

國立臺灣科技大學一百年度電力電子產業碩士專班招生(秋)試題

系所組別：電力電子領域

科目：電路學

(總分為 100 分)

不得使用計算器

1. For the circuit shown in Fig. P1, find the node voltages  $v_1$  and  $v_2$ . (10%)

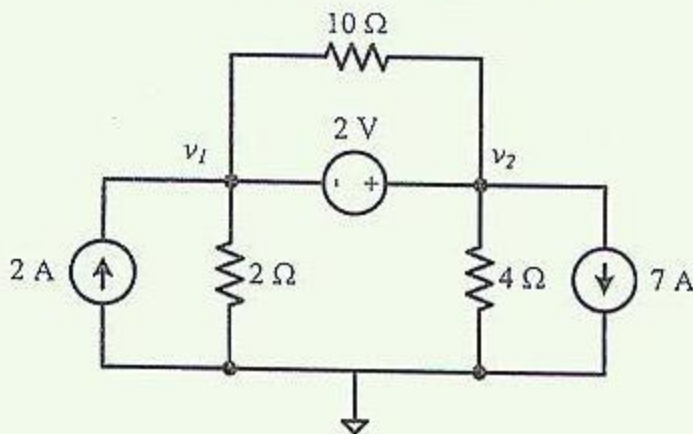


Fig. P1

2. Find the Thevenin equivalent of the circuit in Fig. P2. (20%)

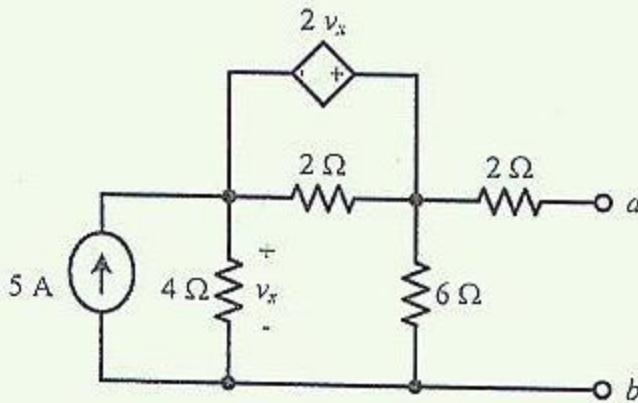


Fig. P2

3. For the RLC circuit shown in Fig. P3, assume the switch has been closed for a long time. It opens at  $t=0$ . Find  $v(t)$  for  $t>0$  (20%)

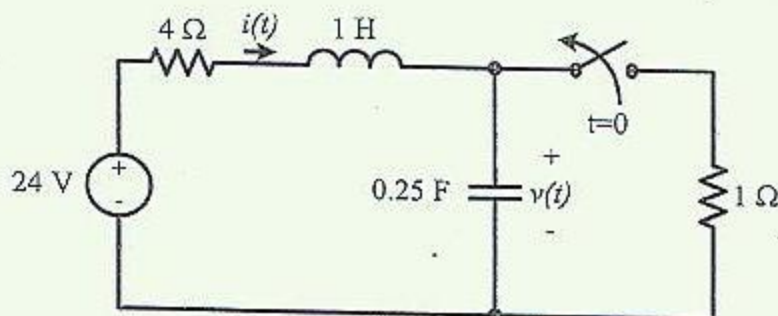


Fig. P3



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4. For the RLC circuit shown in Fig. P4, if  $i(t) = 1 \sin(t)$  A,  $R = 1 \Omega$ ,  $L = 1$  H,  $C = 1$  F, please calculate  $v_L(t)$ ,  $v_R(t)$ ,  $v_C(t)$ , and  $v(t)$ , assuming that  $v_C(0) = 0$  V. (20%)

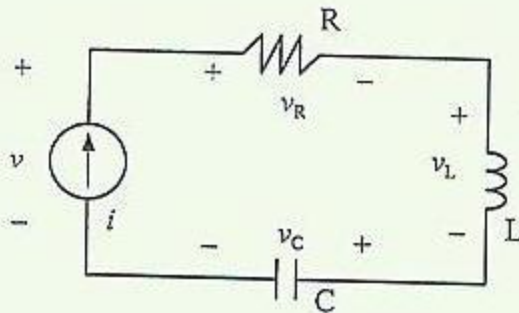


Fig. P4

5. A load with a lagging power factor (PF) of  $1/\sqrt{2}$  is supplied by a voltage source with an amplitude of 110 Vrms. If the reactance of this load is  $10 \Omega$ , Please determine the average power consumed by the load. (15%)
6. For the circuit shown in Fig. P6, find the impedance  $Z_{ab}$  in the circuit if  $Z_L = 80 \angle 60^\circ \Omega$ . (15%)

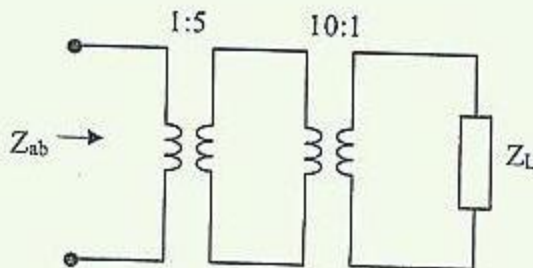


Fig. P6

