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- 1 Attempt any four parts: 5×4=20
- (a) What are the characteristics of an ideal power switching device?
 - (b) Explain the switching characteristics of a BJT.
 - (c) Find the number of thyristors each with a rating of 500V and 75A required for each branch of a series parallel combination for a circuit for a total voltage and current rating of 7.5KV and 1 KA. Assume derating factor of 14%.
 - (d) Explain the significance of latching and holding currents.
 - (e) Explain the steady state and switching characteristics of MOSFET.
 - (f) Explain working of Triac.

Note: (1) Attempt all questions.
(2) All questions carry equal marks.

Time : 3 Hours] [Total Marks : 100

B. Tech.
(SEM. VI) THEORY EXAMINATION, 2014-15
POWER ELECTRONICS

Roll No.									
PAPER ID : 121603									
(Following Paper ID and Roll No. to be filled in your Answer Book)									

EEE-602



Printed Pages : 3

2. Attempt any two parts : 10×2=20

- (a) What is a DC chopper? Describe the various types of chopper configuration with neat and appropriate diagrams.
- (b) Discuss the two transistor model of a thyristor. Using this model, describe the various mechanisms of turning on a thyristor.
- (c) Explain the resonant pulse commutation with the help of circuit diagram and waveforms. Explain the effect of accelerating diode.

3. Attempt any two parts:- 10×2=20

- (a) A single phase half controlled bridge operated from the 230 V, 50 HZ mains feeds a resistive load of 100 Ω . If the firing angle is 60°, Calculate,
 - (i) Average output voltage
 - (ii) rms output voltage
 - (iii) total output power
 - (iv) DC output power
 - (v) load current at instant of turn on
- (b) What do you understand by dual converters? Explain the operation of a 3 ϕ dual converter using circulating current mode of operation. How are firing angles of two converters controlled?
- (c) Discuss the working of 1 ϕ full wave ac-dc converter taking into account the effect of source inductance. Draw the output voltage waveform for firing angle of 30°.

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4. Attempt any two parts:- 10×2=20

- (a) Describe the basic principle of working of 1 ϕ to 1 ϕ step down cycloconverter for both continuous and discontinuous conduction. Make the conduction of various thyristor also.
- (b) Describe 1 ϕ ac voltage controller with inductive and resistive loads. Describe an expression for output voltage.
- (c) Show that the fundamental rms value of per phase output voltage of low frequency for an m pulse cycloconverter is given by:

$$V_{ov} = V_{phn} \pi \sin \pi m$$

5. Attempt any two parts:- 10×2=20

- (a) Discuss the working principle of a 1 ϕ series inverter. What are the advantages and disadvantages of series inverter.
- (b) Explain operation of a 3 ϕ bridge inverter employing 1200 mode of operation. Draw waveforms of phase voltages and any one line voltage assuming star connected resistance load. The single phase quasi-square wave bridge inverter operates from a DC supply of 200V at a frequency of 100 Hz and feeds a resistive load of 10 Ω calculate:
 - (i) Duration of the ON period if the rms value of the load voltage is 100V.
 - (ii) Peak supply current
 - (iii) Average DC supply current.
- (c) _____

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