EN-3212 Electronics Worksheet 9

AC Analysis

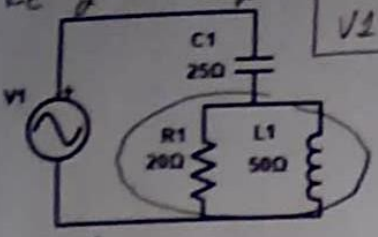
1 Analyze the circuit shown below given V1=150V @20°.

$Z_R = 20\Omega$ $Z_C = -j25\Omega$ $Z_L = j50\Omega$

$V1 = 150V\angle 20^\circ = 150V\cos(20^\circ) + j\,150V\sin(20^\circ)$

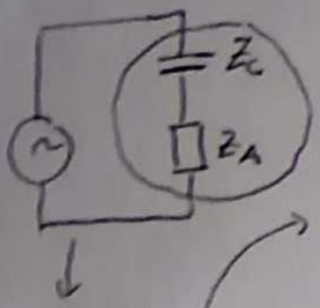
$V1 = 140.95V + j\,51.30V$

I



$Z_A = \left(\frac{1}{R} + \frac{1}{Z_L}\right)^{-1} = 17.24\Omega + j\,6.90\Omega$

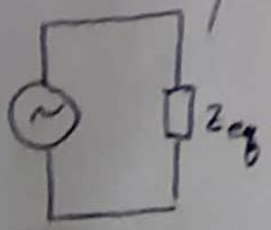
II



$Z_{eq} = Z_C + Z_{eq} = 17.24\Omega - j18.10\Omega$

III $I_T = \frac{V_s}{Z_{eq}} = 2.40A + j\,5.50A$

III



II $I_T = I_C = I_A$

$V_C = I_C Z_C = 137.46V - j\,60.07V$

$V_A = I_A Z_A = 3.49V + j\,111.37V$

III $V_A = V_R = V_L$

$I_R = \frac{V_R}{Z_R} = 0.17A + j\,5.57A$

$I_L = \frac{V_L}{Z_L} = 2.23A - j\,0.07A$