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Total Number of Pages : 1

M.TECH

M.TECH 2ND SEMESTER (AR 17) SUPPLEMENTARY EXAMINATIONS, APRIL/MAY 2019

ADVANCED POWER CONVERTERS

Branch: PE, Subject Code:MPEPC2010

Time: 3 Hours

Max Marks : 70

PART-A**(10 X 2=20 MARKS)****1. Answer the following questions.**

- What is continuous current operation?
- What type of gating signal is used in single phase ac voltage controller with RL load
- What are the advantages of PWM control?
- What is meant by current commutation
- What are the different methods of firing circuits for line commutated converter?
- What is meant by input power factor in controlled rectifier
- What is the disadvantage of ON-OFF control??
- What are the methods of reduction of harmonic content?
- Compare VSI and CSI
- What are the applications of cyclo-converter?

PART-B**(5 X 10=50 MARKS)****Answer any five questions from the following.**

- Describe the working of 1 ϕ fully controlled bridge converter in the Rectifying mode and inversion mode. And derive the expressions for average output voltage and rms output voltage. [5]
 - A dc chopper has an input voltage of 200V and a load of 15ohm resistance. When the chopper is on, its voltage drop is 1.5V and the chopping frequency is 10 KHz. If the duty cycle is 80%. Find i) average and rms output voltage ii) chopper on time [5]
- With the necessary circuit diagram and waveforms, explain the principle of operation of single phase ac voltage controller having only thyristor feeding resistive load by on-off control and phase control [5]
 - Derive the expression for rms value of output voltages for the above two cases [5]
- Classify the various techniques adopted to vary the inverter gain and brief on sinusoidal PWM. [5]
 - Explain the operation of 3 ϕ bridge inverter for 180 degree mode of operation with aid of relevant phase and line voltage waveforms. [5]
- Differentiate natural commutation and forced commutation [5]
 - Explain the operation of three phase semi converter with RLE load. Sketch the associated waveforms [5]
- Prove the output voltage of step down chopper is $V_o = D V_s$. From the necessary waveforms [5]
 - Explain the working of voltage commutated chopper with aid of circuit diagram and necessary waveforms. Derive an expression for its output voltage [5]
- Explain the operation of multistage control of AC voltage controllers with neat diagram [5]
 - For a 1-phase voltage controller, feeding a resistive load, draw the waveforms of source voltage, gating signals, output voltage and voltage across the SCR. Describe the working with reference to waveforms drawn. [5]
- Write short notes on
 - 60 degree PWM [5]
 - Effect of source inductance on three phase converters [5]