Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

EE-6002-CBGS

B.E. VI Semester

Examination, December 2020

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) Draw and explain the two transistor model of SCR and derive an expression for anode current.
   b) Explain the different methods for turning on of SCR. Briefly discuss the Resistance, capacitance firing circuit of SCR.

2. a) Mention the importance of snubber circuit which is connected across SCRs.
   b) Derive an expression for
      i) average load voltage
      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.
   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 = 0.5Ω and load inductance, L is large enough to cause the load current to be essentially constant.

i) Determine the delay angle α
ii) Estimate the power delivered to the load.

4. a) With a neat circuit diagram, explain the principle of operation of a single phase half bridge inverter.
   b) A single phase bridge inverter fed from 230V dc is connected to load R = 10Ω and L=0.03 H. Determine the power deliver to load in case the inverter is operating at 50Hz with square wave output.

5. a) Discuss the methods of controlling the output voltage of a chopper.
   b) A step up chopper has input voltage of 230V and output voltage of 600V if the conducting time of thyristor chopper is 100 μs, compute the pulses width of output voltage.

6. a) A step down chopper has an input voltage of 110V, the average load voltage is 60V and the average load current is 1.2 A. Calculate the value of the inductor and the load current.
   b) Explain various control techniques used for chopper circuits.

7. a) Discuss integral cycle control of single phase A.C. controller.
   b) Explain 3-Φ to 1-Φ cycloconverter with schematic diagram and basic circuit configuration and waveform.

8. 8. Write short notes on any two:
   a) Forced commutation technique of thyristor
   b) GTO and its VI characteristics
   c) Buck boost regulator
   d) AC voltage controllers

******