

國立臺灣科技大學

九十五年電資產業研發碩士專班(春)考試試題

系所組別：電力電子領域

科目：電路學

「總分：100分」

1. For the circuit shown in Fig. 1, please determine i by using source transformation. (15 %)

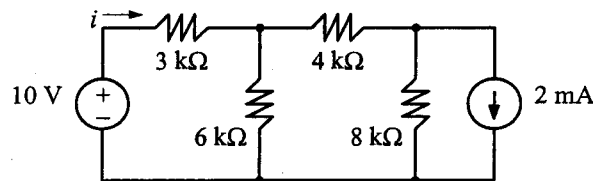


Fig. 1

2. Refer to Fig. 1, please determine i by using superposition. (15 %)
3. Find the Thevenin equivalent circuit for the circuit shown in Fig. 2. (15 %)

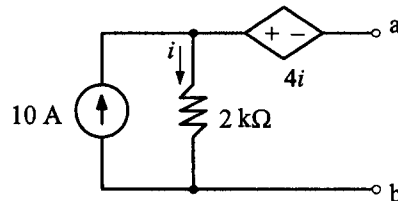


Fig. 2

4. For the circuit shown in Fig. 3, please find R such that maximum power is dissipated in R . Also please find the power supplied by the 2-V voltage source. (15 %)

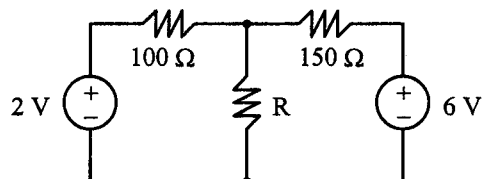


Fig. 3



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5. Compute V_1 and V_2 in the circuit of Fig. 4 using phasor representation. (10%)

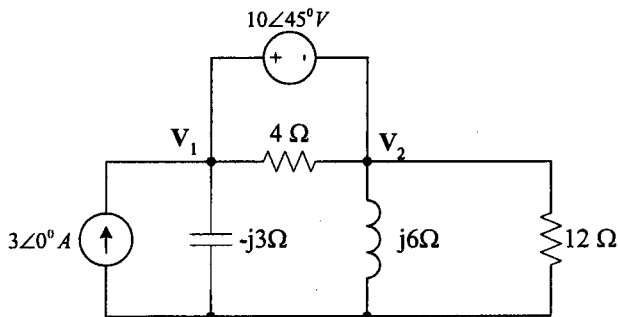


Fig. 4

6. Using a single op amp, a capacitor, and resistors of 100 kΩ or less, design a circuit to implement the following equation. (Assume $v_o = 0$ at $t = 0$). (10%)

$$v_o = -50 \int v_i(t) dt$$

7. Find the state-space representation of the circuit of Fig. 5. Determine the transfer function of the circuit when v_s is the input and i_x is the output. (10%)

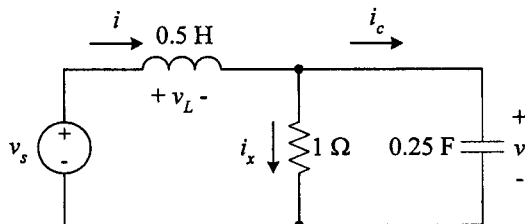


Fig. 5

8. Consider the circuit in Fig. 6, which may be regarded as a two-input (v_s, v_i), two-output system (v_o, i_o). Determine the state-space representation. (10%)

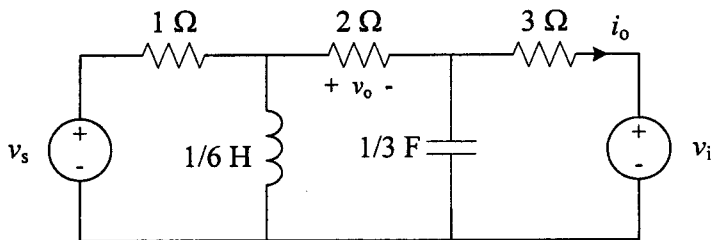


Fig. 6

→8

