Started on	Sunday, 27 November 2016, 2:49 PM
State	Finished
Completed on	Sunday, 27 November 2016, 4:21 PM
Time taken	1 hour 32 mins
Grade	**93.33** out of 100.00

Question 1

Correct

Mark 10.00 out of 10.00

CQ6.13
Given two inductors are magnetically coupled.
The coefficient of coupling k = 0.56
The self-inductances are:

$L_1 = 1.4$ H $\qquad L_2 = 4.4$ H

Find the mutual inductance.

M = ?? H

Answer: 1.38 ✓

Calculated Question

The correct answer is: 1.390

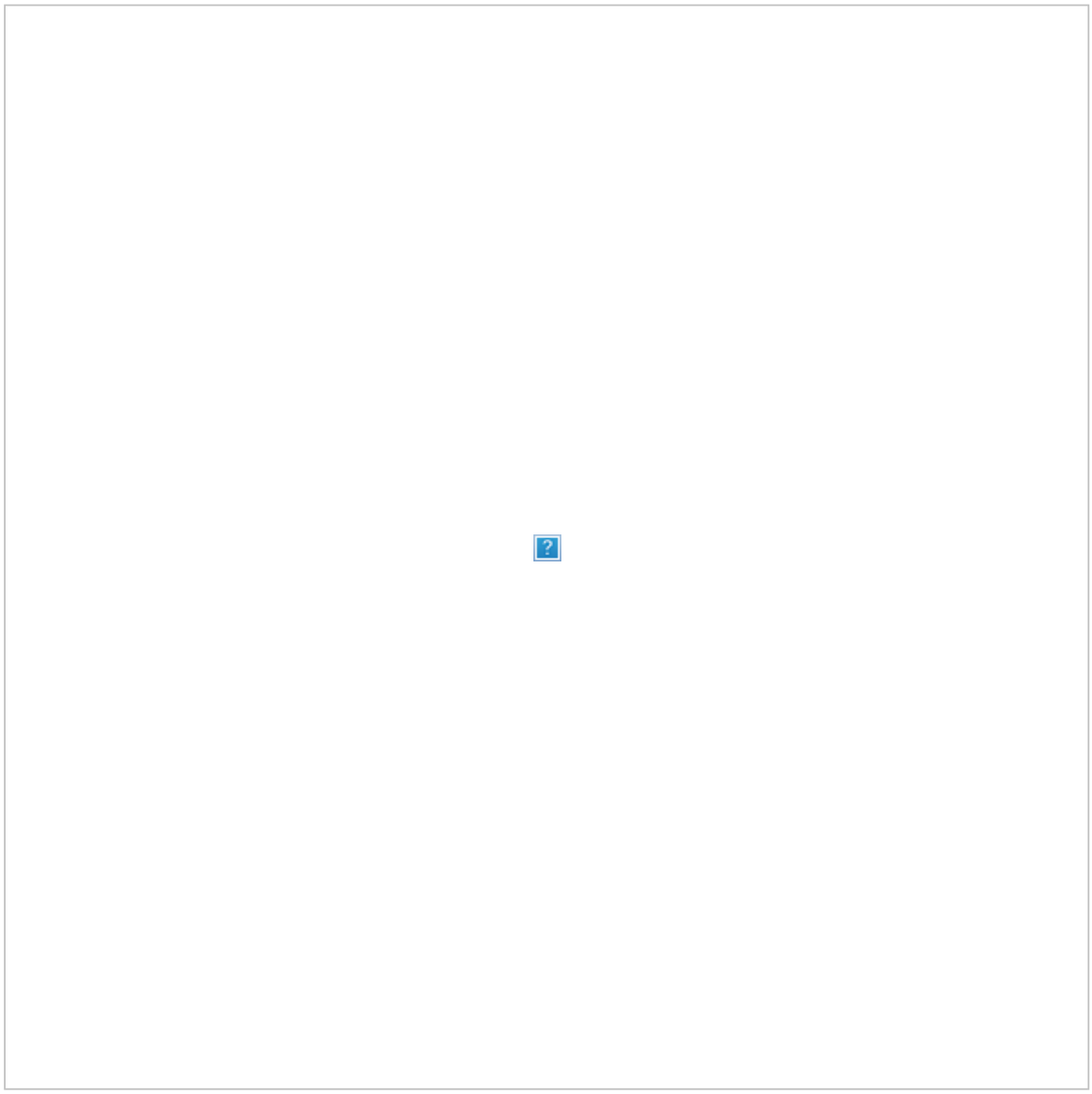
Correct

Marks for this submission: 10.00/10.00.

