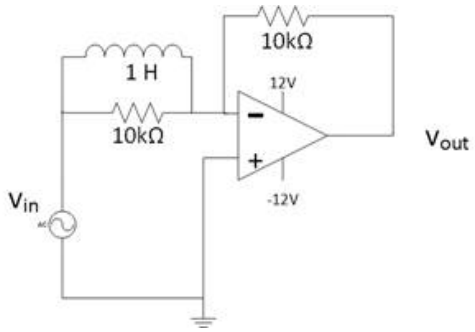
Started on	Wednesday, 14 December 2016, 10:11 AM
State	Finished
Completed on	Wednesday, 14 December 2016, 12:11 PM
Time taken	1 hour 59 mins
Grade	**97.50** out of 100.00

Question 1

Correct

Mark 10.00 out of 10.00



Q1k

Given $V_{in} = 8 \cos(20{,}000t)$.

What is the steady state output $\mathbf{V}_{out}$?

State your answer in the rectangular form Real + j Imaginary.

$\mathbf{V}_{out}$ = -8 ✓ + j 4 ✓ V

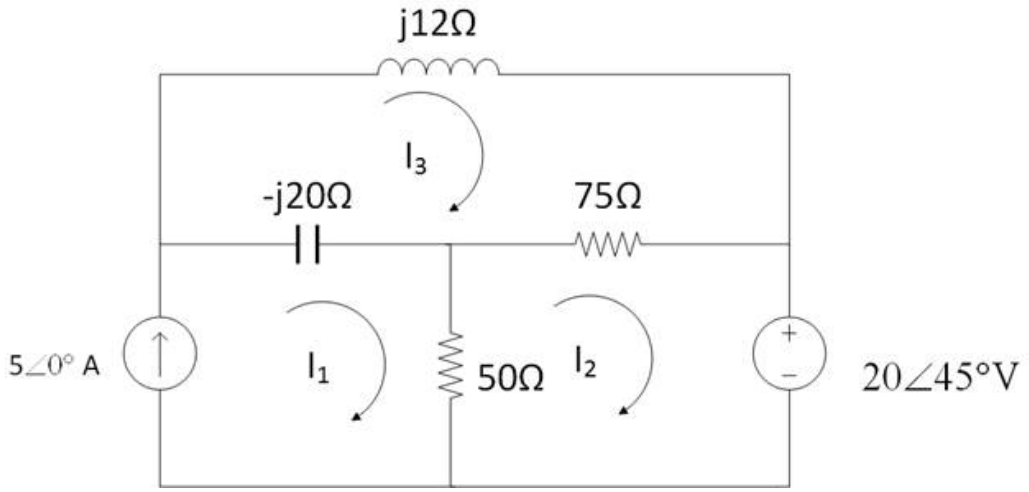
Correct

Marks for this submission: 10.00/10.00.

Question 2

Partially correct

Mark 12.50 out of 15.00



Q2d

Find the three mesh currents.

State your answer in the rectangular form Real + j Imaginary.

I_1 = 5 ✓ + j 0 ✓ Amps

I_2 = 5.04 ✓ + j 1.2 ✗ Amps

I_3 = 5.26 ✓ + j -2.21 ✓ Amps

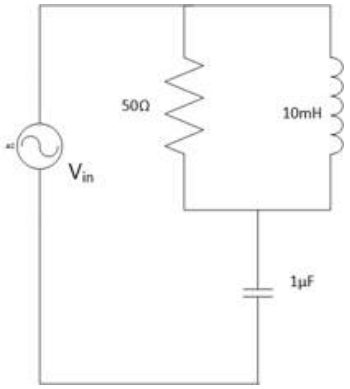
Partially correct

Marks for this submission: 12.50/15.00. Accounting for previous tries, this gives **12.50/15.00**.

Question 3

Correct

Mark 15.00 out of 15.00



Q3a

Given V_{in} = 22 cos (10,000 t)

Find the steady state phasor current through the 50 Ω (Ohm) resistor.

State your answer with the smallest appropriate positive angle.

