Code No: RT31025

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$\boxed{\text{SET - 1}}$

III B. Tech I Semester Supplementary Examinations, May -2018
POWER ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1 a) How the secondary breakdown occurs in Power BJT? Show it on I-V characteristics of Power BJT. [3M]

b) How the freewheeling diode effects the performance of single phase half wave converters? [3M]

c) Explain why the firing angle is restricted in single phase fully controlled converter with RLE load. [4 M]

d) What is six pulse converter? Write its advantages. [4M]

e) What are the control strategies used in DC-DC converters? [4M]

f) What are the methods used for control the output voltage of inverter? [4M]

PART –B

2 a) Describe the turn-on methods of SCR. [4M]

b) Explain the dynamic characteristics of power IGBT. [8M]

c) What is the importance of snubber circuit in protection of SCR? [4M]

3 a) Explain the operation of half wave converter with RL load and freewheeling diode and also reduce the expression for average load current. [8M]

b) A single phase full-wave ac voltage controller feeds a load of R=30 Ω with an input voltage of 230V, 50Hz. Firing angle for both the thyristors is 65°. Calculate (i) rms value of output voltage. (iii) Average and rms current of thyristors. [8M]

4 a) A single phase full converter, connected from 230 V, 50 Hz source, is feeding a load R= 25 Ω in series with a large inductance that makes the load current ripple free. For a firing angle 30°, calculate the input and output performance parameters of this converter. [8M]

b) Explain the operation of single phase semiconverter feeding RLE load with neat circuit diagram and waveforms also deduce the rms output voltage. [8 M]

5 a) Explain the effect of source inductance on three phase full converter in detail. [8 M]

b) Design a three phase dual converter to achieve at four quadrant operation for I_d = 10 A at 200 V. The converter is supplied from 400 V, three phase and 50 Hz supply. I_{ripple} = 2A. [8 M]

6 a) Discuss the working of a single phase bridge type cycloconverter with RL loads and for continuous waveform operation with neat circuit diagram and output rms voltage and current wave form for fo = 4 fs. [8 M]

b) Explain the operation of Boost chopper with relevant waveforms and derive the expression for average output voltage. [8 M]

7 a) Explain the operation of unipolar switching in full bridge inverter. [6 M]

b) Explain the operation of three phase bridge inverter for 120° mode of operation with aid of relevant phase and line voltage waveforms. [10M]

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