

Roll No .....

**EX-5004 (CBGS)****B.E. V Semester**

Examination, December 2017

**Choice Based Grading System (CBGS)****Power Electronic Devices and Circuits***Time : Three Hours**Maximum Marks : 70*

- Note:** i) Total No. of questions are eight.  
 ii) Attempt any five questions.  
 iii) All questions carry equal marks.

1. a) Draw and explain structure and working of IGBT. Also draw its V-I characteristics and transfer characteristics. 7  
 b) Explain the turn-ON process of thyristors. 7
2. a) Explain the design of snubber circuit. What is ramp triggering? 7  
 b) For an SCR, the gate-cathode characteristics has a straight line slope of 130. For trigger source voltage of 15V and allowable gate power dissipation of 0.5 watts, compute the gate-source resistance. 7
3. a) Compare the facts of series and parallel operation of SCR. 7  
 b) Explain the circuit diagram and waveform for Class-F commutation i.e. line commutation. 7

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4. a) Explain the operation of single phase semiconverter with waveforms. 7  
 b) Describe operation of single phase half wave rectifier circuit with RLE load. Draw its waveform. 7
5. a) Explain the operation of three phase bridge inverter in  $180^\circ$  mode with waveforms. 8  
 b) Explain external control of ac output voltage in inverter. 6
6. a) Discuss the working of step-up chopper with diagram and waveforms. 7  
 b) What is duty cycle? Explain the control strategies of output voltage in chopper. 7
7. a) Explain the working of four quadrant chopper i.e type E chopper. 7  
 b) A step up chopper has input voltage of 220V and output voltage of 660V. If the non-conducting time of thyristor chopper is  $100\mu s$ , compute the pulse width of output voltage.  
 In case pulse width is halved for constant frequency operation, find the new output voltage. 7
8. a) Explain single phase AC voltage controller with R-load. Draw its voltage and current waveforms. 7  
 b) Explain three phase to single phase cycloconverter. Draw its fabricated and mean output voltage waveforms. 7

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