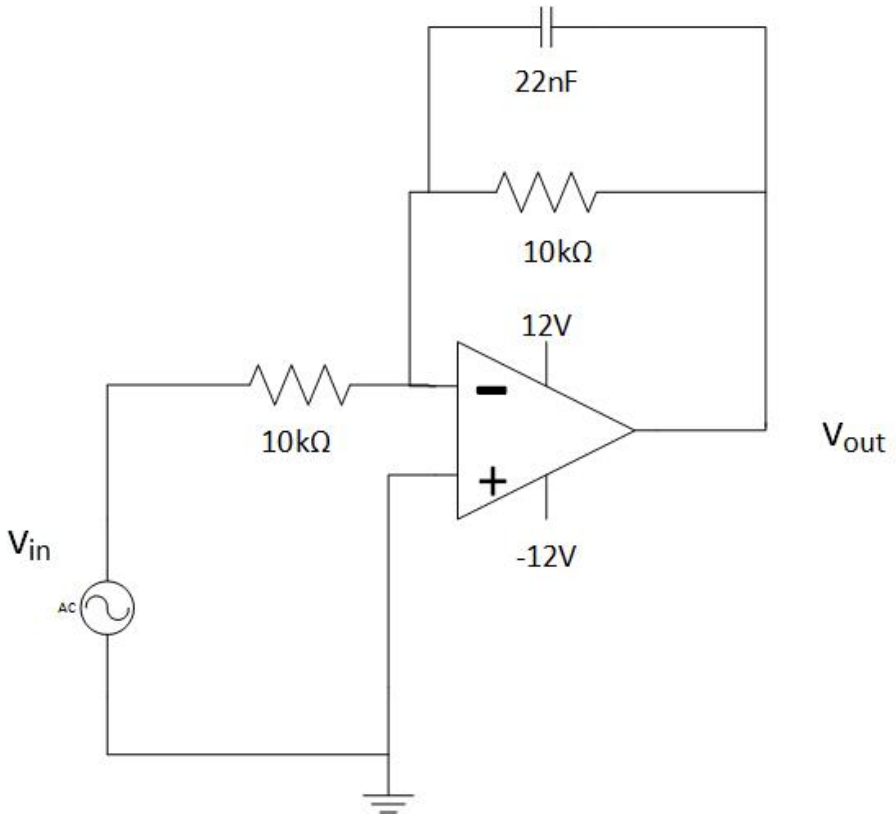
Started on	Wednesday, 14 December 2016, 10:11 AM
State	Finished
Completed on	Wednesday, 14 December 2016, 12:11 PM
Time taken	1 hour 59 mins
Grade	**95.00** out of 100.00

Question 1

Correct

Mark 10.00 out of 10.00



Q1b

Given V_{in} = 10 cos(200t).

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

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

$\mathbf{V}_{out}$ = -9.98 ✓ + j 0.44 ✓ V

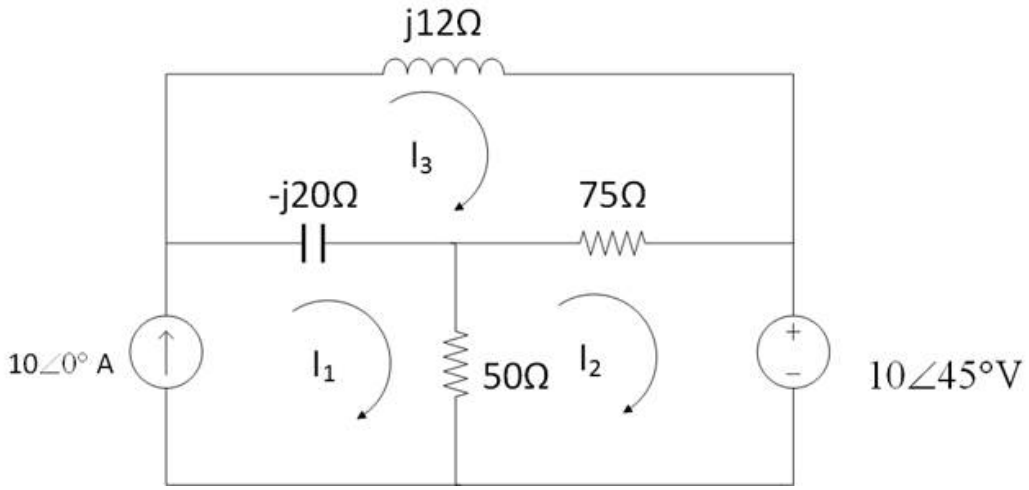
Correct

Marks for this submission: 10.00/10.00.

