

國立臺灣科技大學 104 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. Calculate the equivalent resistance R_{ab} shown in Fig. P1 (10 分)

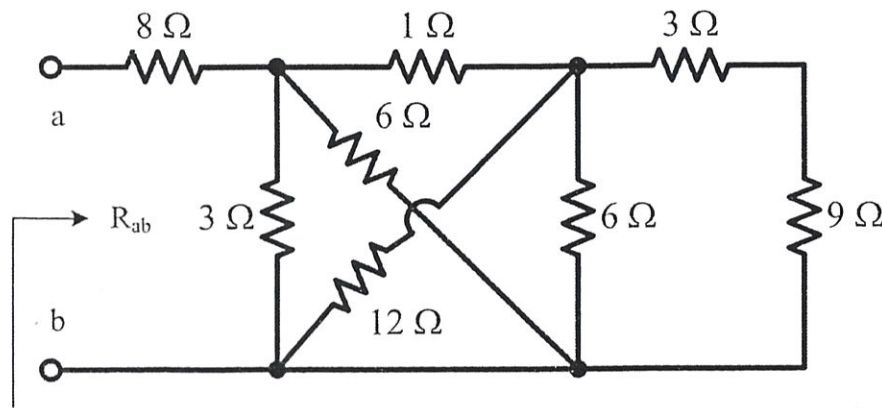


Fig. P1

2. Find v_o and i_o in the circuit of Fig. P2 (20 分)

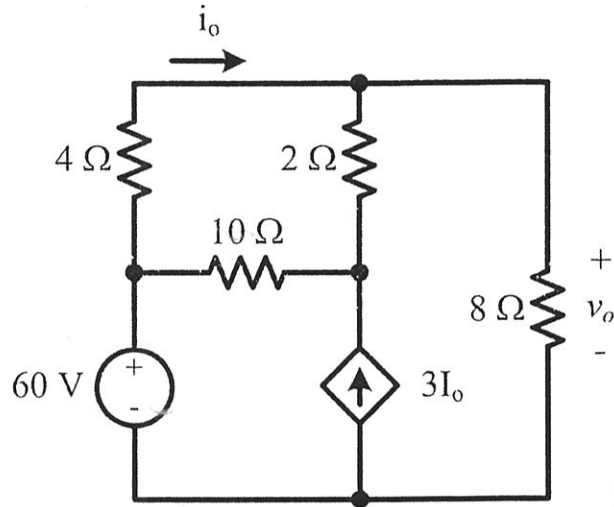


Fig. P2

3. For the circuit shown in Fig. P3 (總分 20 分)

- (a) What resistor connected across terminals a-b will absorb maximum power from the circuit? (12 分)
- (b) What is that power? (8 分)

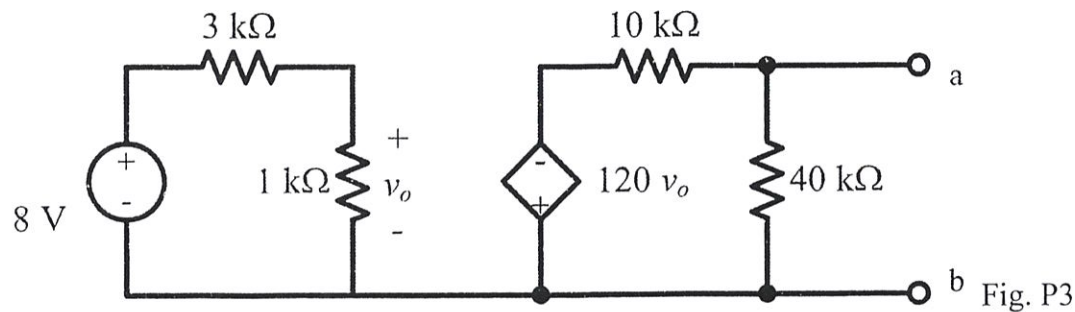
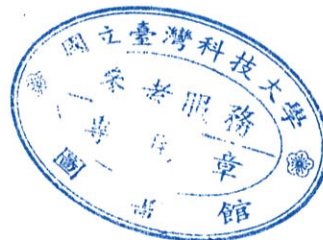


Fig. P3



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4. Find the equivalent input impedance, Z , for the circuit of Fig. P4. Let the impedance of the capacitor be $(j\omega C_2)^{-1}$. (10 分)

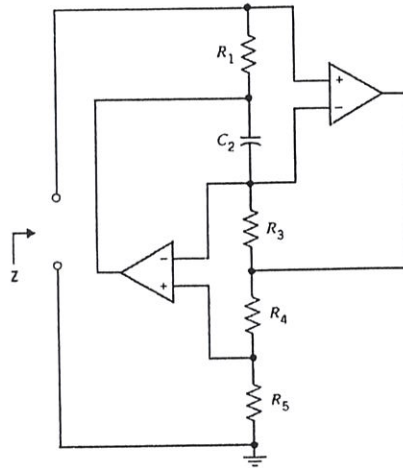


Fig. P4

5. In Fig. P5, the source voltage $V_s = 10\angle 0^\circ$ and delivers 10VA to the load, *i.e.*, $Z \parallel (6+j8)$. If the power factor is 0.707 (*pf* angle is 45°). Find the known impedance Z . (10 分) In addition, if the power factor is expected to be raised to unity by paralleling a capacitor, find the impedance of the capacitor. (10 分)

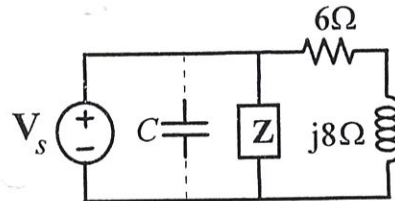


Fig. P5

6. The input to the circuit in Fig. P6 is $v_i(t)$, the output is $v_o(t)$ across the capacitor. Determine (a) the step response (10 分) and (b) the impulse response of the circuit. (10 分)

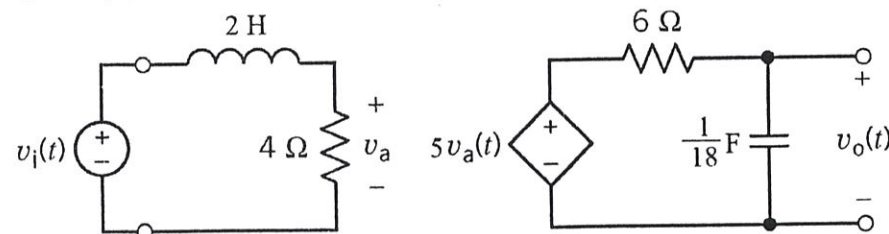


Fig. P6