Question 2

Correct

Mark 10.00 out of 10.00



P6.39_10ed

Given: $L_1 = 5$ H $\quad L_2 = 0.2$ H $\quad M = 0.5$ H $\quad R_0 = 10\,\Omega$ (Ohm)

$i_g = -10 + e^{-10t}$ A for $t \geq 0$ $\quad i_2 = 0.625e^{-10t} - 0.250\,e^{-50t}$ A for $t \geq 0$

There is no energy stored in this circuit at the time the switch is opened.

a) Find the voltage $v_1(t)$ at $t = 0^+$ sec just as the switch opens.

$v_1(t = 0^+ \text{ sec}) =$ -46.875 ✓ V

b) Find the voltage $v_1(t)$ at $t = 0.2$ sec after the switch opens.

$v_1(t = 0.2 \text{ sec}) =$ -7.189 ✓ V

Numeric Answer

a) $v_1(t = 0^+ \text{ sec}) = -46.875$ V

b) $v_1(t = 0.2 \text{ sec}) = -7.190$ V

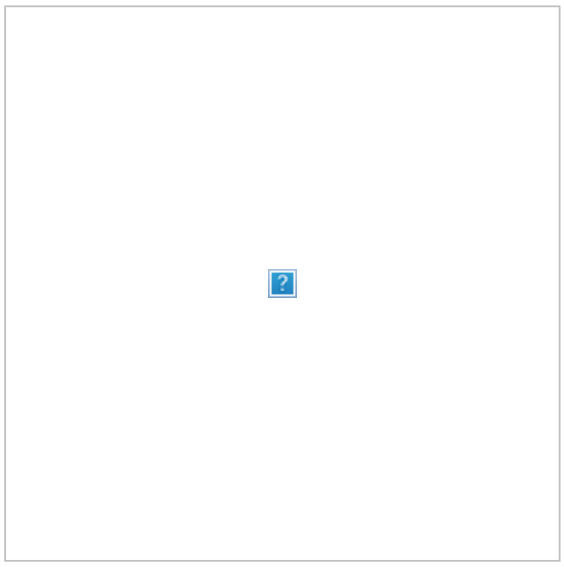
Correct

Marks for this submission: 10.00/10.00.

Question 3

Correct

Mark 10.00 out of 10.00



P6.39_6ed

Two magnetically coupled coils which have

$L_1 = 196$ mH $\quad L_2 = 4$ mH $\quad M = 23.8$ mH

a) What is the coefficient of coupling k?

k = 0.85 ✓

b) What is the largest possible value of M if the coupling was perfect?

M = 28 ✓ mH

c) Given that in this circuit $P_1 = P_2$, what is the turns ratio N_1/N_2?