Question 2

Partially correct

Mark 10.00 out of 15.00



Q2e

Find the three mesh currents.

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

I_1 = 10 ✓ + j 0 ✓ Amps

I_2 = 10.3 ✓ + j 0 ✗ Amps

I_3 = 10.7 ✓ + j 0 ✗ Amps

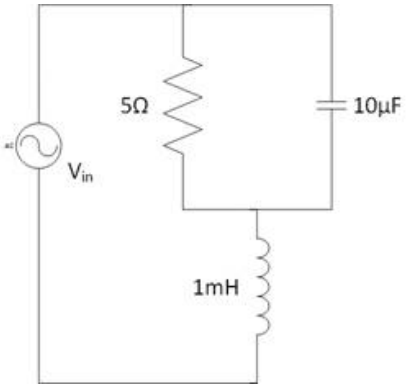
Partially correct

Marks for this submission: 10.00/15.00. Accounting for previous tries, this gives **10.00/15.00**.

Question 3

Correct

Mark 15.00 out of 15.00



Q3d

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

Find the steady state phasor current through the 5 W (Ohm) resistor.

State your answer with the smallest appropriate negative angle.

I_{5W} (polar form) Magnitude 2.24 ✓ Phase -90 ✓ ° (Degree) Amps

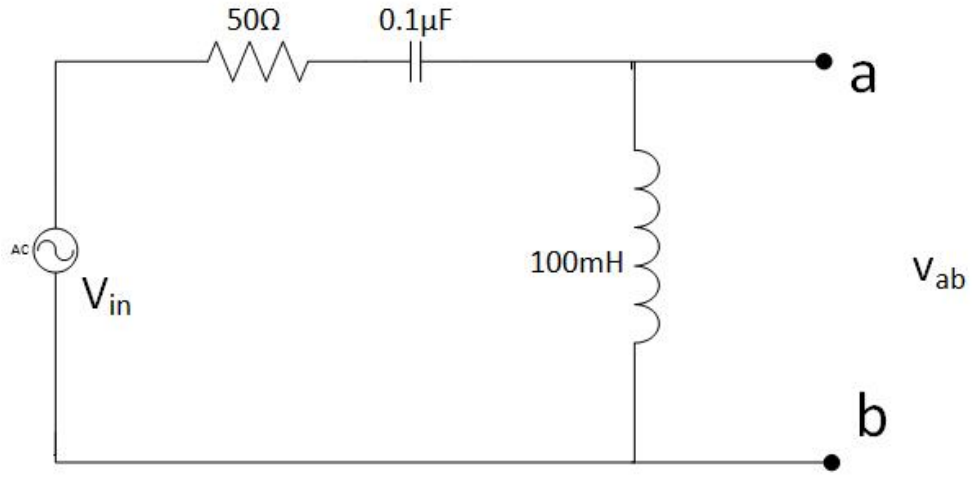
Correct

Marks for this submission: 15.00/15.00.

Question 4

Correct

Mark 15.00 out of 15.00



Q4c

Given V_{in} = 12 cos (10,000 t)

Find the Thévenin phasor equivalent of this circuit.

Z_{Th} (rectangular form) = 20000 ✓ + j 1000 ✓ Ω (Ohm)

V_{Th} (rectangular form) = 0 ✓ + j 240 ✓ V

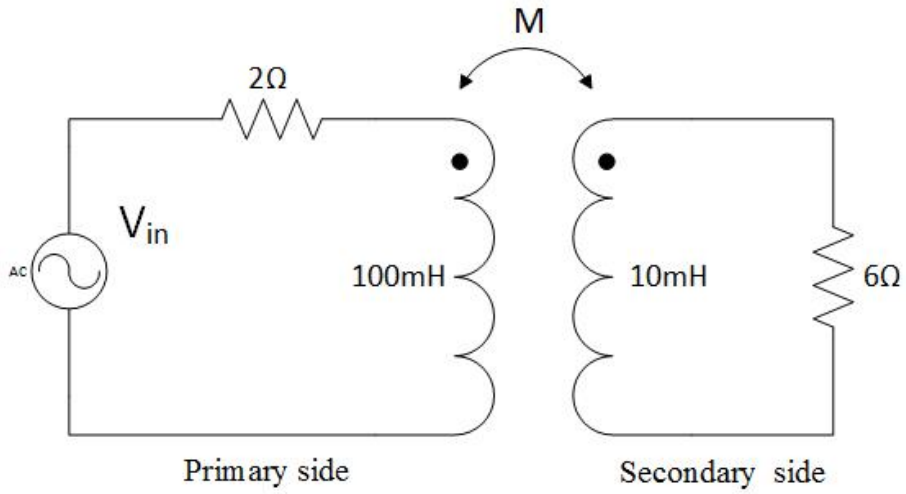
Correct

Marks for this submission: 15.00/15.00.

