Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: 152401 Date: 11-06-2014

Subject Name: Power Electronics Devices and Components

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/ symbols used have usual meanings.**

Q.1	**(a)**	Discuss the following: (i) Building blocks of PES (ii) Concept of Power processing.	**08**
	(b)	Explain the following diodes in brief: (i) PiN diode (ii) Schottky barrier diode	**06**
Q.2	**(a)**	Discuss losses in a power BJT.	**07**
	(b)	Why isolation is required in a power electronic system? Explain opto-coupler in detail.	**07**
		OR	
	(b)	Draw and explain UJT with an application circuit.	**07**
Q.3	**(a)**	Draw detailed V-I characteristics of the SCR and explain the term "Latching and Holding current".	**08**
	(b)	(i) Define: Commutation. Why it is needed? (ii) What are the requirements for the successful commutation? (iii) Which specification(s) is useful to design a commutation circuitry?	**06**
		OR	
Q.3	**(a)**	Draw and discuss turn-on mechanism for an SCR.	**08**
	(b)	State various types of commutation. Discuss Class B commutation in detail.	**06**
Q.4	**(a)**	Compare: IGBT with Power MOSFET.	**07**
	(b)	With neat diagram discuss switching characteristic of Power MOSFET.	**07**
		OR	
Q.4	**(a)**	What is IGBT? Derive the equivalent circuit of IGBT from its structural details.	**07**
	(b)	Compare: Converter grade thyristor with Inverter Grade thyristor.	**07**
Q.5	**(a)**	Write short note on: GTO.	**07**
	(b)	Discuss heat sink and cooling requirements with reference a power device.	**07**
		OR	
Q.5	**(a)**	Write short note on: MCT.	**07**
	(b)	Explain in brief: SIT, SITH.	**07**

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