

科目	電路學	適用系所	電機工程學系電磁與能源組	時間	100 分鐘
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※請務必在答案卷作答區內作答。

共 2 頁 第 1 頁

1. The variable resistor in the circuit in Fig.1 is adjusted for maximum power transfer to R_o .

- Find the value of R_o .
- Find the maximum power that can be delivered to R_o . (20%)

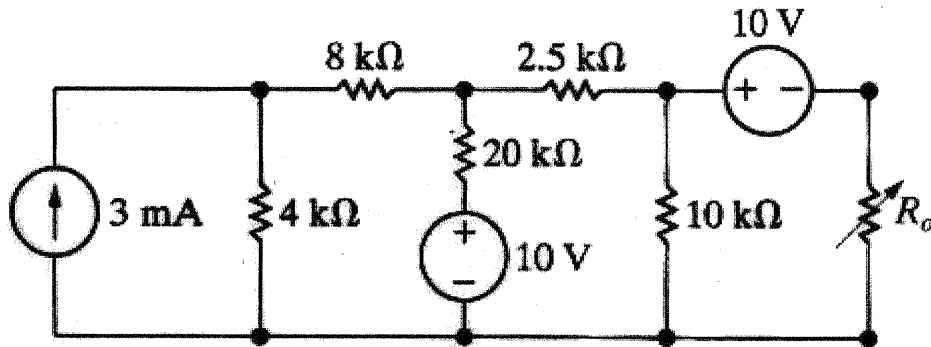


Fig. 1

2. The switch in the circuit in Fig. 2 has been in position x for a long time. The initial charge on the 10 nF capacitor is zero. At $t = 0$, the switch moves instantaneously to position y . (a) the energy delivered to the $250\text{ k}\Omega$ resistor. (b) the energy trapped in the capacitors. (c) the initial energy stored in the capacitors. (15%)

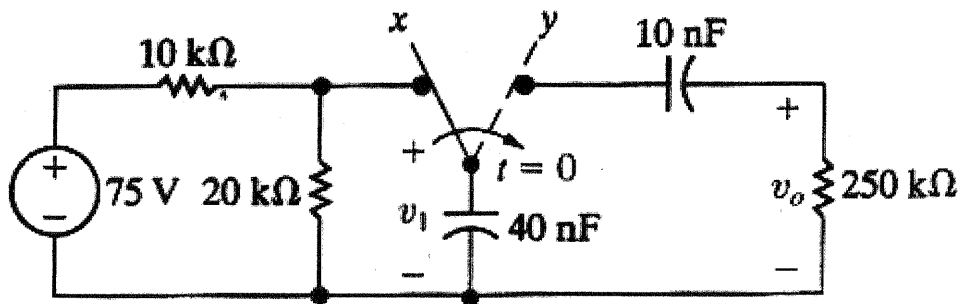


Fig.2

3. The two switches in the circuit seen in Fig. 3 operate synchronously. When switch 1 is in position a , switch 2 is in position d . When switch 1 moves to position b , switch 2 moves to position c . Switch 1 has been in position a for a long time. At $t=0$, the switches move to their alternate positions. Find $v_o(t)$ for $t \geq 0$. (15%)

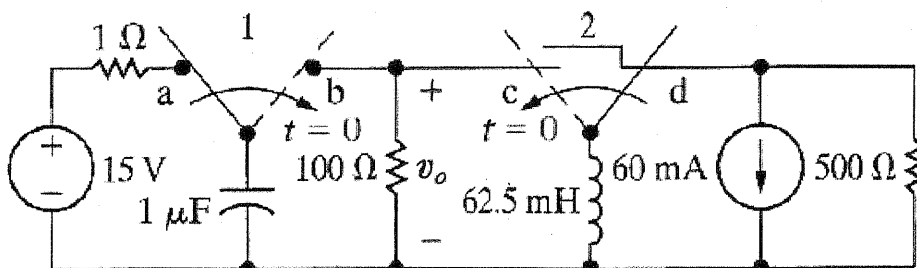


Fig. 3

4. Find and express $v(t)$ and $i(t)$ in time domain form (15 %).

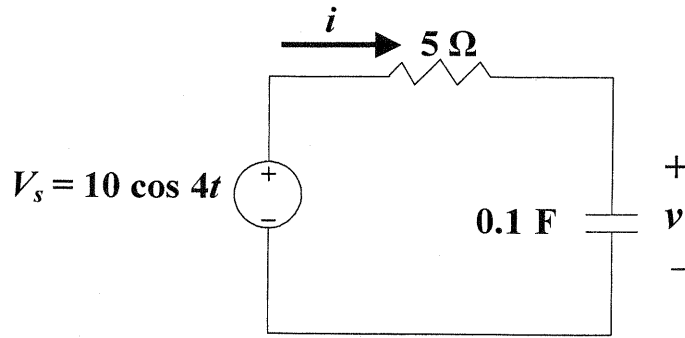


Fig. 4

5. (i) Determine the load impedance of the circuit that will results in Maximum Power being transferred to the load if $\omega = 10 \text{ k rad/s}$ (10 %)
 (ii) Determine the maximum average power if $v_g = 120 \cos 10000t \text{ V}$ [13 %]

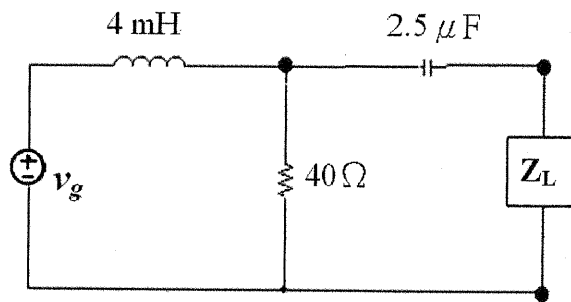


Fig. 5

6. Determine the z-parameter for the circuit below (12 %).

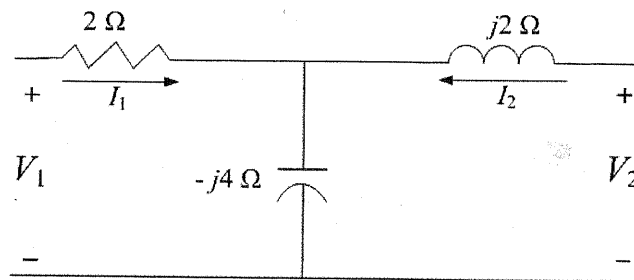


Fig. 6

Hint*

$$z_{11} = \left. \frac{V_1}{I_1} \right|_{I_2=0} \Omega, \quad z_{21} = \left. \frac{V_2}{I_1} \right|_{I_2=0} \Omega,$$

$$z_{12} = \left. \frac{V_1}{I_2} \right|_{I_1=0} \Omega, \quad z_{22} = \left. \frac{V_2}{I_2} \right|_{I_1=0} \Omega.$$