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

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –I Examination Feb. - 2012

Subject code: 712902N **Date: 13/02/2012**
Subject Name: Power Processing Circuits
Time: 10.30 am – 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.**
4. **Notations used have usual meaning.**

Q.1	**(a)**	Explain switching characteristics of MOSFET. And discuss driver circuit for MOSFET.	**07**
	(b)	Explain class B type commutation circuit for SCR.	**07**
Q.2	**(a)**	Explain 3-phase fully controlled converter with necessary waveforms.	**07**
	(b)	A 230V, 1 kW resistive load is connected across a fully controlled single phase bridge converter. If load is to be delivered a power of 800 W, find (i) Output voltage rms. (ii) Load current rms. Also find power delivered to the load if firing angle is kept at 90º.	**07**
		OR	
	(b)	Thyristors having a peak voltage rating of 800V and average forward current of 30A are available for building converter circuit. Find the average power output for, (i) Single phase full wave midpoint converter (ii) Single phase full bridge converter. Use a safety factor of 2.5 for both current and voltage ratings.	**07**
Q.3	**(a)**	Explain 3-phase AC voltage controller with waveforms. And mention its application.	**07**
	(b)	Explain sequence control of AC voltage controller using tape changing.	**07**
		OR	
Q.3	**(a)**	Discuss non circulating type cyclo-converter. And explain how frequency and voltage can be controlled?	**07**
	(b)	A single phase bridge inverter supplies power to a series connected RLC load having R=2 ohms and inductive reactance equal to 10 ohms at the operating frequency of 4 kHz. The turn off time of SCR is 12 μsec. Assume 50% tolerance in circuit turn off time. Find the value of C for proper load commutation.	**07**
Q.4	**(a)**	Describe half bridge type dc-dc converter. Compare it with full bridge type dc-dc converter.	**07**
	(b)	Explain CUK dc-dc converter with waveforms.	**07**
		OR	
Q.4	**(a)**	Explain working principle of boost converter. Derive an expression for output voltage of boost converter.	**07**
	(b)	Discuss Forward type dc-dc converter with its merits and demerits..	**07**

Q.5	**(a)**	Discuss 3-phase inverter circuit with 120º mode operation.	**07**
	(b)	Write detailed note on space vector modulation technique.	**07**

OR

Q.5	**(a)**	Explain reduction of harmonics in output voltage of the inverter circuit using pulse width modulation.	**07**
	(b)	Discuss effect of source inductance on phase controlled converter operation.	**07**

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