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

Roll No .....

EX-504

B.E. V Semester

Examination, December 2016

Power Electronics Devices and Circuits

Time : Three Hours

Maximum Marks : 70

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

1. a) Describe the different modes of operation of a thyristor with the help of its static V-I characteristics. 7
   b) Define latching and holding currents as applicable to an SCR. Show these currents on its static V-I characteristics. 7

2. a) Explain the different applications of: 7
      i) Power MOSFET
      ii) IGBT
      iii) GTO
      iv) SCR
   b) Explain the need of commutation in thyristor circuits. 7 Name the different methods of commutation schemes. Explain any one method.

3. a) Explain with circuit diagram of a single phase full converter bridge with RLE load. Draw voltage and current waveforms for continuous load currents? for $\alpha > 90°$. 7
   b) Discuss the effect of source inductance on the performance of a single phase full converter indicating clearly the conduction of various thyristors during one cycle. 7

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4. a) Explain with the waveforms the operations of three phase bridge inverter when each is conducting for 120degree, and the resistive load is star connected. 7
   b) What is the purpose of connecting diodes in anti-parallel with thyristors in inverters circuits? 7

5. a) Describe the principle of dc chopper operation. Derive the expression for its average dc output voltage. 7
   b) Describe current commutated chopper with circuit diagram and current and voltage waveforms. 7

6. a) Explain the principle of cycloconverter. 7
   b) How are the frequency and voltage both controlled simultaneously in cycloconverter circuit? 7

7. a) Write the working of single phase A.C. controller when it is supplying an inductive load and plot the waveforms of the output voltage and current if the delay angle is 7
      i) 30degree
      ii) 90degree
   b) A single phase voltage controller with an R-L load is connected to a 110 volts source if R=10 Ohms and L = 20mH and α = 90degree. Find 7
      i) The Rms output current
      ii) The power delivered to the load
      iii) The power factor

8. Write short notes on any two. 2×7=14
   a) Dual converter
   b) Harmonics and their reduction techniques.
   c) Switch mode power supply
   d) Snubber circuit.

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