$I_{50\Omega}$ (polar form) = Magnitude .22 ✓ Phase 90 ✓° (Degree) Amps

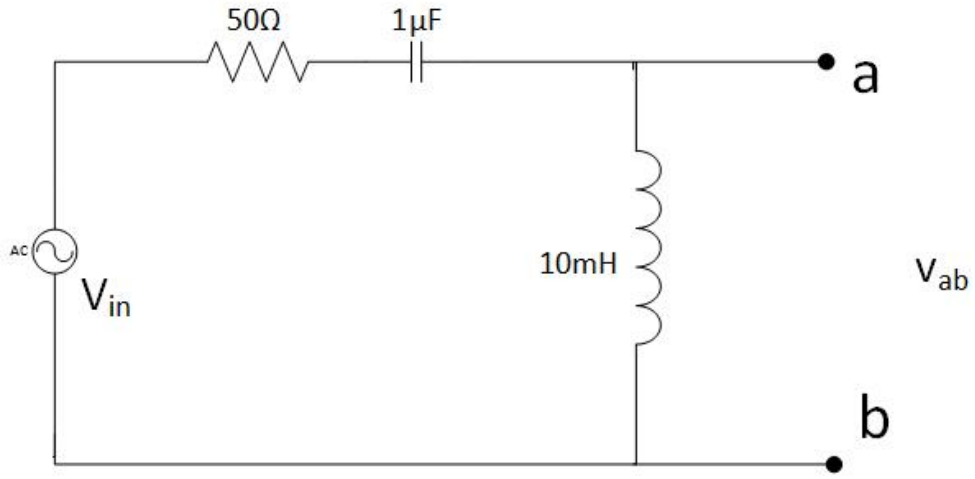
Correct

Marks for this submission: 15.00/15.00.

Question 4

Correct

Mark 15.00 out of 15.00



Q4a

Given V_{in} = 22 cos (10,000 t)

Find the Thévenin phasor equivalent of this circuit.

Z_{Th} (rectangular form) = 200 ✓ + j 100 ✓ Ω (Ohm)

V_{Th} (rectangular form) = 0 ✓ + j 44 ✓ V

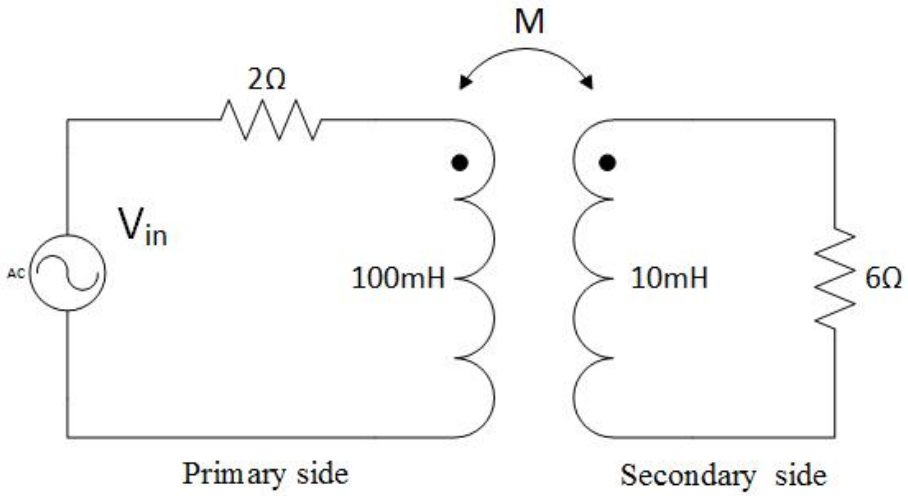
Correct

Marks for this submission: 15.00/15.00.

Question 5

Correct

Mark 10.00 out of 10.00



Q5b

Given V_{in} = 240 cos (377 t) V_{rms} and the coefficient of coupling k = 0.8

a) Find the mutual inductance between the two windings.

M = 25.29 ✓ mH (milli H)

b) Find the magnitude of the reflected impedance from the secondary side to the primary (source) side.

| Zr | = 12.83 ✓ Ω (Ohms)

c) Find the current in the primary side.

