EEET-121 AC Circuits Lecture **Quiz #3 (2185)**

FULL NAME (Printed): * SOLUTIONS *

RIT Program: _____

Choose the one alternative that best completes the statement or answers the question. No partial credit will be awarded so choose carefully.

1) What is the total impedance, Z_T of a series network consisting of a 5 Ω resistor, an inductor having 10 Ω reactance, and a capacitor with 15 Ω reactance? 1) A

A) (5 - *j* 5) Ω B) (5 - *j* 25) Ω C) (5 + *j* 25) Ω D) (5 + *j* 5) Ω

$\vec{Z}_T = 5\Omega + j10\Omega - j15\Omega = (5 - j5)\Omega$

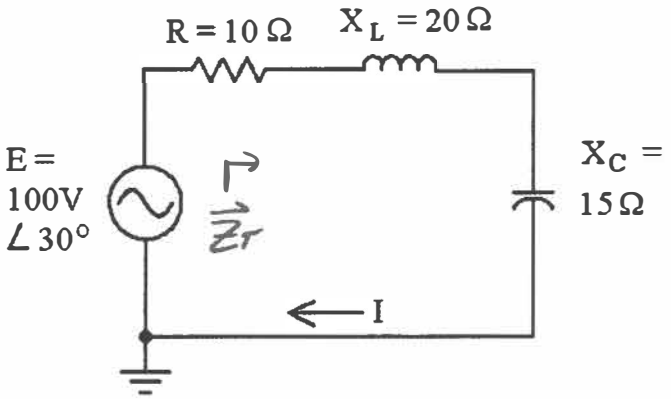


Figure 15.3

2) See Figure 15.3. The total impedance of this circuit may be made purely resistive by 2) C

A) increasing *R* to 35 Ω.
B) increasing *R* to 5 Ω.
C) decreasing the signal frequency.
D) increasing the signal frequency.

$\vec{Z}_T = 10 + j20 - j15$
$= 10 + jX_L - jX_C$
$= 10 + j\omega L - j\frac{1}{\omega C}$
IF $\omega \downarrow$, $X_L \downarrow$ & $X_C \uparrow$

3) See Figure 15.3. What is Z_T (the total series circuit impedance) in polar form? 3) C

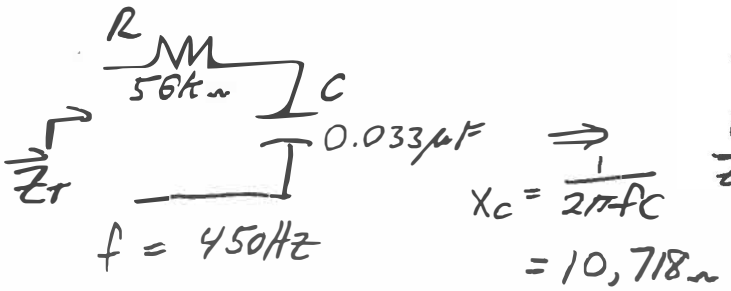
A) 5 Ω ∠10° B) 10 Ω ∠5° C) 11.18 Ω ∠26.6° D) 11.18 Ω ∠63.43°

$\vec{Z}_T = (10 + j5)\Omega = 11.18\Omega \angle 26.6°$

Problems 4 and 5 on the back ->

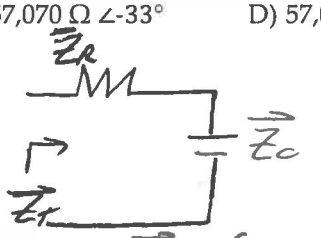
4) What is the impedance, $\mathbf{Z}_T$ of a series *R*-*C* circuit made up of a 56 kΩ resistor and a 0.033 μF capacitor at a signal frequency of 450 Hz? 4) D

A) 10,730 Ω ∠-90° B) 66,730 Ω ∠10.8° C) 57,070 Ω ∠-33° D) 57,016Ω ∠-10.8°



$X_C = \frac{1}{2\pi fC}$

$= 10,718\,\Omega$

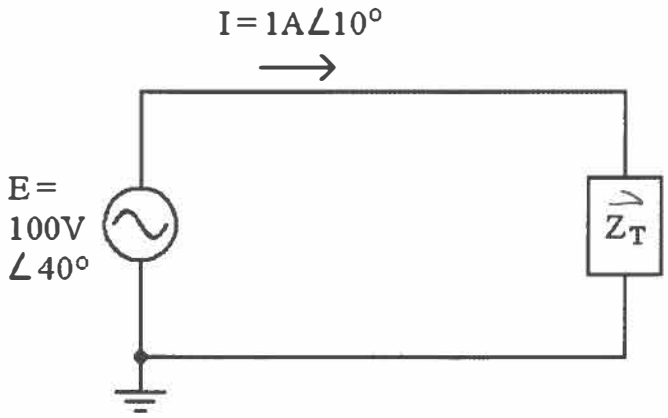


$\vec{Z}_T = (56{,}000 - j10{,}718)\,\Omega$

OR

$57{,}016\,\Omega \angle -10.84°$

5) See Figure 15.4. Determine $\mathbf{Z}_T$ expressed in rectangular form. 5) B



$\vec{Z}_T = \frac{\vec{E}}{\vec{I}}$

$= \frac{100V \angle 40°}{1A \angle 10°}$

$\vec{Z}_T = 100\,\Omega \angle 30°$

OR

$(86.6 + j50)\,\Omega$

Figure 15.4

A) (64.3 + *j* 76.6) Ω
B) (86.6 + *j* 50) Ω
C) (100 + *j* 50) Ω
D) (100 + *j* 30) Ω