR	
	(b)	A DC-DC buck converter is supplying energy to the load of R_L=20 ohms. The converter is operated with input voltage 200 Vdc. The switch is modulated with the frequency of 2 kHz. For duty cycle of 30%, calculate (i) t_{on} time (ii) Average output voltage (iii) output power of the converter.	**07**
Q.3	**(a)**	Explain complementary voltage commutation of SCR with necessary waveforms.	**07**
	(b)	Discuss the working operation of single phase integral cycle control for AC voltage controller.	**07**
		OR	
Q.3	**(a)**	Explain three phase half wave converter circuit with necessary waveforms.	**07**
	(b)	Discuss the effect of source inductance on working of AC-DC converter.	**07**
Q.4	**(a)**	Explain center-tapped 1-phase to 1-phase Cyclo-converter with neat circuit diagram and waveforms.	**07**
	(b)	Discuss the working of DC-DC boost converter with appropriate waveforms.	**07**
		OR	
Q.4	**(a)**	Explain working operation of dual converter with circulating mode. Draw appropriate waveforms.	**07**
	(b)	Describe working of phase controlled single phase AC-AC controller with R-L load with waveforms.	**07**
Q.5	**(a)**	Explain working of three phase inverter circuit with 180 ↔conduction mode. Draw line voltage and phase voltage waveforms.	**07**
	(b)	Write a brief note on harmonics reduction in inverter output voltage.	**07**
		OR	
Q.5	**(a)**	What is safe operating area? Discuss SOA for Bipolar Junction Transistor.	**07**
	(b)	Explain single pulse width modulation technique for single phase inverter circuit. Draw necessary waveforms.	**07**

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