

國立高雄科技大學 109 學年度碩士班 招生考試 試題紙

系 所 別： 電機工程系碩士班

組 別： 甲組

考科代碼： 2012

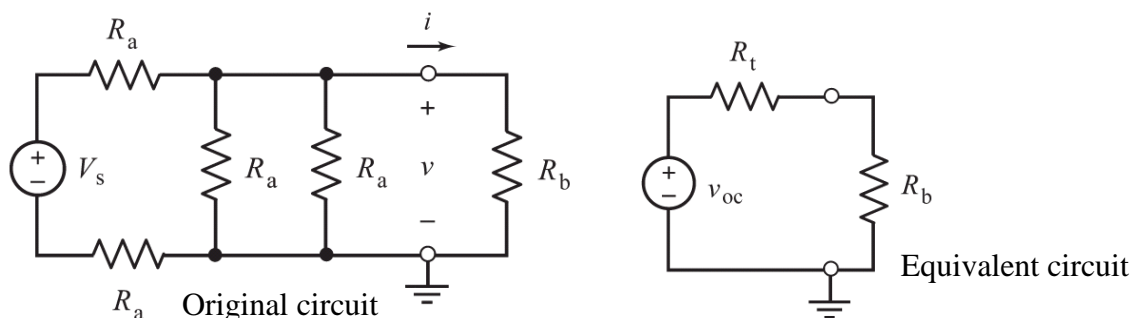
考 科： 電路學

注意事項：

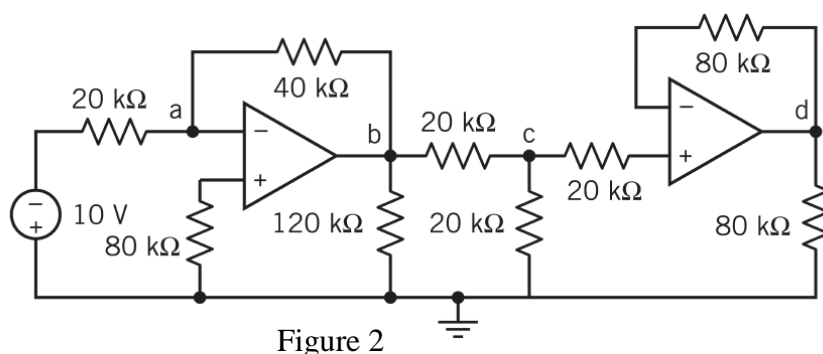
- 1、各考科一律可使用本校提供之電子計算器，**考生不得使用自備計算器**，違者該科不予計分。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

1. The equivalent circuit in Figure 1 is obtained by replacing part of the original circuit by its Thevenin equivalent circuit. The values of the parameters of the Thevenin equivalent circuit are  $v_{oc} = 15V$  and  $R_t = 60\Omega$ . Determine the following:

- (1) The values of  $V_s$  and  $R_a$ . (Four resistors in the original circuit have equal resistance,  $R_a$ ) (10%)
- (2) The value of  $R_b$  required to cause  $i = 0.2A$ . (5%)
- (3) The value of  $R_b$  required to cause  $v = 12V$ . (5%)



2. Determine the node voltages at nodes a, b, c and d of the circuit shown in Figure 2. (20%)



3. Determine  $v(t)$  in each time step for  $t \geq 0$  for the circuit of Figure 3(a) when  $i_s(t)$  is the current shown in Figure 3(b) and  $v(0) = 2\text{V}$ . (20%)

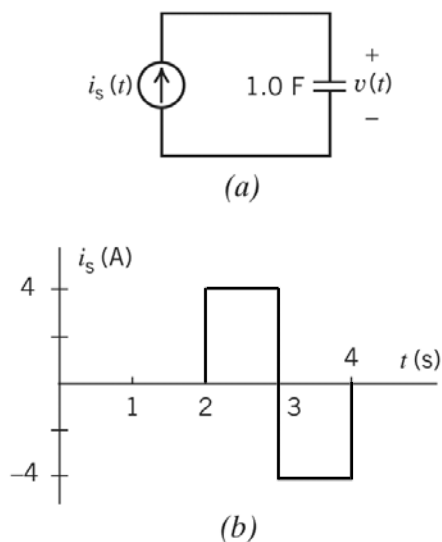


Figure 3

4. The input to the circuit shown in Figure 4 is the current source  $i_s(t) = 4 + 8u(t)$  A. The output is the voltage  $v(t)$ . Determine the following:
- (1) The parameters of Norton equivalent circuit  $R_t$  and  $i_{sc}$  without inductance. (10%)
  - (2) The time constant  $\tau$ . (5%)
  - (3) The inductance current  $i(t)$  for  $t \geq 0$ . (5%)
  - (4) The output voltage  $v(t)$  for  $t > 0$ . (5%)

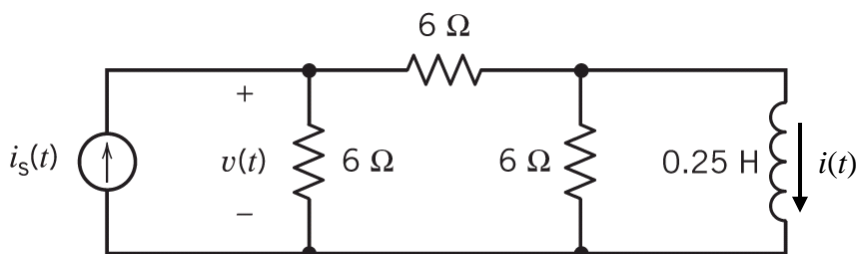


Figure 4

5. A circuit shown in Figure 5.
- (1) Determine the steady-state voltage  $v_o(t)$  in the circuit when current source is 400 rad/s. (5%)
  - (2) Determine the steady-state voltage  $v_o(t)$  in the circuit when current source is 200 rad/s. (10%)

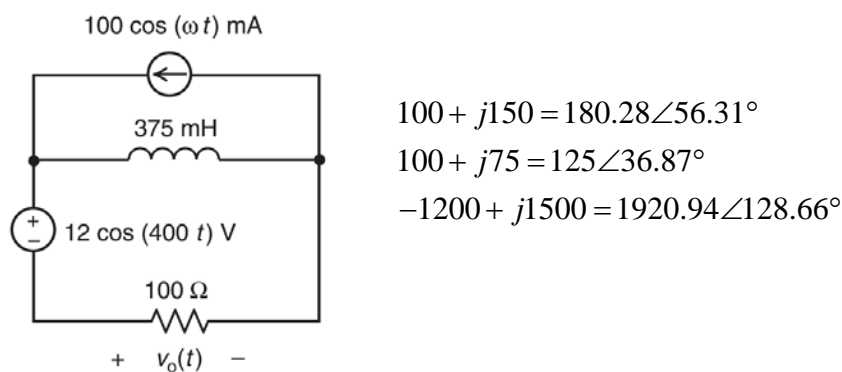


Figure 5