

國立臺北科技大學  
九十五學年度學士班二、三年級轉學生招生考試  
四技三年級 電機工程系 專業科目 (二)  
電路學試題

填 准 考 證 號 碼

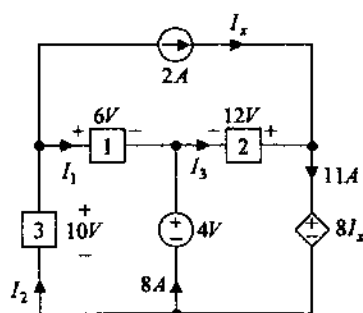
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第一頁 共二頁

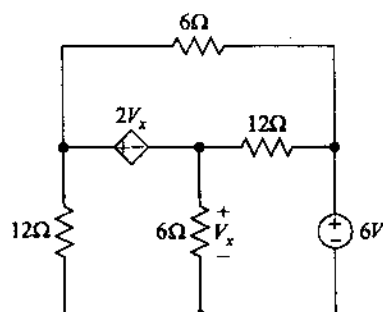
**注意事項：**

1. 本試題共 10 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

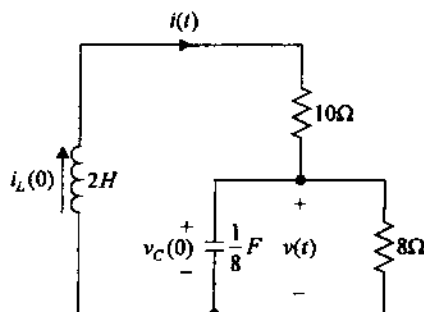
1. Find the total power dissipated in the following circuit, where numbered blocks are electrical elements. (10%)



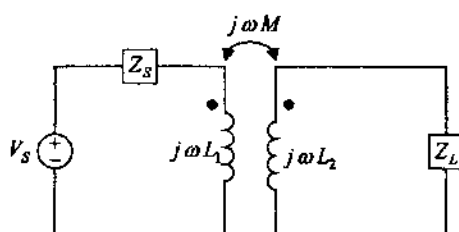
2. Find the voltage  $V_x$  in the following circuit. (10%)



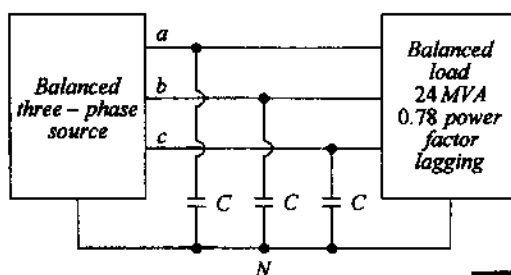
3. Find  $v(t)$  in the following circuit with  $v_C(0) = 1V$  and  $i_L(0) = \frac{1}{2}A$ . (10%)



4. An industrial load consumes 88kW at a pf of 0.707 lagging from a 480V<sub>rms</sub> line. The transmission line resistance from the power company's transformer to the plant is 0.08Ω. Please find the power that must be supplied by the power company if the pf is changed to 0.90 lagging. (10%)
5. Given the following circuit with the parameters  $Z_S = 3 + j1\Omega$ ,  $j\omega L_1 = j2\Omega$ ,  $j\omega L_2 = j2\Omega$ ,  $j\omega M = j1\Omega$ , and  $Z_L = 1 - j1\Omega$ , determine the impedance seen by the source  $V_S$ . (10%)



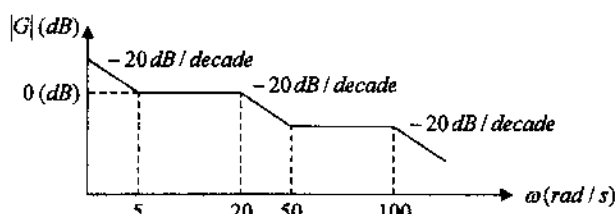
6. For the balanced three-phase system shown in the following circuit, the line voltage is 34.5kV<sub>rms</sub> at 60Hz. Please find the value of the capacitors  $C$  such that the total load has a power factor of 0.94 leading. (10%)



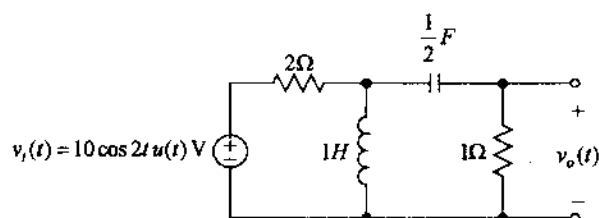
注意：背面尚有試題

## 第二頁 共二頁

7. Determine the transfer function  $G(j\omega)$  if the straight-line magnitude characteristic approximation for this function is as shown in the following figure. (10%)



8. For the following circuit to be considered, please find the steady-state voltage expression for  $v_o(t)$  for  $t > 0$  if the initial conditions are zero. (10%)



9. At the input terminals of a circuit, the voltage  $v(t)$  and the current  $i(t)$  are given by the following expression:

$$v(t) = 64 + 16 \cos(377t + 105^\circ) - 24 \sin(754t + 10^\circ) \text{ V}$$

$$i(t) = 6 \cos(377t + 45^\circ) + 8 \cos(754t + 160^\circ) \text{ A}$$

Please find the average power absorbed by the circuit. (10%)

10. (a) Please determine the  $y$  parameters for the following two-port network; and (b) once these parameters are known, please find the current  $I_2$  flowing through a  $4\Omega$  load, which is connected to the output port when a  $2\text{A}$  current source is applied at the input port. (5%, 5%)

