GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER- V • EXAMINATION - WINTER 2016

Subject Code:152401

Subject Name: POWER ELECTRONICS DEVICES & COMPONENTS Time:

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 **(a)**



The latching current of athyristor in Fig.1 is 50 mA. The duration of the firing pulse is 50 μ sec. will the thyristor get fired? Assume V=150 V DC , R=20 Ω and L=0.5H.

(b) Draw the symbol and V-I Characteristics of the following : (i) LASCR (ii) GTO (iii) UJT (iv) PUT (v) TRIAC (vi) SCS (vii) DIAC.

Q.2	(a) (b)	Derive an equation for oscillating frequency for an UJT relaxation oscillator. Define commutation. Explain Class F commutation method for a thyristor.	07 07
	(b)	Describe Turn-on mechanism for a Thyristor with necessary waveforms.	07
Q.3	(a) (b)	Describe reverse recovery characteristics of a diode with necessary diagram(s). Discuss the switching performance of a Power BJT with relevant waveforms. OR	07 07
Q.3	(a) (b)	Enlist various power diodes. State its applications. Describe the principle of operation of a power diode. State merits of Power MOSFET. Also, discuss parallel operation of two Power MOSFETs.	07 07
Q.4	(a) (b)	Sketch symbol and equivalent circuit of an IGBT. Describe its operation. Write notes on :- GTO	07 07
Q.4	(a) (b)	Enlist factors responsible for un-reliable operation of a thyristor. Discuss remedies for any two of them. Write notes on :- TRIAC	07 07
Q.5	(a)	Write notes on :- (i) SITH (ii) Materials for power electronic components	07
	(b)	Discuss ideal switch characteristics. Enlist only various types of losses in an electronic switch.	07
Q.5	(a) (b)	OR Write notes on :- (i) PIC and (ii) RCT. Explain cooling, heat sink and mounting requirements for a power device.	07 07

Date: 30/11/2016

Total Marks: 70

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