RLC Circuits

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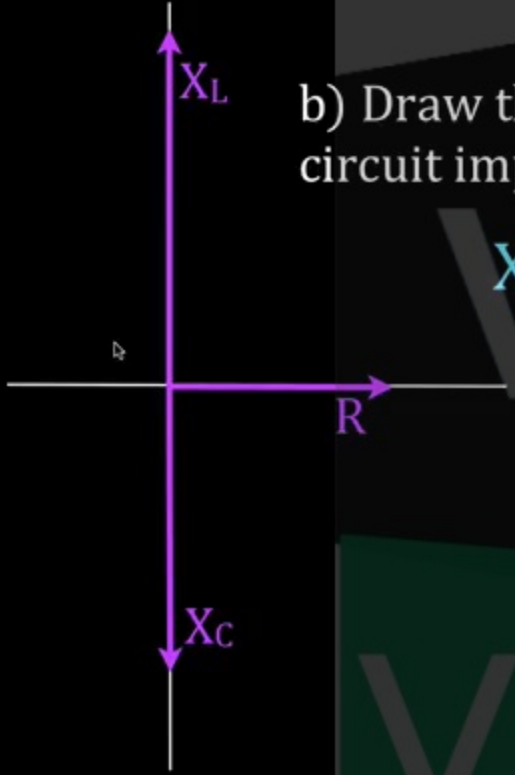
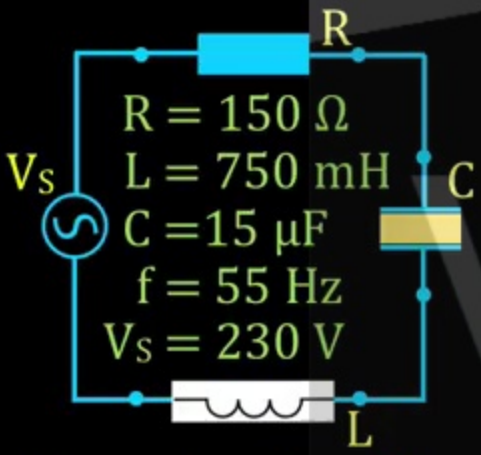


b) Draw the phasor diagram, determine the circuit impedance and the phase angle.

$$X_L = 259\ \Omega \quad X_C = 193\ \Omega$$

$$R = 150\ \Omega$$



d) Determine the voltage drop across all three elements.

$I = 1.40\ A$ $Z = 164\ \Omega$

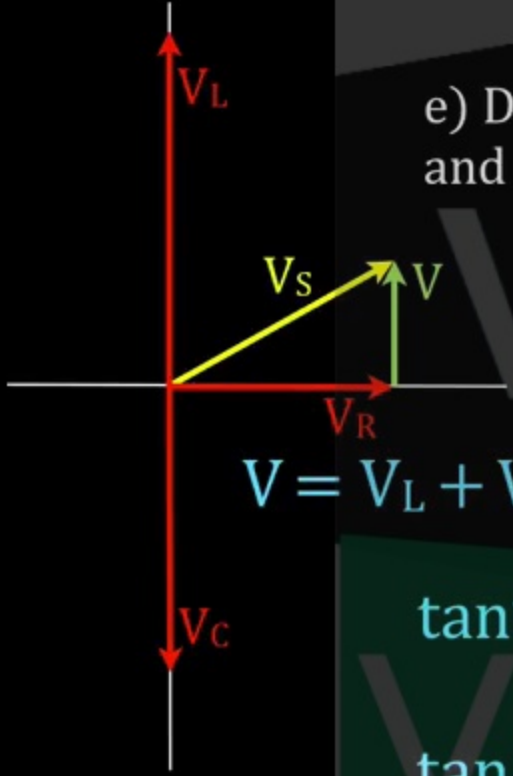
$X_C = 193\ \Omega$ $X_L = 259\ \Omega$

$V_R = I \cdot R$ $V_R = 1.40\ A \cdot 150\ \Omega = 210\ V$

$V_C = I \cdot X_C$ $V_C = 1.40\ A \cdot 194\ \Omega = 272\ V$

$V_L = I \cdot X_L$ $V_L = 1.40\ A \cdot 259\ \Omega = 363\ V$

$V_S = I \cdot Z$ $V_S = 1.40\ A \cdot 164\ \Omega = 230\ V$



e) Draw the voltage phasor diagram and determine the phase angle.

$V_R = 210\ V \quad V_L = 363\ V$

$V_C = 272\ V \quad V_S = 230\ V$

$$V = V_L + V_C = 363\ \Omega - 272\ \Omega = 91\ \Omega$$

$$\tan^{-1}\phi = \frac{V}{V_R}$$

$$\tan^{-1}\phi = \frac{91\ \Omega}{210\ \Omega}$$

$$\phi = 24°$$

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