

Roll No.

EE-6002 (CBGS)**B.E. VI Semester**

Examination, November 2019

Choice Based Grading System (CBGS)**Power Electronics**

Time : Three Hours

Maximum Marks : 70

- Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) Explain the operation of MOSFET with VI and switching characteristics. 7
b) Discuss the switching characteristics of SCR by mentioning its salient features. 7
2. a) Mention the importance of snubber circuit which is connected across SCRs. 7
b) Derive an expression for
i) average load voltage 7
ii) average load current
iii) RMS load voltage of 1-phase half-controlled converter with inductive load.
3. a) Explain the operation of three phase, half wave controlled converter with resistive load and inductive load. Sketch the associated waveforms also. 7
b) The dc voltage from a 1-phase fully controlled bridge converter with RL load is 110V. The ac source voltage is 220V rms. The load resistance, $R = 0.5 \Omega$ and load inductance, L is large enough to cause the load current to be essentially constant. 7
i) Determine the delay angle α
ii) Estimate the power delivered to the load.
4. a) With the help of neat circuit diagram and associated waveforms, explain operation of 1-phase full bridge voltage source inverter with RL load. 7
b) The square-wave inverter of 1-phase full bridge type has $V_{dc} = 125V$, an output frequency of 60 Hz and a resistive load of 12.5Ω . Sketch the currents in the load, each switch and the source and determine the average and rms values of each. 7
5. a) Describe the operation of 3-phase bridge inverter circuit diagram with resistive load in 120° conduction mode. 7
b) A dc chopper is connected to an inductive load with a resistance of 5Ω and an input voltage of 300V. The on time and off time of the chopper are 20 ms and 10 ms respectively. Estimate the duty ratio, chopping frequency, average load voltage and average load current. 7
6. a) What is time ratio control in dc choppers? Explain the use of TRC for controlling the output voltage in choppers. 7
b) Draw the circuit of class-B commutation circuit. Explain how thyristor is commutated in class-B chopper. What are disadvantages of this commutation circuit? 7
7. a) Distinguish between an ac voltage controller and a cyclo-converter with respect to operation and control aspects. 7
b) Explain the various modes of operation of TRIAC with the help of equivalent circuits and relevant waveforms. 7
8. Write short note on any two of the following: 14
a) Single pulse Modulation
b) SPWM Technique
c) Parallel operation of SCR
d) Effect of freewheeling diode.