Question 5

Correct

Mark 10.00 out of 10.00



Q5a

Given V_{in} = 120 cos (377 t) V_{rms} and coefficient of coupling k = 0.9

a) Find the mutual inductance between the two windings.

M = 28.5 ✓ mH (milli H)

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

| Zr | = 16.25 ✓ Ω (Ohm)

c) Find the current in the primary side.

State as positive current magnitude and smallest appropriate negative angle.

$|I_1|$ = 3.63 ✓ A_{rms} Angle I_1 = -61.5 ✓ ° (Degree)

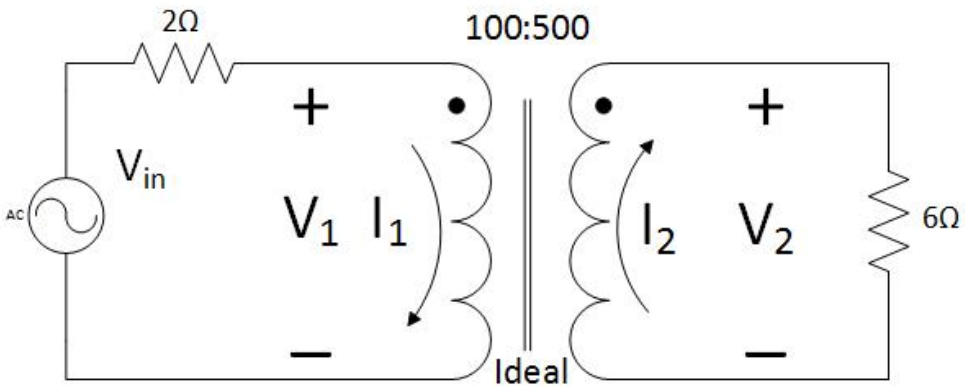
Correct

Marks for this submission: 10.00/10.00.

Question 6

Correct

Mark 10.00 out of 10.00



Q6a

Given: The transformer is ideal.

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

a) Find the magnitude of the current $\mathbf{I_1}$. $|\mathbf{I_1}| =$ 53.57 ✓ A

b) Find the magnitude of the voltage $\mathbf{V_1}$. $|\mathbf{V_1}| =$ 12.86 ✓ V

Correct

Marks for this submission: 10.00/10.00.

Question 7

Correct

Mark 10.00 out of 10.00

Q7c

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

$v = 240 \sin(377\ t)\ V_{rms}$

$i = 13 \cos(377\ t - 125°)\ A_{rms}$

a) Find the average power absorbed by the circuit. P = 2555.75 ✓ W

b) Find the reactive power. Q = 1789.55 ✓ VAR

c) Find the apparent power. $|S| =$ 3120 ✓ VA

Correct

Marks for this submission: 10.00/10.00.

Question 8

Correct

Mark 5.00 out of 5.00

Q8f

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

$v = 120 \cos(377\,t - 45°)\ V_{rms}$

$i = 7 \cos(377\,t + 10°)\ A_{rms}$

a) Find the power factor of this circuit. pf = 0.573 ✓

b) Is this a lagging or leading power factor?

Leading power factor ✓

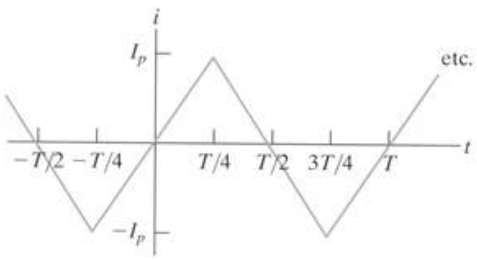
Correct

Marks for this submission: 5.00/5.00.

Question 9

Correct

Mark 10.00 out of 10.00



Q9d

The periodic triangular current has a peak value of 200 mA (milli Amp).

a) Find the rms value of the current.

$I_{p,rms}$ = 115.47 ✓ mA_{rms} (milli A_{rms})

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

P_{avg} = 66.67 ✓ W

Correct

Marks for this submission: 10.00/10.00.