ECE 2260
N. Cotter

UNIT 4
PRACTICE EXAM SOLUTION: Prob 1
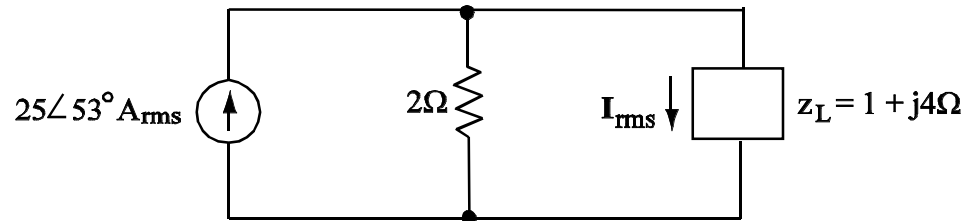
THE
UNIVERSITY
OF UTAH

1.   (30 points)

a. Calculate the value of rms current, $\mathbf{I}_{rms}$, flowing through z_L.

b. Calculate the complex power, S, for z_L. Include appropriate units.

ans: a) $\mathbf{I}_{rms} = 10\ A_{rms}$

   b) $S = 100 + j400$ VA

sol'n: (a)   The circuit is a current divider:

$$\mathbf{I}_{rms} = 25\angle 53°A_{rms} \cdot \frac{2\Omega}{2\Omega + 1 + j4\Omega}$$

$$\mathbf{I}_{rms} = 25\angle 53°A_{rms} \cdot \frac{2\Omega}{3 + j4\Omega}$$

$$\mathbf{I}_{rms} = 25\angle 53°A_{rms} \cdot \frac{2\Omega}{5\angle 53°\Omega}$$

$$\mathbf{I}_{rms} = \frac{25 \cdot 2}{5}\angle(53° - 53°)\frac{A_{rms}\Omega}{\Omega}$$

$$\mathbf{I}_{rms} = 10\angle 0°A_{rms}$$

sol'n: (b) $S = |\mathbf{I}_{rms}|^2 z_L = |10A|^2 (1 + j4\Omega)$

$$S = 100(1 + j4)\ \text{VA}$$

$$S = 100 + j400\ \text{VA}$$