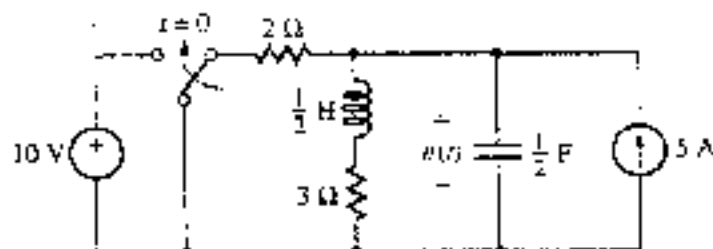


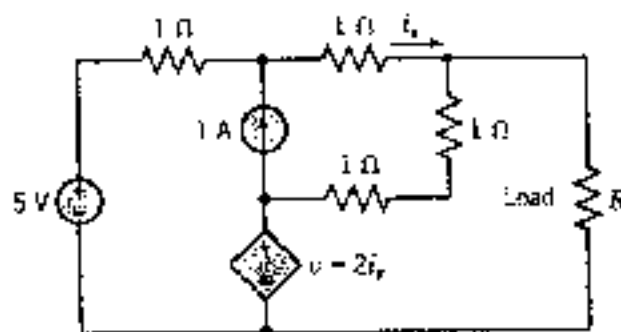
八十五學年度 電機工程學系(所) 甲 組碩士班研究生入學考試

科目 電路學 科號 2902 共 3 頁第 1 頁 \*請在試卷【答案卷】內作答

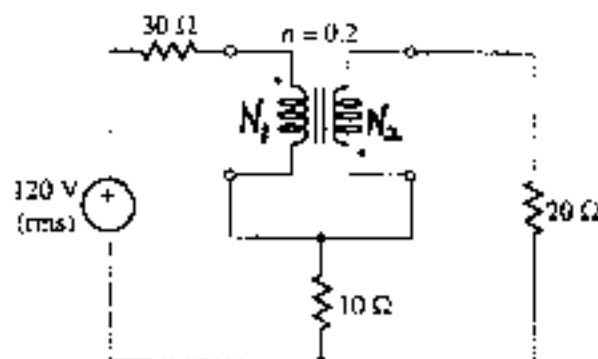
1. Assume that the circuit is in steady state at  $t = 0^-$ , find  $v(t \geq 0^+)$  when the switch is connected to the voltage source. (15%)



2. (a) Find  $R$  that will result in the maximum power absorption by this resistor; and (7%)  
 (b) find the magnitude of this maximum power. (3%)



3. Find the average power dissipated in the  $10\text{-}\Omega$  resistance, where the turns ratio of the transformer  $n$  is defined as  $n = N_2/N_1$ . (10%)



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4. Given that  $v_s = 200\sqrt{2} \cos(500t + 45^\circ)$  in the circuit shown in Figure P4, please find  $v_c$  and  $i$ , and draw the phasor diagram for  $v_c$ ,  $v_R$ ,  $v_{L1}$ ,  $v_{L2}$ ,  $i_c$ ,  $i_{RL}$  and  $i$ .  
(Hint:  $\tan 76^\circ = 4$ ,  $\tan 45^\circ = 1$ ,  $\sqrt{2} = 1.414$ ,  $\sqrt{17} = 4.123$ )

(15%)

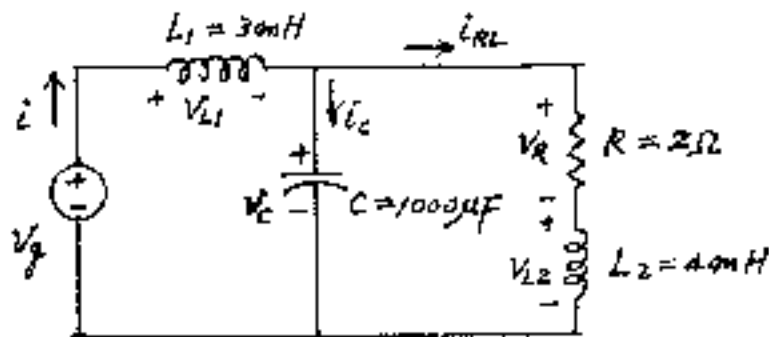


Figure P4

5. In the network shown in Figure P5, find the resonant frequency  $\omega_r$  in terms of  $L, C, R_1, R_2$ .

(10%)