N_1/N_2 = 7 ✓

Numeric Answer

a) k = 0.850

b) M = 28.0 mH

c) $N_1/N_2 = 7$

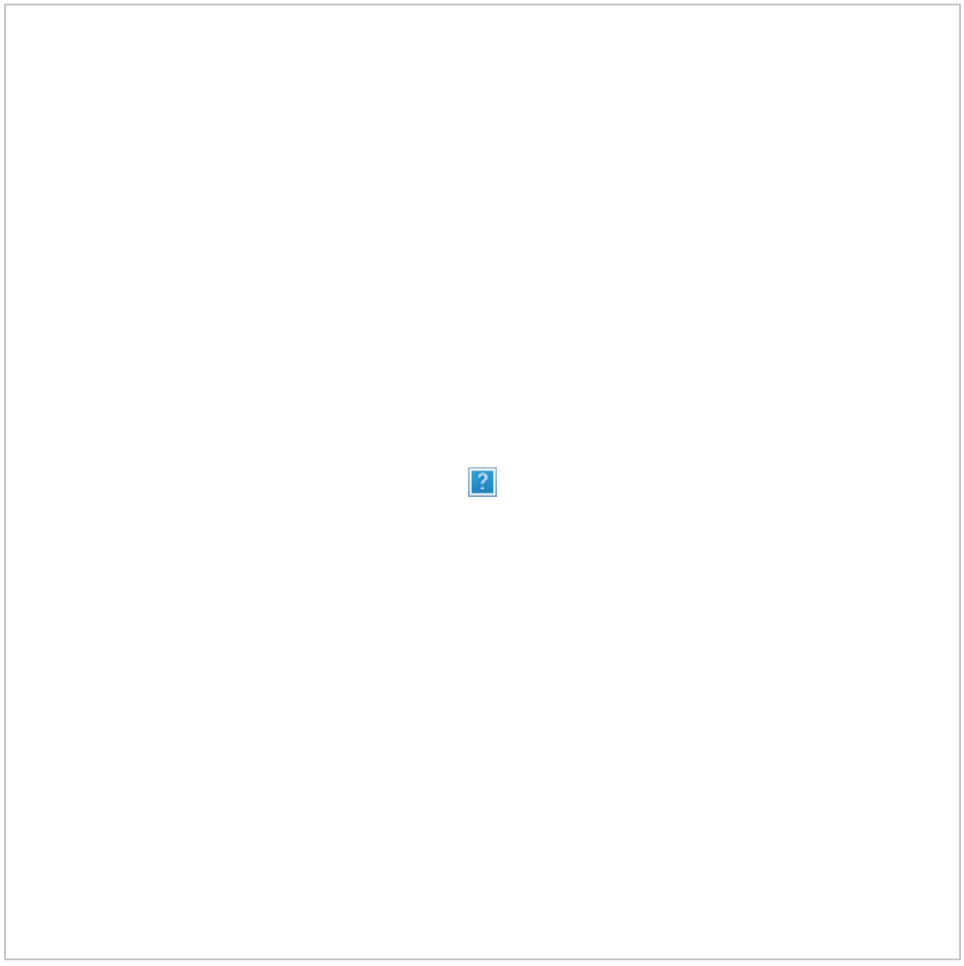
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 10.00 out of 10.00



P9.76_9ed

The sinusoidal source is operating at 200 krad/sec (kilo rad/sec).

The coefficient of coupling k is adjusted until the peak amplitude of i_1 is maximum.

Given $v_g = 560 \cos(200{,}000t)$ V.

a) What is the value of k? [Hint: Use reflected impedance which includes k and determine when Z_{in} is minimum which yields the max current]

$k =$ .3536 ✓

b) What is the peak amplitude of i_1?

