

No. of Printed Pages : 03

Roll No.

513

B. Tech. EXAMINATION, Dec. 2018

(Fifth Semester)

(Old Scheme)

(EE)

EE317

POWER ELECTRONICS

Time : 3 Hours]

[Maximum Marks : 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* questions.

1. What is an Inverter ? Describe the working of a single-phase series inverter with appropriate circuit and waveforms. For this inverter, derive an expression for the output frequency in terms of circuit parameters. **20**

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2. What are A.C. voltage regulators ? What are different types of A.C. regulators ? Discuss the working of three phase regulator with circuit and waveforms. **20**
3. What is a cycloconverter ? Describe the operating principle of single phase to single phase step-up cycloconverter with the help of mid-point and bridge type configurations. Illustrate your answer with appropriate circuit and waveforms. The conduction of various thyristors must also be indicated on the waveforms. **20**
4. Describe static Kramer drive and show that steady-state torque is not influenced by whether a transformer is used *or* not. Derive appropriate expressions to obtain speed-torque characteristics of static Kramer drive. **20**
5. (a) Describe the principle of operation of step-up chopper. Derive an expression for the average output voltage in terms of input d.c. voltage and duty cycle. State the assumptions made. **10**

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- (b) Describe a voltage commutated chopper with relevant current and voltage waveforms as a function of time. The chopper operation may be divided into certain well defined modes. State various simplifying assumptions made. **10**
6. What are various characteristic of Diac and Triac ? Compare them. Also, explain the latching and holding currents as applicable to SCR. Show these currents on its V-I characteristics. **20**
7. For a single phase one pulse controlled converter system, sketch waveforms for load voltage and load current for (i) RL load and (ii) RL load with freewheeling diode across RL. From a comparison of these waveforms, discuss the advantages of using a freewheeling diode. **20**
8. Explain R, RC and UJT firing circuits for SCRs with circuit diagrams and waveforms. Discuss their merits and demerits also. **20**

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