Department of Electrical Engineering IIT Delhi

PEEMD M. Tech. programme

EEL 744 A. C. Controllers

Max Marks 40 Mayor Test 29th Nov. 2006 Time 120 mts

Q1. Draw layout of a half bridge converter-inverter based UPS with a step up/down chopper. Explain its operation in complete detail. Show the layout for the converter-inverter and chopper control blocks and explain the operation [10]

Q2. Explain the principle of operation of a SVPWM inverter. An SV PWM VSI has 5 samples/sector is operating at 0.6 modulation index. Obtain T_0, T_1 and T_2 for 3rd sample. [10]

Q3. A PWM voltage source inverter operating in symmetrical multiple-pulse modulation mode, has 8-pulses/half cycle. Show the location of the pulses and explain the effect of each pulse on the amplitude and phase of 5th harmonic component of the inverter output voltage. Given the pulse width 'd' in pu as 0.8. [10]

Q4 A 1-phase phase back controller feeds a pure resistance load R_L, has input voltage of $230\sqrt{2}\sin 314t$. If the series equivalent resistance and reactance of the source be $R_s = 14.3174\Omega$ and $X_s = 9.06\Omega$ respectively. Determine the values of load resistance R_L and operating α. Derive the necessary equations. [10]