

MEPS - 301(C) (Elective-I)

M.E./M.Tech. III Semester

Examination, December 2012

Power Controller

Time : Three Hours

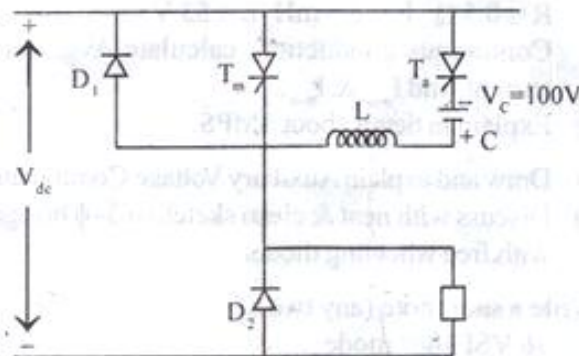
Maximum Marks : 70

Note : 1. Attempt any five questions.

2. Each question carry equal marks.

1. a) An auxiliary thyristor is triggered to turn off the conducting thyristor in the circuit shown in Fig. find the time after which main thyristor is turned off and also circuit commutation time.

$V_{dc} = 100$ V, $L = 0.1$ mH and $C = 10$ μ f. capacitor initially charged to 100 V, $I_L = 15$ A.



- b) Explain in detail of MOSFET. With its characteristics.

2. a) A 3 ϕ , fix pulse fully controlled convertor is connected to 3 ϕ are mains a 400 V at 50 Hz and $\alpha_d = 45^\circ$. The I_L is constant = 10 A, $V_{dc} = 360$ V.
Calculate load resistance, source introduced overlap angle.
- b) Explain in detail with suitable application of pulse width modulated converters.
3. Write a short note:
 - a) Load Commutated Chopper.
 - b) JONES CHOPPER.
4. a) Calculate the frequency of the output of a series resonant inverter. Damped frequency of R-L-C circuit is 50 Hz and thyristor turn off time $T_o = 50$ μ sec. circuit turn off time, T_c , should be 1.5 times the thyristor turn off time.
- b) Discuss Equal Pulse width modulation [EPWM].
5. a) Explain clearly about the operation of cyclo-converters and also discuss about two applications of them.
- b) Describe firing angle control by cosine modulating signal of cycle-converter.
6. a) A single quadrant dc chopper is feeding a R-L-E load
 $V = 200$ V $f = 400$ Hz $\alpha = 0.6$
 $R = 0.5 \Omega$ $L = 2.5$ mH $E = 53$ V
Continuous conduction, calculate Avg. value of load current, and I_{max} & I_{min} .
- b) Explain in detail about SMPS.
7. a) Draw and explain Auxiliary Voltage Commutation Circuit.
- b) Discuss with neat & clean sketch of 3- ϕ bridge converter with free wheeling diode.
8. Write a short note (any two):
 - i) 3 ϕ VSI 180° mode
 - ii) Voltage Commutated Choppers.
 - iii) Protection of MOSFET & MCT's.