Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: 152401 **Date: 26-11-2014**

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)**	Compare for various aspects in tabular form. (i) Rectifier diode with Power diode (ii) Converter grade thyristor with inverter grade thyristor.	**08**
	(b)	Discuss switch specifications in detail.	**06**
Q.2	**(a)**	Explain cooling, heat sink and mounting requirements for a power device.	**07**
	(b)	Derive an equation for oscillating frequency for an UJT relaxation oscillator.	**07**
		OR	
	(b)	Explain (i) pulse transformer (ii) Opto-coupler.	**07**
Q.3	**(a)**	Enlist various power diodes. State its applications. Describe the principle of operation of a power diode.	**07**
	(b)	Discuss the switching characteristic of a Power BJT with relevant waveforms.	**07**
		OR	
Q.3	**(a)**	Discuss working of a Power Darlington circuit.	**07**
	(b)	Describe reverse recovery characteristics of a diode with necessary diagram(s).	**07**
Q.4	**(a)**	Describe Turn-on mechanism for a Thyristor with necessary waveforms.	**07**
	(b)	Draw and explain two transistor model of an SCR.	**07**
		OR	
Q.4	**(a)**	State requirements for successful commutation. Explain Class A commutation method for thyristor.	**07**
	(b)	List thyristor protections required for reliable operation . Discuss any two of them in detail.	**07**
Q.5	**(a)**	Discuss switching characteristic of IGBT.	**07**
	(b)	Write notes on :- TRIAC	**07**
		OR	
Q.5	**(a)**	Write notes on :- GTO	**07**
	(b)	Sketch symbol and equivalent circuit of depletion type Power MOSFET. Describe its operation.	**07**

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