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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations November/December 2018
POWER ELECTRONICS

(EEE)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Explain the two transistor analogy of the thyristor with neat diagrams. 7M
b Explain the switching characteristics of BJT. 5M

OR

- 2 a Describe input and transfer characteristics of an IGBT. 7M
b A bipolar transistor has current gain $\beta = 40$. The load resistance $R_c = 10$ ohm, dc supply voltage $V_{CC} = 130$ v and input voltage to base circuit $V_B = 10$ v. For $V_{CES} = 1$ v and $V_{BES} = 1.5$ V calculate,
i) The value of R_B for operation in the saturated state
ii) The value of R_B for an over drive factor 5.
iii) Forced current gain and Power loss in the transistor. 5M

UNIT-II

- 3 a Explain the operation of single phase half wave converter with RL-Load at $\alpha=60$ with necessary wave forms. Also derive the output voltage, output current and RMS output voltages. 7M
b A single phase full converter is made to deliver a constant load current. For zero degree firing angle, the overlap angle is 15 calculate the overlap angle when firing angle is a) 30 b) 45 and c) 60. 5M

OR

- 4 a What is a freewheeling diode? Draw the circuit diagram of an SCR full wave rectifier with RL load for with and without freewheeling diode and explain the operation with necessary output waveforms. 7M
b Give the difference between discontinuous mode and continuous mode of operation 5M

UNIT-III

- 5 a Explain the effect of source inductance in the operation of single phase fully controlled converter. 7M
b Give the difference between midpoint and bridge type converters. 5M

OR

- 6 a Explain the operation of three phase dual converter with circulating and non-circulating current type. 7M
b Give the difference between discontinuous mode and continuous mode of operation 5M

UNIT-IV

- 7 a Explain about the 1-phase AC voltage controller with R and RL loads with circuit diagram. 7M
- b What are the advantages and disadvantages of ac voltage controller? 5M

OR

- 8 a Explain the basic principle of operation of step up cycloconverter. 7M
- b What are the applications of cycloconverter? 5M

UNIT-V

- 9 a Derive the expression for output voltage of step up chopper with neat diagrams 7M
- b What are the advantages of dc chopper? 5M

OR

- 10 a Describe different types of pulse width modulation techniques (PWM) inverter 7M
- b What are the applications of inverters? 5M

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