Series Resonance – In Class Problem
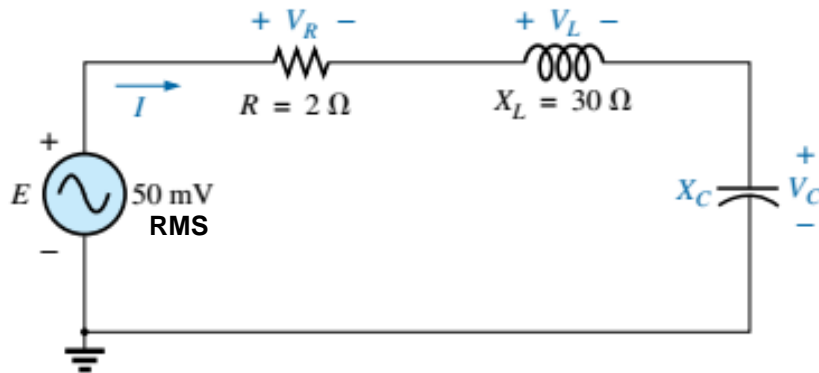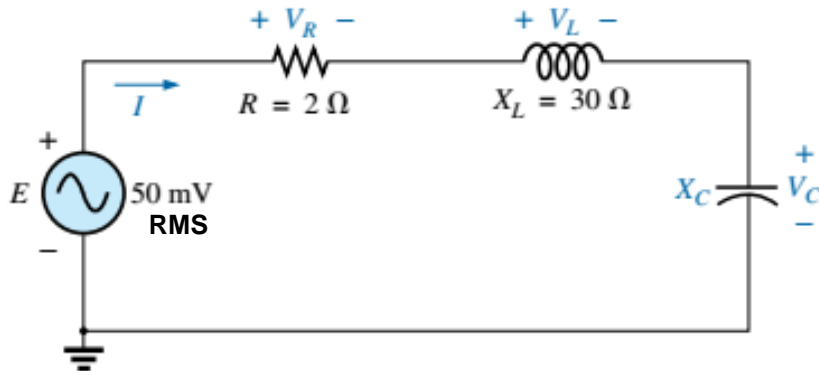

Find:
a) Xc for resonance
b) ZT at resonance
c) **|I|** at resonance
d) **|VR|, |VL|, |Vc|** at resonance
e) Q, the quality factor
f) The power <u>dissipated</u> by the circuit at resonance

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d) $|V_R|$, $|V_L|$, $|V_C|$ at resonance

$V_R = (I)(R) = 50mV_{RMS} < 0^0$
Or $|V_R| = 50mV_{RMS}$

$V_L = (I)(Z_L) = 750mV_{RMS} < 90^0$
Or $|V_L| = 750mV_{RMS}$

$V_C = (I)(Z_C) = 750mV_{RMS} < -90^0$
Or $|V_C| = 750mV_{RMS}$

a) Xc for resonance

At fs, $X_C = X_L = 30$ Ohms

b) **Z_T** at resonance

At fs, **Z_T** = R = 2 Ohms

e) Q, the quality factor

$Q = X_L/R = 30$ Ohms / 2 Ohms
Or Q = 15

c) |I| at resonance

At fs, **I** = E/R = $50mV_{RMS}<0^0$ / 2 Ohms

$I = 25mA_{RMS}<0^0$
Or $|I| = 25mA_{RMS}$

f) The power dissipated by the circuit at resonance

$P = |I_{RMS}|^2R$ or $[(25mA_{RMS})^2][2$ Ohms$] =$

1.25mW

NP