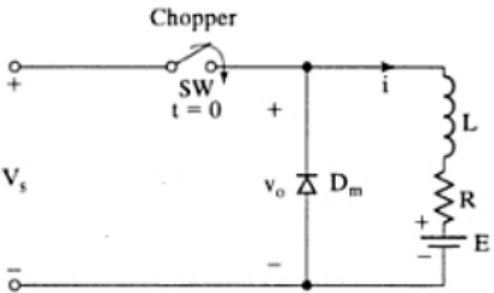
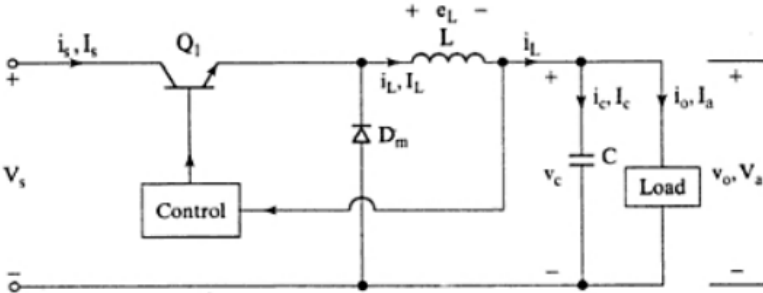
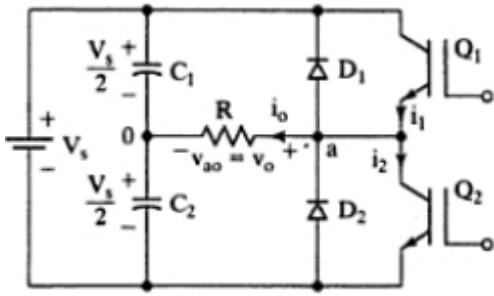




	Questions	mark
1-	<p>The reverse recovery time of a diode is <math>t_{rr} = 5\mu s</math>, and the rate fall of the diode current is <math>di/dt = 80 A/\mu s</math>. If the softness factor is <math>SF=0.5</math>, determine (a) the storage charge <math>Q_{rr}</math> and (b) the peak reverse current <math>I_{RR}</math>.</p>	7
2-	<p>In a single-phase full-wave diode bridge rectifier, the diodes have a reverse recovery time of <math>40\mu s</math>. For an ac input voltage of 230 V, determine the effect of reverse recovery time on the average output voltage for a supply frequency of (a) 50 Hz and (b) 2.5 kHz.</p>	12
3-	<p>The converter in figure below has a load resistance <math>R = 0.25\Omega</math>, input voltage <math>V_s = 550V</math> and battery voltage <math>E = 0V</math>. The average load current <math>I_a = 200A</math> and chopping frequency <math>f = 250Hz</math>. Use the average output voltage to calculate the load inductance L which would limit the maximum load ripple current to 10 percent of <math>I_a</math>.</p> 	14
4-	<p>The buck regulator in figure below has an input voltage of <math>V_s = 12V</math>. The required average output voltage is <math>V_a = 5V</math> at <math>R = 500\Omega</math> and the peak to peak output ripple voltage is 20mV. The switching frequency is 25kHz. If the peak to peak ripple current is limited to 0.8A, determine (a) the duty cycle, (b) the filter inductance L, (c) the filter capacitance C and (d) the critical values of L and C.</p> 	16

- 5- The single phase half bridge inverter in figure below has a resistive load of  $R = 2.4\Omega$  and the dc input voltage is  $V_s = 48V$ . Determine (a) the rms output voltage at the fundamental frequency  $V_{o1}$ , (b) the output power  $P_o$ , (c) the average and peak current of each transistor, (d) the peak reverse blocking voltage  $V_{BR}$  of each transistor, (e) the THD, (f) DF.



- 6- The three phase inverter in figure below has a Y connected load of  $R = 5\Omega$  and  $L = 23mH$ . The inverter frequency is  $f_o = 60Hz$  and the dc input voltage is  $V_s = 220V$ . (a) Express the instantaneous line to line voltage  $v_{ab}(t)$  and line current  $i_a(t)$  in a Fourier series. Determine (b) the rms line voltage  $V_L$ , (c) the rms phase voltage  $V_p$ , (d) the rms line voltage  $V_{L1}$  at the fundamental frequency, (e) the rms phase voltage at the fundamental frequency  $V_{p1}$ , (f) the THD and (g) the DF.