$|i_1| =$ 2 ✓ A

Numeric Answer

$k = 0.3536$

$i_1 = 2$ A (peak) the phasor current is 2 at angle -36.87° A

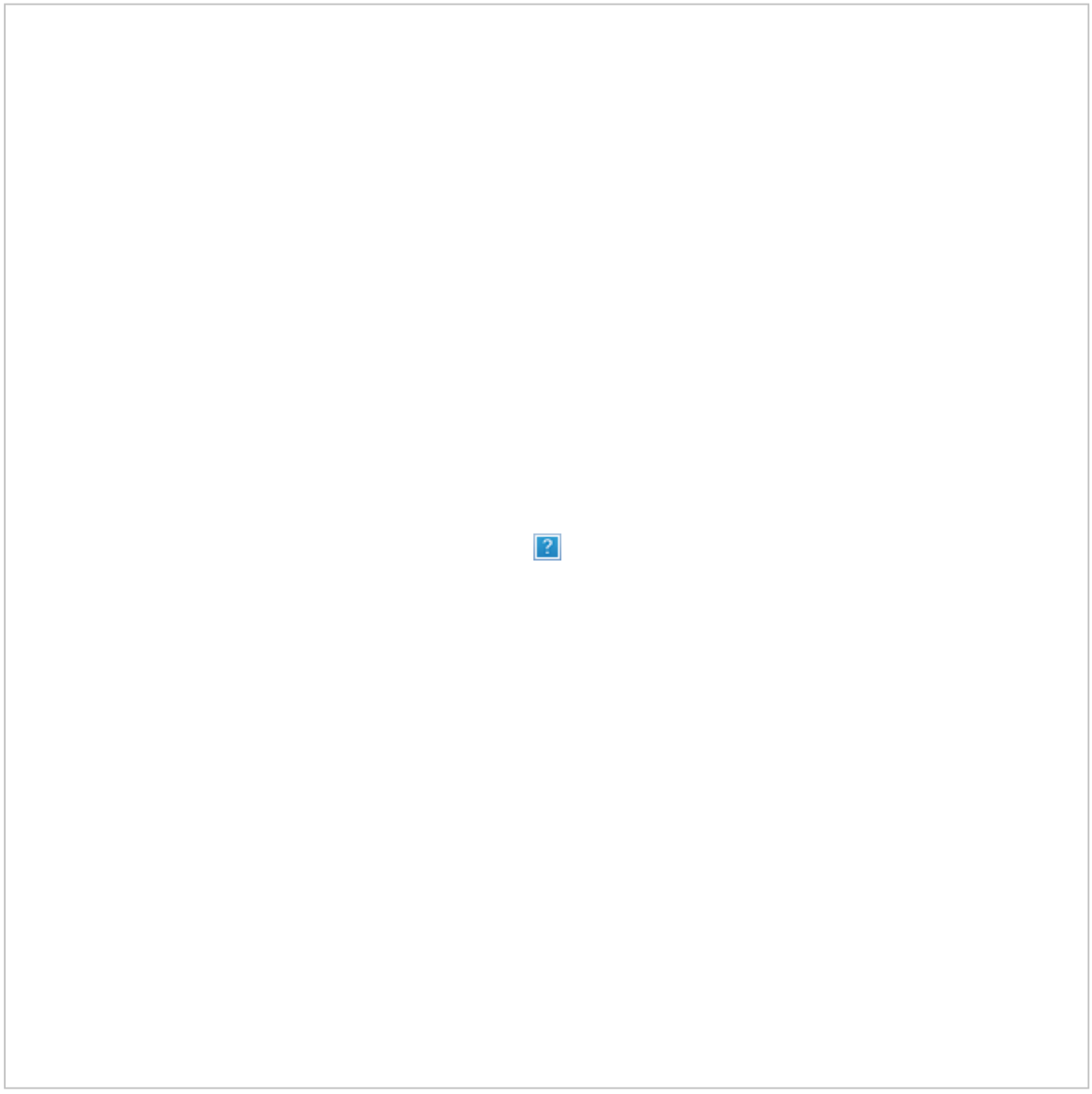
Correct

Marks for this submission: 10.00/10.00.

Question 5

Partially correct

Mark 5.00 out of 10.00



P9.60_6ed

Given $v_g = 369 \cos(50{,}000t)$ V.

The coefficient of coupling k is adjusted until the peak amplitude of i_1 is maximum.

a) What is the value of k? [Hint: Use reflected impedance which includes k and determine when Z_{in} is minimum which yields the max current]

$k =$ .5059 ✗

b) What is the peak amplitude of i_1?

