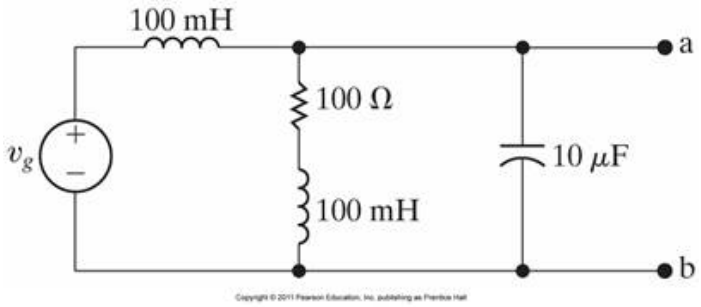
Started on	Sunday, 20 November 2016, 7:12 PM
State	Finished
Completed on	Sunday, 20 November 2016, 8:53 PM
Time taken	1 hour 40 mins
Grade	**98.75** out of 100.00

Question 1

Correct

Mark 10.00 out of 10.00



P9.44_9ed

The sinusoidal voltage source in the circuit is developing a voltage equal to

247.49 cos(1,000 t +45°) V.

a) Find the Thévenin voltage with respect to the terminals a,b.

$|V_{Th}|$ = 350 ✓ V

Angle = 0 ✓ ° (Degrees)

b) Find the Thévenin impedance with respect to the terminals a,b.

Express your answer in polar form.

$|Z_{ab}|$ = 141.42 ✓ Ω (Ohm)

Angle = 45 ✓ ° (Degrees)

Numeric Answer

V_{Th} = 350 at angle 0° Volts

Z_{ab} = 100 + j 100 Ω (Ohm) = 141.42 at angle 45° Ω (Ohm)

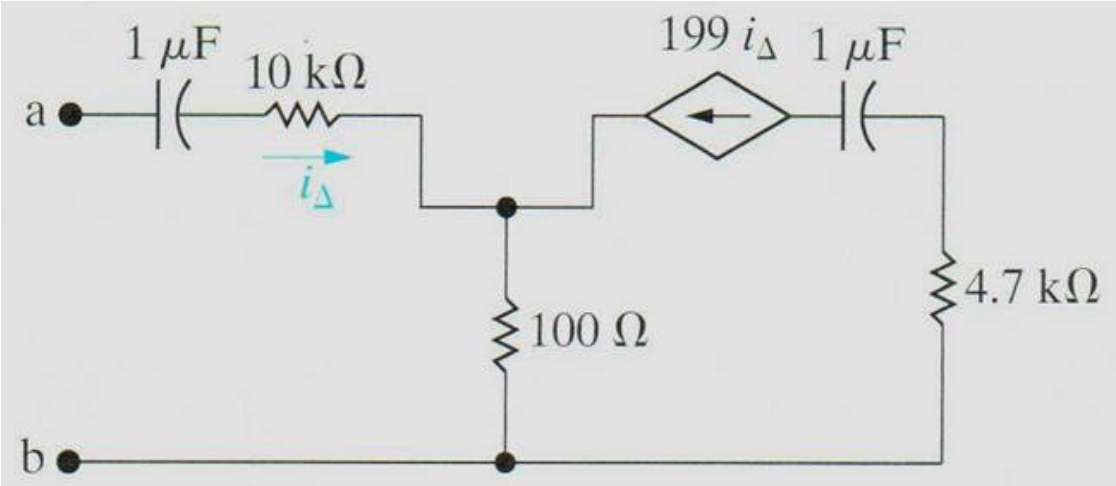
Correct

Marks for this submission: 10.00/10.00.

Question 2

Correct

Mark 10.00 out of 10.00



P9.46_7ed

The frequency of operation is 400 rad/sec.

Find the Thévenin impedance seen looking into the terminals ab of this circuit.

Z_{Th} = 30000 ✓ + j -2500 ✓ Ω (Ohm)

Numeric Answer

Z_{Th} = 30,000 – j 2,500 Ω (Ohm)

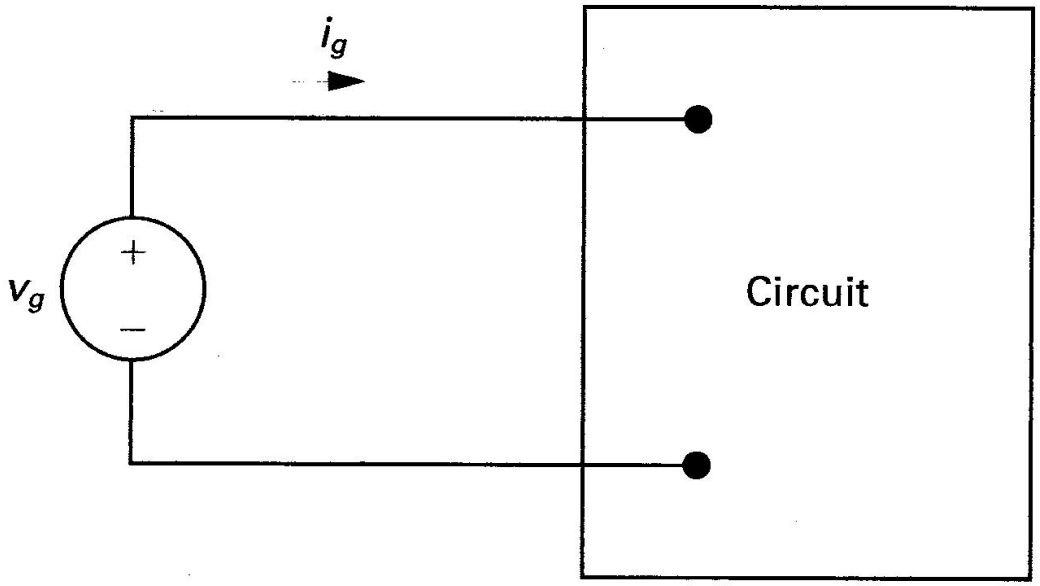
Correct

Marks for this submission: 10.00/10.00.

