Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER– IV EXAMINATION–SUMMER 2015

Subject Code:142402 **Date: 08/06/2015**

Subject Name: Fundamentals of Power Electronics

Time: 10.30am-01.00pm **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)**	Discuss utility of latching current and holding current in Power Electronics.	**02**
	(b)	Describe construction & working of SCR. Analyze it's performance using two transistor Analogy.	**05**
	(c)	Draw symbols and V-I characteristics of (a) Diode (b) DIAC (c) Power BJT (d) UJT (e) TRIAC (f) Power MOSFET (g) IGBT	**07**
Q.2	**(a)**	What do you mean by "Power Electronic System"? Draw & explain the block diagram of Power Electronic System. Also, enumerate the advantages of Power Electronic System.	**07**
	(b)	Write a detailed note on TURN ON Methods of SCR.	**07**
		OR	
	(b)	Draw the Power circuit, Symbol & V-I characteristic of UJT. Derive the expression for periodic time T of UJT relaxation oscillator.	**07**
Q.3	**(a)**	Draw and explain equivalent circuit and transient response of Fast Recovery diode.	**07**
	(b)	Define TRIAC. Enlist all triggering modes of TRIAC and explain the most Sensitive mode.	**07**
		OR	
Q.3	**(a)**	What are the benefits of IGBT over SCR. Draw the structure, symbol & output characteristics of IGBT?	**07**
	(b)	Draw and explain schematic construction, symbol and V-I characteristic of LASCR.	**07**
Q.4	**(a)**	Explain dv/dt and di/dt protection of SCR.	**07**
	(b)	Define Chopper. Explain Principles of operation of STEP-UP/DOWN Chopper and Derive equation for Output Voltage.	**07**
		OR	
Q.4	**(a)**	Explain with the help of neat power diagram and associated waveforms, the operation of 1-phase half-wave controlled converter with Resistive and Inductive load.	**07**
	(b)	Discuss principle and working of SMPS with the help of block diagram.	**07**
Q.5	**(a)**	Define and classify Inverters. Draw and explain single phase MC-MURRAY Inverter circuit with voltage and current waveforms.	**07**
	(b)	What is Cycloconverter? Explain working and application of it.	**07**
		OR	
Q.5	**(a)**	Explain the basic principle and working of single-phase step down cycloconverter.	**07**
	(b)	Write the principle of inverter. Enlist the various types of inverter circuits. Explain the operation of 1-Ø bridge inverter.	**07**

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