NR

Code No: 52102/MT

M.Tech., I-Semester Regular Examinations, March-2008.

ANALYSIS OF POWER ELECTRONIC CONVERTERS
(Common to Power Electronics & Electric Drives, Power & Industrial Drives, Power Electronics, power Engg.& Energy Systems)

Time: 3 hours **Max. Marks: 60**

Answer any FIVE questions
All questions carry equal marks.

1.a) What are the effects of load inductance on the performance of ac voltage controllers?
b) Explain the PWM control on ac voltage controllers and draw the waveforms of output voltage and load current.

2.a) The three-phase full wave controller supplies a Y-connected resistive load of R = 15Ω and the line-to-line input voltage is V_s=208V at 60Hz. The delay angle is $\alpha = \pi/3$. Determine
i) The input PF &
ii) The expression for the instantaneous out voltage of phase a. Draw the waveforms.
b) What are the effects of source and load inductances.

3.a) Analyse the midpoint and bridge configurations for a three phase to three phase cyclo converter.
b) What are the advantages of sinusoidal harmonic reduction techniques for cyclo converters?

4.a) What is Extinction angle and symmetrical angle control of converters?
b) Explain the operation of Dual converter with and without circulating current.

5. A 3phase full converter charges a battery from a three-phase supply of 230V, 50Hz. The battery emf is 200V and its internal resistance is 0.5Ω. On account of inductance connected in series with the battery, charging current is constant at 20A. Compute the firing angle delay and the supply power factor.

(Contd...2)

6. The cuk regulator has an input voltage V_s=15V. The duty cycle in K=0.4 and the switching frequency is 25KHz. The filter inductance is L_2=350 μH and filter capacitance is C_2=220 μF. The energy transfer capacitance is C_1=400 μF and inductance is L_1=250 μH. The average load current is I_a=1.25A. Determine
   i) The average output voltage, V_a
   ii) The average input current, I_s
   iii) The peak-to-peak ripple voltage of capacitor C_1, $\Delta \vee_{C1}$ and
   iv) Ripple current of Inductor L_2, ΔI_2.

7.a) Explain the advanced modulation techniques.
   b) What are the performance parameters of inverters.

8. Explain the voltage control of three phase inverters with the help of diagrams.

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