Code: 9A02504

R09

B.Tech III Year I Semester (R09) Supplementary Examinations June 2017

POWER ELECTRONICS

(Common to EEE & E.Con.E)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) State and explain various turn on methods of SCR.

(b) Explain in detail the dynamic characteristics of an SCR are assumed to be a straight line passing through origin with a gradient of 3 x 10^3. Calculate the required gate source resistance. Given that E_{gs} = 10 V and allowable P_g = 0.012 ohm.

2 (a) Explain in detail the Resonant-Pulse Commutation.

(b) Explain in detail the constructional details of IGBT.

3 (a) Describe the operation of a single phase two pulse midpoint converter with relevant waveforms. Derive an expression for average output voltage.

(b) A single phase half controlled bridge converter is supplied at 230 V, 50 Hz with source inductance of 2mH. Neglecting resistance voltage drop, when the converter is operating at a firing angle of 45deg, and the load current is constant at 10 A. Determine the load voltage.

4 A 1-phase full converter feeding RLE has the following data source voltage is 230 V, 50 Hz, R = 2.5 Ω E = 100 V and firing angle is 30deg. Assume the output current is continuous of constant value. Evaluate: (i) Average value of load voltage and load current. (ii) Input power factor.

5 (a) Distinguish between three pulse and six pulse converters.

(b) Explain the operation of three phase mid-point converter with associate waveforms.

6 Explain briefly

(a) AC Voltage controller.

(b) Cycloconverter.

(c) Traic.

7 (a) Derive an expression for output power for type D chopper.

(b) Explain in detail the principle operation of the four quadrant chopper.

8 Explain the operation of basic series inverter with neat diagram? Compute the O/P frequency of a series inverter with the following specifications L = 10mH, R = 150 Ω, T_{off} = 0.2 ms. Also find the attenuation factor (AF).

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