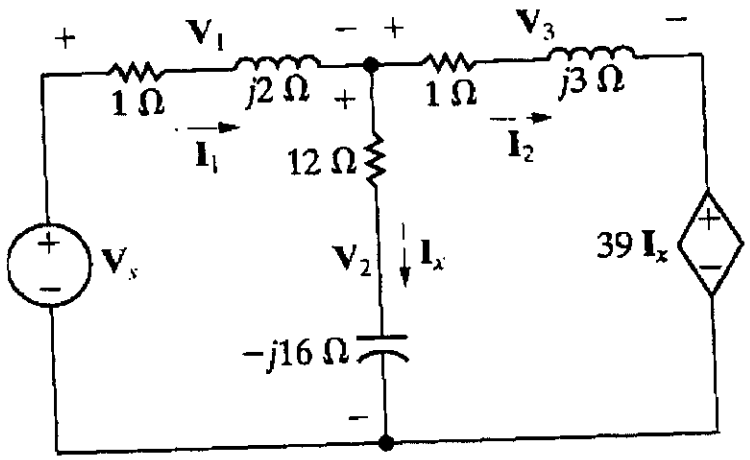
EE 201-01 – Fall 2011(111)
Quiz 7

SER	ID	NAME KEY



Example 10.7 P 398

$\mathbf{V}_s = 150\angle 0°$ V

$\mathbf{V}_1 = (78 - j104)$ V $\mathbf{I}_1 = (-26 - j52)$ A

$\mathbf{V}_2 = (72 + j104)$ V $\mathbf{I}_x = (-2 + j6)$ A

$\mathbf{V}_3 = (150 - j130)$ V $\mathbf{I}_2 = (-24 - j58)$ A

For the circuit shown above :

(a) Calculate the Complex power absorb by each impedance in the circuit?

(b) Calculate the Complex power deliver by each source in the circuit ?

(c) The power factor of the total impedance in the circuit and indicate if it is leading or lagging?

(a) $\bar{S}_1 = \frac{1}{2}\bar{V}_1\bar{I}_1^* = \frac{1}{2}(78 - j104)(-26 + j52) = 1690 + j3380$ VA

$\bar{S}_2 = \frac{1}{2}\bar{V}_2\bar{I}_x^* = \frac{1}{2}(72 + j104)(-2 - j6) = 240 - j320$ VA

$\bar{S}_3 = \frac{1}{2}\bar{V}_3\bar{I}_2^* = \frac{1}{2}(150 - j130)(-24 + j58) = 1970 + j5910$ VA

(b) $\bar{S}_s = -\frac{1}{2}\bar{V}_s\bar{I}_1^* = -\frac{1}{2}(150)(-26 + j52) = 1950 - j3900$ VA

$\bar{S}_x = \frac{1}{2}(39\bar{I}_x)(\bar{I}_2^*) = \frac{1}{2}(-78 + j234)(-24 + j58)$

$= -5850 - j5070$ VA

(c) $\bar{S}_{Total} = \bar{S}_1 + \bar{S}_2 + \bar{S}_3 = 3900 + j8970$ VA $= 390\sqrt{629}\,\angle 66.50°$

$pf = \cos(66.50) = 0.4$ lagging