

Code No: RT31025

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**

~~~~~

**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  $R = 15 \Omega$ . 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  $R = 15 \Omega$  in series with a large inductance that makes the load current ripple free. For a firing angle  $60^\circ$ , 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]

Code No: RT31025

**R13****SET - 1**

- 6 a) Discuss the working of a single phase bridge type cycloconverter with RL loads and for discontinuous waveform operation with neat circuit diagram. Draw the output voltage and current wave forms for  $f_o = (1/3) f_s$ , where  $f_s$  is input frequency and  $f_o$  is the output frequency. [8M]
- b) Explain the operation of Buck-Boost converter with relevant waveforms and derive the expression for average output voltage. [8M]
- 7 a) With a neat circuit diagram, explain the principle of operation of a single phase full bridge inverter feeding RL load. [6M]
- b) Explain the operation of three-phase bridge inverter with  $180^\circ$  mode of operation with aid of relevant phase and line voltage waveforms. [10M]

\*\*\*\*\*

2 of 2