State as positive current magnitude and smallest appropriate negative angle.

| I_1 | = 7.1756 ✓ A_{rms} Angle I_1 = -67.38 ✓ ° (Degree)

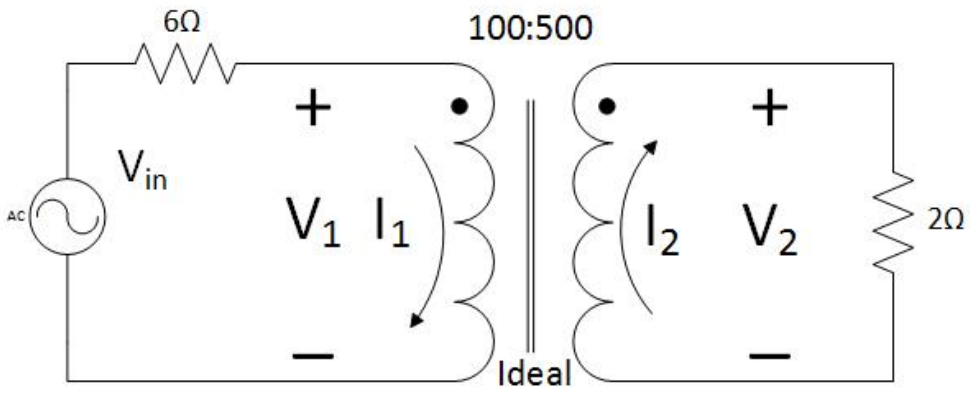
Correct

Marks for this submission: 10.00/10.00.

Question 6

Correct

Mark 10.00 out of 10.00



Q6d

Given: The transformer is ideal.

$V_{in} = 120 \cos(377\ t)$ V

a) Find the magnitude of the current $\mathbf{I_1}$. $|\mathbf{I_1}| =$ 19.7 ✓ A

b) Find the magnitude of the voltage $\mathbf{V_1}$. $|\mathbf{V_1}| =$ 1.57 ✓ V

Correct

Marks for this submission: 10.00/10.00.

Question 7

Correct

Mark 10.00 out of 10.00

Q7d No figure

A circuit has the following input voltage with the resulting current:

$v = 100 \sin(377\ t + 10°)\ V_{rms}$

$i = 14 \cos(377\ t - 95°)\ A_{rms}$

a) Find the average power absorbed by the circuit. P = 1358.75 ✓ W

b) Find the reactive power. Q = 362.35 ✓ VAR

c) Find the apparent power. $|S| =$ 1400 ✓ VA

Correct

Marks for this submission: 10.00/10.00.

Question 8

Correct

Mark 5.00 out of 5.00

Q8c

A circuit has the following input voltage with the resulting current:

$v = 120 \cos(377\,t + 25°)\ V_{rms}$

$i = 7 \cos(377\,t - 25°)\ A_{rms}$

a) Find the power factor of this circuit. pf = .64

b) Is this a lagging or leading power factor?

Lagging power factor

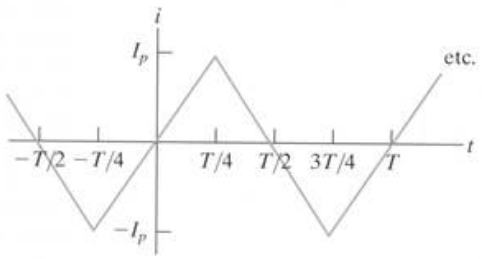
Correct

Marks for this submission: 5.00/5.00.

Question 9

Correct

Mark 10.00 out of 10.00



Q9c

The periodic triangular current has a peak value of 150 mA (milli Amp).

a) Find the rms value of the current.

$I_{p,rms}$ = 86.6 mA_{rms} (milli A_{rms})

b) Find the average power that this current delivers to a 5 kΩ (kilo Ohm) resistor.

P_{avg} = 37.49 W

Correct

Marks for this submission: 10.00/10.00.