$|i_1| =$ 1.5 ✓ A

Numeric Answer

$k = 0.566$

$i_1 = 1.5$ A (peak) the phasor current is 1.50 Ð-36.87° A

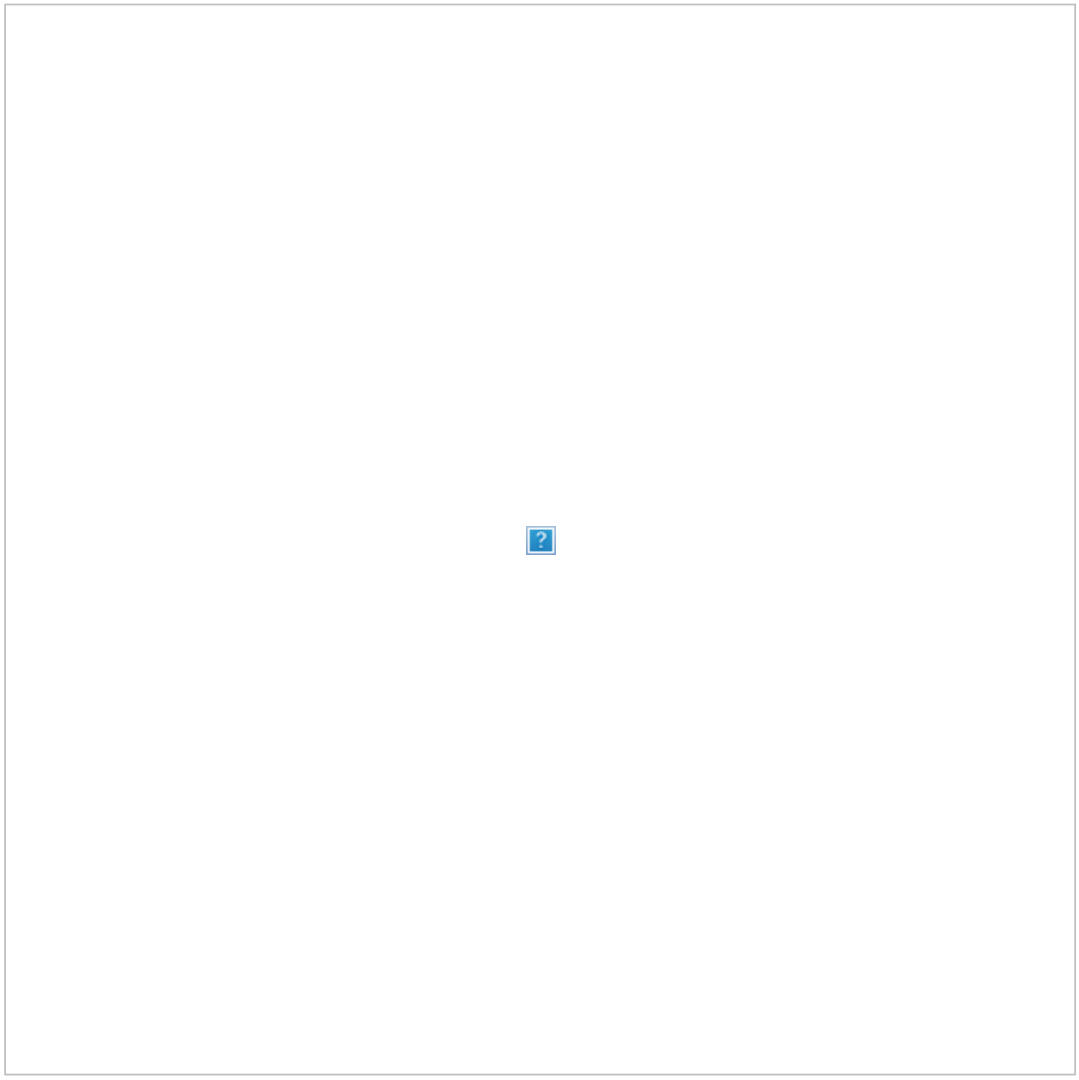
Partially correct

Marks for this submission: 5.00/10.00.

Question 6

Correct

Mark 10.00 out of 10.00



P9.63_6ed

Given driving source frequency = 25 krad/sec.

The coefficient of coupling *k* is adjusted so that Z_{ab} is purely resistive.

Find Z_{ab} for this condition.

Z_{ab} = 30 Ω (Ohm)

Numeric Answer

Z_{ab} = 30.0 Ω (Ohm)

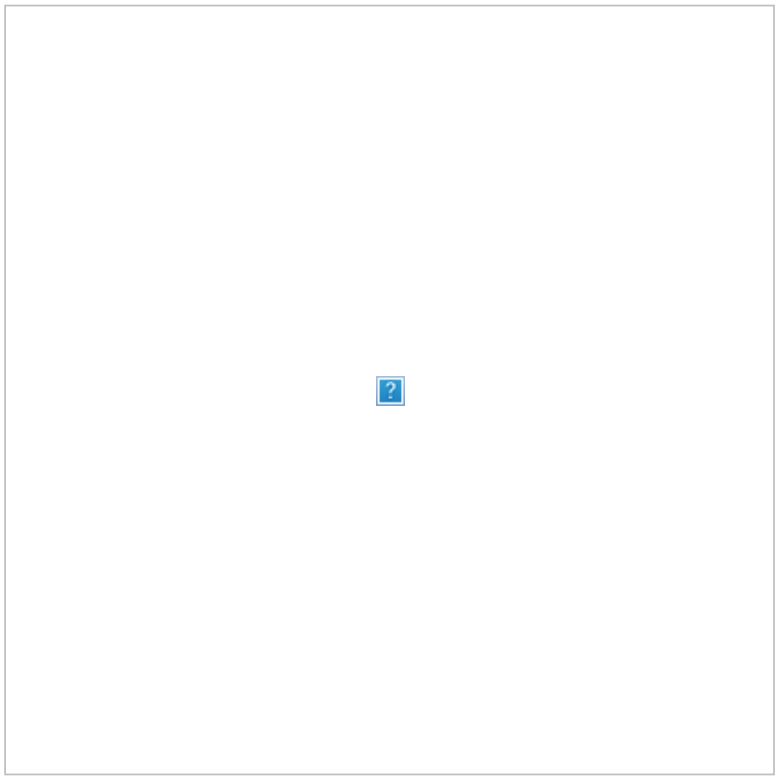
Correct

Marks for this submission: 10.00/10.00.

