R13

SET - 1

III B. Tech I Semester Supplementary Examinations, October/November -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)	List out the different turn on methods of a SCR. Explain about temperature triggering.	[3M]
	b)	What type of gating signal is used in single phase AC voltage controller with RL load?	[4M]
	c)	What are the advantages of single phase bridge converter over single phase mid-point converter?	[3M]
	d)	Write the firing angle ranges of dual converters in four quadrants.	[4M]
	e)	A DC chopper operates on 230 V dc and frequency of 400 Hz, feeds R-L load. Determine the on time of the chopper for output of 150 V.	[4M]
	f)	Explain about unipolar switching in single phase bridge inverters.	[4 M]

PART –B

2	a)	Explain the diode bridge rectifier with R load and capacitive filter with neat circuit diagram and necessary waveforms. Deduce the expression for ripple factor.	[10M]
	b)	Explain the static characteristics of thyristor with neat diagrams.	[6M]
3	a)	A single phase half-wave controlled converter is operated from 230 V, 50 Hz supply. Load resistance R= 15 Ω. If the average output voltage is 35% of the maximum possible average output voltage, determine: (a) firing angle (b) rms and average output currents (c) average and rms SCR currents	[8M]
	b)	Why the firing angle in single phase ac voltage controller should be more than load phase angle explain with neat circuit and waveforms?	[8M]
4	a)	Explain the operation of single phase fully controlled converter feeding RLE load with neat circuit diagram and waveforms also deduce the rms output voltage.	[8M]
	b)	A single phase semiconverter, connected from 230 V, 50 Hz source, is feeding a load R= 15 Ω in series with a large inductance that makes the load current ripple free. For a firing angle 60°, calculate the input and output performance parameters of this converter.	[8M]
5		Explain the operation of three phase circulating current type dual converter and obtain the expression for peak value of circulating current. Draw the relevant voltage and current waveforms.	[16M]

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6   a)   Discuss the working of a single phase bridge type cycloconverter with RL loads and   [8M]
         for discontinuous waveform operation with neat circuit diagram. Draw the output
         voltage and current wave forms for $f_O = (1/3)$ fs, where f_S is input frequency and f_O
         is the output frequency.
    b)   Explain the operation of Buck-Boost converter with relevant waveforms and derive   [8M]
         the expression for average output voltage.

7   a)   With a neat circuit diagram, explain the principle of operation of a single phase full   [6M]
         bridge inverter feeding RL load.
    b)   Explain the operation of three-phase bridge inverter with 180° mode of operation   [10M]
         with aid of relevant phase and line voltage waveforms.

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