生機系電工學第七次隨堂測驗 2012/05/23

學號： 姓名：

1. For the following pairs determine the power delivered to the load, find the power factor, and indicate whether it is a resistor, inductor, or capacitor.

   Determine the resistance, inductance, or capacitance.

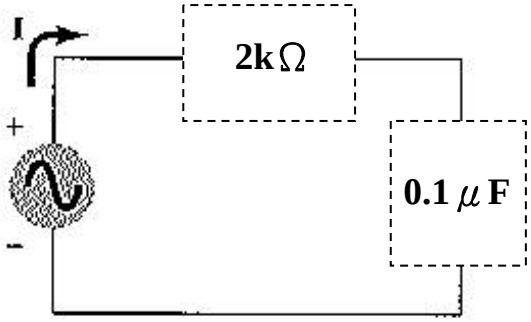
   $v(t) = 100\sin(10^6 t - 10°)V \quad i(t) = 0.2\sin(10^6 t - 40°)A$

   Power $P = V(jw)I(jw)\cos\theta = \frac{100V \cdot 0.2A}{2}\cos 30° = 8.66W$

   Power factor $F_P = \cos 30° = 0.866$ Lagging

   負載非純電阻，也非純電感。負載的電感性高於電容性，是一具有電感特徵的負載。

2. 圖示電路的電壓源 v(t) = 169.706 sin (1000t) 、電流 i(t) = 16.639×10^{-3} sin (1000t + 78.69˚)。請問電路上兩個未知元件分別為何？其電阻值？或電感值？或電容值？請把元件符號畫上去，並把電阻值或電感值或電容值標上去【注意單位，沒有標示單位不予計分】



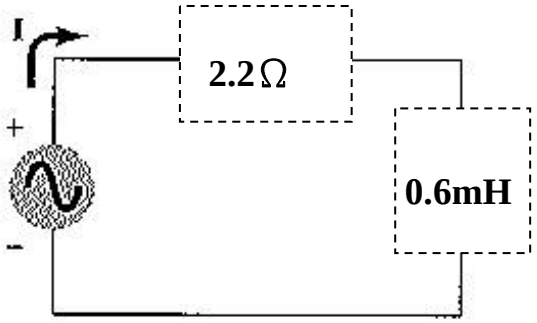
$V(j\omega) = 120\angle 0°,\ I(j\omega) = 11.767\times10^{-3}\angle 78.69°$

$Z_T = \frac{V(j\omega)}{I(j\omega)} = \frac{120\angle 0°}{11.767\times10^{-3}\angle 78.69°}$

$= 10.198\times10^3 \angle -78.69° = 2\times10^3 - j10\times10^3 = R - jX_c$

$X_C = \frac{1}{\omega C} = 10\times10^3 \quad C = 0.1\mu F$

3. 圖示電路的電壓源 v(t) = 84.853 sin (1000t) 、電流 i(t) = 37.22 sin (1000t - 15.26˚)。請問電路上兩個未知元件分別為何？其電阻值？或電感值？或電容值？請把元件符號畫上去，並把電阻值或電感值或電容值標上去【注意單位，沒有標示單位不予計分】



$V(j\omega) = 60\angle 0°,\ I(j\omega) = 26.3185\angle -15.26°$

$Z_T = \frac{V(j\omega)}{I(j\omega)} = \frac{60\angle 0°}{26.3185\angle -15.26°}$

$= 2.28\Omega\angle 15.26° = 2.2\Omega + j0.6\Omega = R + jX_L$

$X_L = \omega L = 0.6\Omega \quad L = 0.6\ mH$