Question 7

Partially correct

Mark 8.33 out of 10.00



AP9.14_9ed

A linear transformer couples a load Z_L = 360 Ω (Ohm) resistor in series with a 0.25 H inductor to a sinusoidal voltage source.

The voltage source V_S has an internal impedance Z_S = 184 + j 0 Ω (Ohm) and a maximum voltage of 245.20 V.

The frequency of the source V_S is 800 rad/sec.

R_1 = 100 Ω (Ohm) L_1 = 0.5 H

R_2 = 40 Ω (Ohm) L_2 = 0.125 H k = 0.4

a) Calculate the reflected impedance.

Z_r = 10.24 ✓ + j 7.68 ✗ Ω (Ohm) (real + j imaginary)

b) Calculate the time domain primary side current. Use the form $i_1(t) = I_m \cos(w\,t + \phi°)$ Amps

$i_1(t)$ = .5 ✓ cos (800 t + -53.5 ✓ °) (Degrees) Amps

c) Calculate the secondary side current. Use the form $i_2(t) = I_m \cos(w\,t + \phi°)$ Amps

$i_2(t)$ = 0.08 ✓ cos (800 t + 0 ✓ °) (Degrees) Amps

Numeric answer

a) Z_r = 10.24 – j 7.68 Ohm

b) $i_1(t)$ = 0.5 cos (800t – 53.13°) Amps

c) $i_2(t)$ = 0.08 cos (800t) Amps

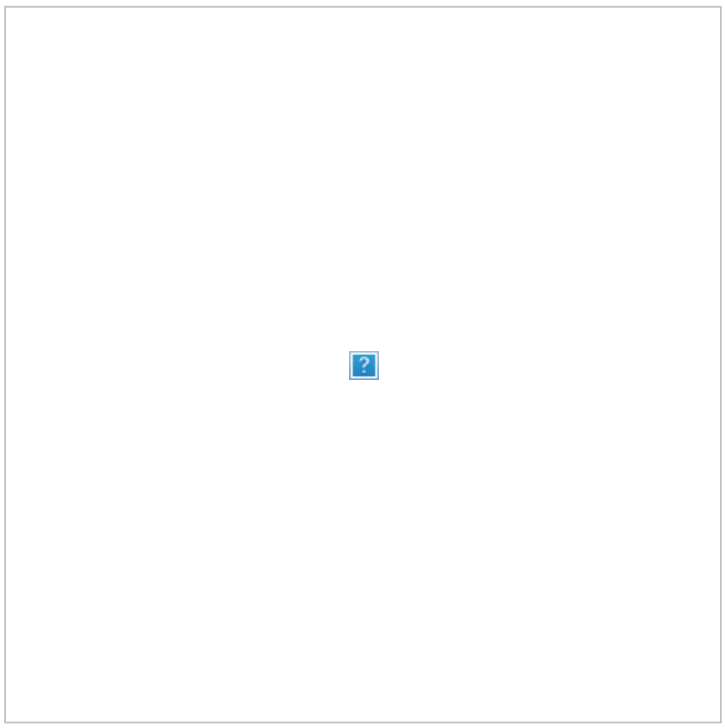
Partially correct

Marks for this submission: 8.33/10.00. Accounting for previous tries, this gives **8.33/10.00**.

Question 8

Correct

Mark 10.00 out of 10.00



P9.83_6ed

Find the impedance Z_{ab} if $Z_L = 80$ at angle 60° Ω (Ohms).

