

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. Find and sketch both the Thevenin and Norton equivalents at terminals  $a-b$  of the circuit shown in Fig. 1. (10 %)

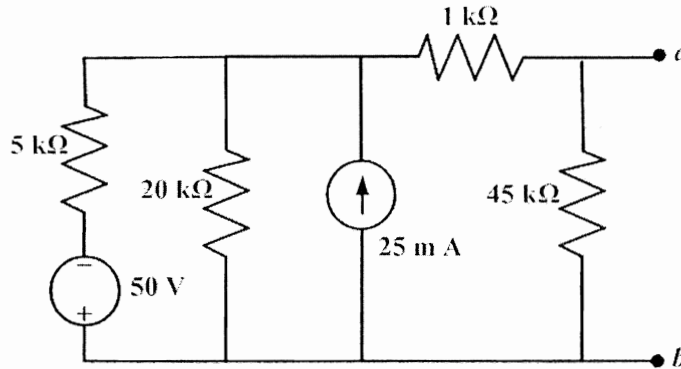


Fig. 1

2. The switch in the circuit shown in Fig. 2 has been in position  $a$  for a long time before switching to position  $b$  at  $t = 0$ .
- Find the numerical expression of  $i(t)$ ,  $v_1(t)$ , and  $v_2(t)$  for  $t \geq 0^+$  [15 %]
  - Determine the energy store in the capacitor at  $t \leq 0$  [5 %]
  - Determine the energy trapped in the circuit at  $t = 0^+$  [5 %]

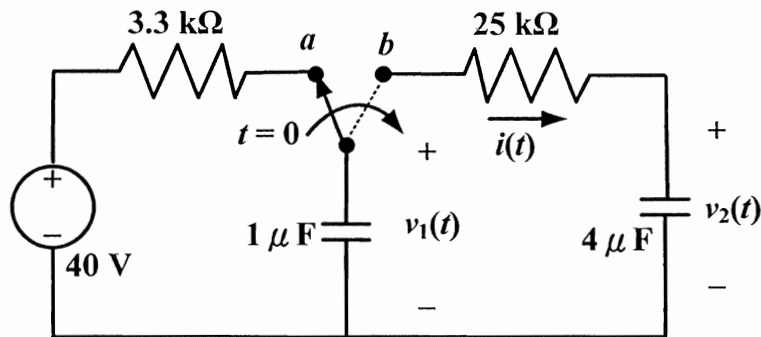


Fig. 2

3. The switch in the circuit shown in Fig. 3 has been opened for a long time before closing at  $t = 0$ . Assume no initial energy is stored in the circuit, find  $v_C(t)$  for  $t \geq 0$ . (15 %)

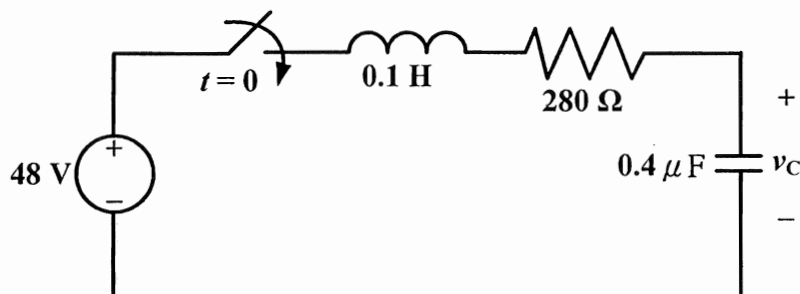


Fig. 3

4. The sinusoidal voltage source in the circuit seen in Fig.4 is operating at a frequency of 200 krad/s. The coefficient of coupling  $k$  is adjusted until the peak amplitude of  $i_1$  is maximum. (a) What is the value of  $k$ ? (b) What is the peak amplitude of  $i_1$  if  $v_g = 560 \cos(2 \times 10^5 t)$  V? (20%)

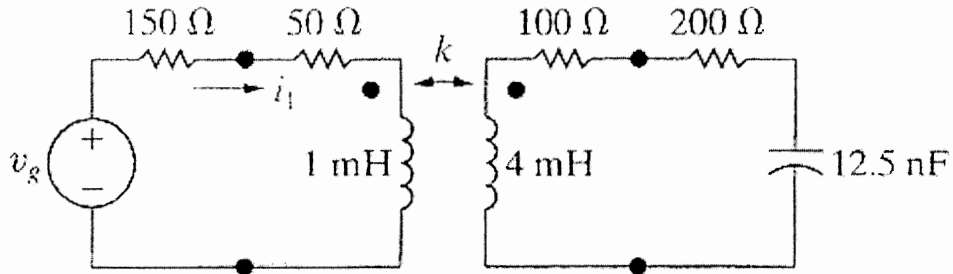


Fig. 4

5. There is no energy stored in the circuit in Fig. 5 at the time the switch is closed. (a) Find  $V_o(s)$ . (b) Find  $v_o(t)$ . (20%)

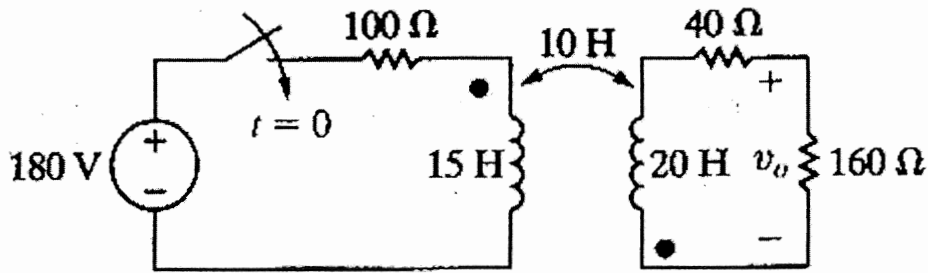


Fig. 5

6. Find the s-domain expressions for the  $h$  parameters of the two-port circuit shown in Fig. 6. (10%)

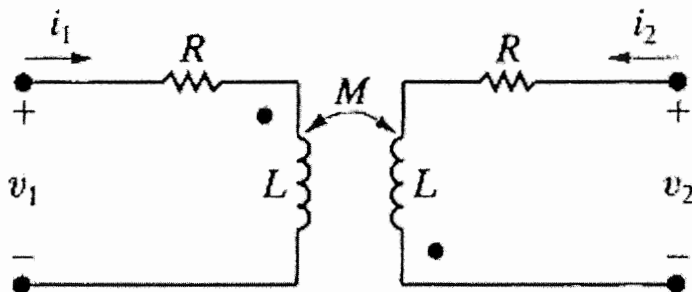


Fig. 6