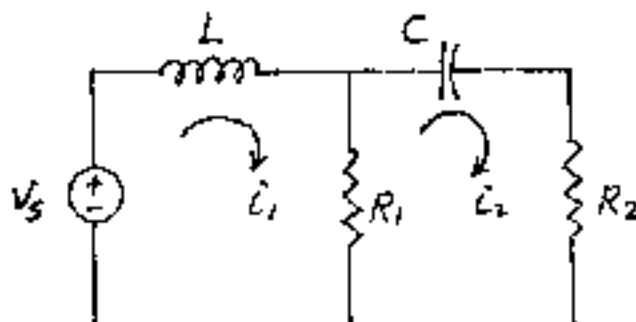


Figure P5

6. Find the transmission matrix of the circuit shown in Figure P6. The transformer is an ideal one whose turns ratio is  $n$ .

(10%)

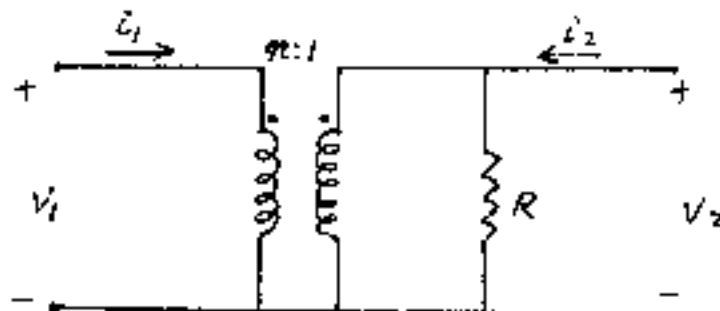
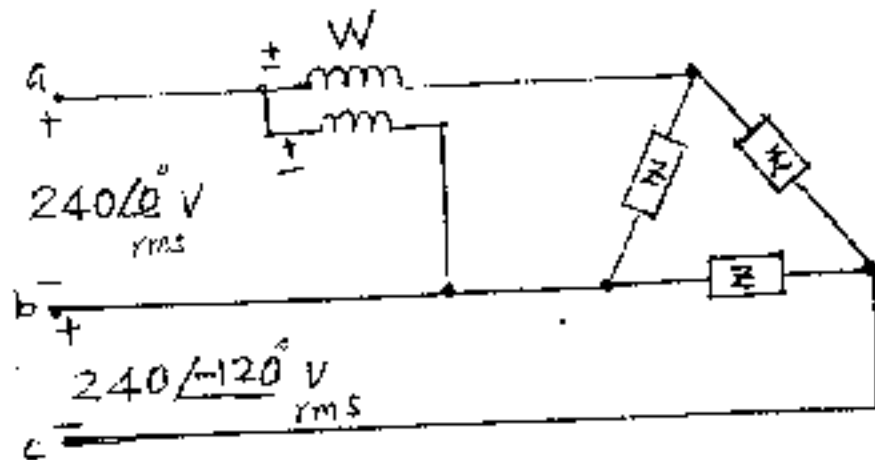


Figure P6

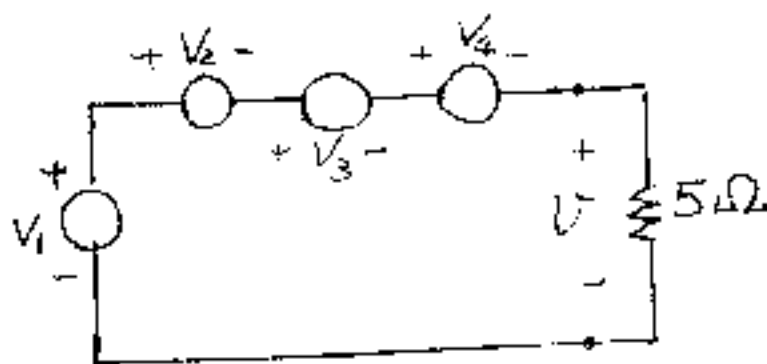
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7. A balanced delta connected load has phase impedance of  $z = 12 \angle 90^\circ$  ohms and is supplied by a 240 Volts, 60 Hz, three phase line. Calculate the reading of the ideal wattmeter as shown below (15%)



8. (a) For the following network, find the rms value of  $v$   
 (b) the average power absorbed by the resistance  
 (c) state the condition such that superposition of power holds.  
 (15%)



$$\begin{aligned} V_1 &= 10\text{V} \\ V_2 &= 20 \cos 20t \text{ V} \\ V_3 &= 30 \sin 20t \text{ V} \\ V_4 &= 50 \cos 40t \text{ V} \end{aligned}$$