$|Z_{ab}|$ = 512 ✓ kΩ (kilo Ohm)

Z_{ab} angle = 60 ✓ ° (Degrees)

Numeric Answer

Z_{ab} = 512 at angle 60° kΩ (kilo Ohm)

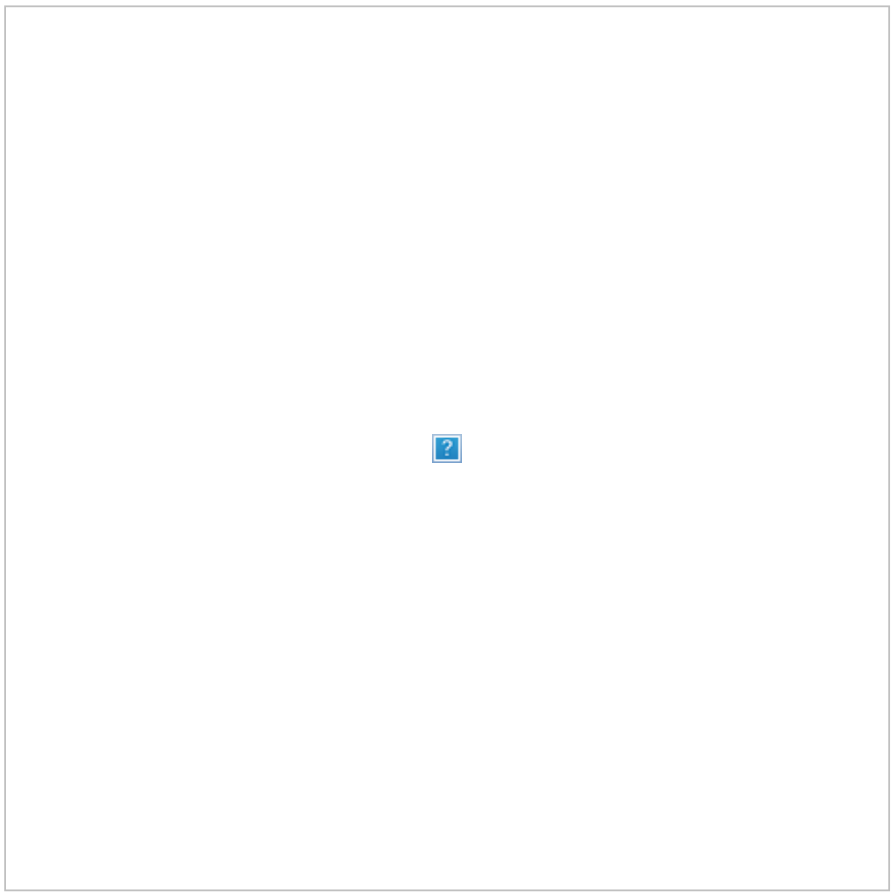
Correct

Marks for this submission: 10.00/10.00.

Question 9

Correct

Mark 10.00 out of 10.00



P9.77_8ed

Given: $Z_L = 200 + j\ 150\ \Omega$.

Find the impedance Z_{ab}

Z_{ab} = Magnitude 1000 ✓ at Angle 36.87 ✓ ° (Degrees) Ω (Ohm)

Numeric Answer

Z_{ab} = 1,000 at angle 36.87° Ω

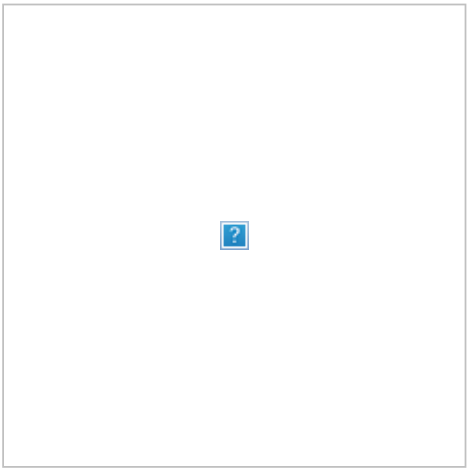
Correct

Marks for this submission: 10.00/10.00.

Question 10

Correct

Mark 10.00 out of 10.00



AP9.15_9ed

The source voltage is 25 at angle 0° kV (kilo Volts).

Find the amplitude and phase angle of $\mathbf{V}_2$ and $\mathbf{I}_2$.

$|\mathbf{V}_2| =$ 1868.15 ✓ Volts

Phase angle $\mathbf{V}_2 =$ 142.39 ✓° (Degrees)

$|\mathbf{I}_2| =$ 125 ✓ A

Phase angle $\mathbf{I}_2 =$ 216.87 ✓° (Degrees)

Numeric Answer

$\mathbf{V}_2$ = 1868.16 at angle 142.4° Volts

$\mathbf{I}_2$ = 125 at angle 216.88° A

Correct

Marks for this submission: 10.00/10.00.