Question 3

Correct

Mark 10.00 out of 10.00



P9.29_6ed

Given:

$v_g = 150 \cos(8{,}000\,\pi\,t + 20°)$ V

$i_g = 30 \sin(8{,}000\,\pi\,t + 38°)$ A

a) What is the impedance seen by the source?

$Z_{circuit}$ = Mag [5] ✓ with Angle [72] ✓° (Degrees) Ω (Ohm)

b) By how many microseconds is the current out of phase with the voltage?

t_{phase} = [50] ✓ µs (micro sec)

Numeric Answer

a) $Z_{circuit}$ = 5 at angle 72° Ω (Ohm)

b) t_{phase} = 50 µs (micro sec)

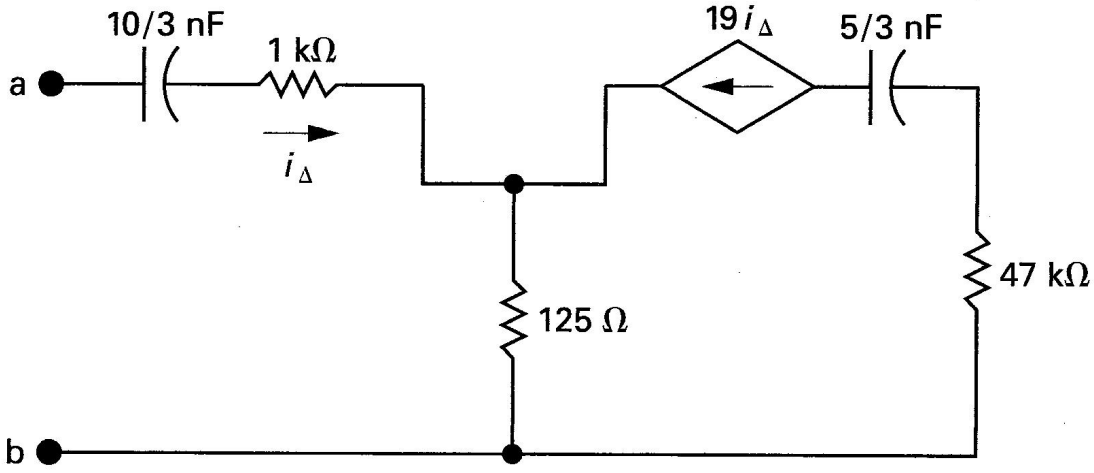
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 10.00 out of 10.00



P9.36_6ed

Find the Thévenin impedance seen looking into the terminals ab of this circuit.

The frequency of operation is 25 krad/sec (kilo rad/sec).

Z_{Th} = 3500 ✓ + j -12000 ✓ Ω (Ohm) in rectangular form

Numeric Answer

Z_{Th} = 3,500 – j 12, 000 Ω (Ohm)

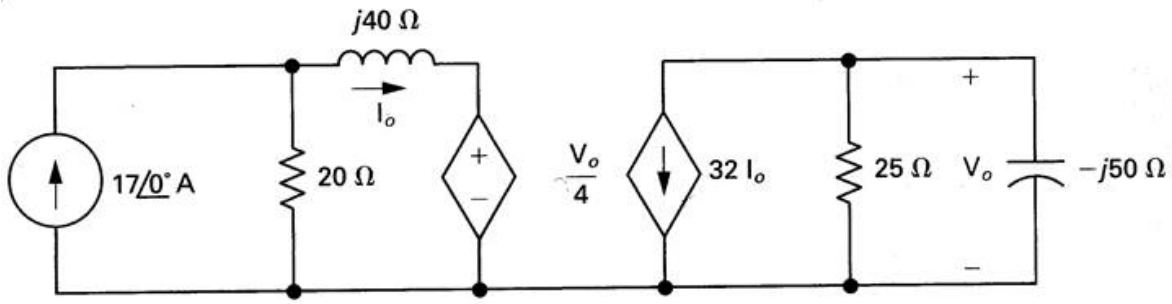
Correct

Marks for this submission: 10.00/10.00.

Question 5

Correct

Mark 10.00 out of 10.00



P9.56_6ed

Use the node-voltage method to find the follow phasor values.

$\mathbf{V_0}$ = 1280 ✓ + j 320 ✓ Volts

$\mathbf{I_0}$ = -1.4 ✓ + j -1.2 ✓ Amps

Numeric answer

$\mathbf{V_0}$ = 1,280 + j 320 V = 1319.394 at angle 14.04° V

$\mathbf{I_0}$ = -1.40 - j 1.20 A = 1.844 at angle -139.40° A

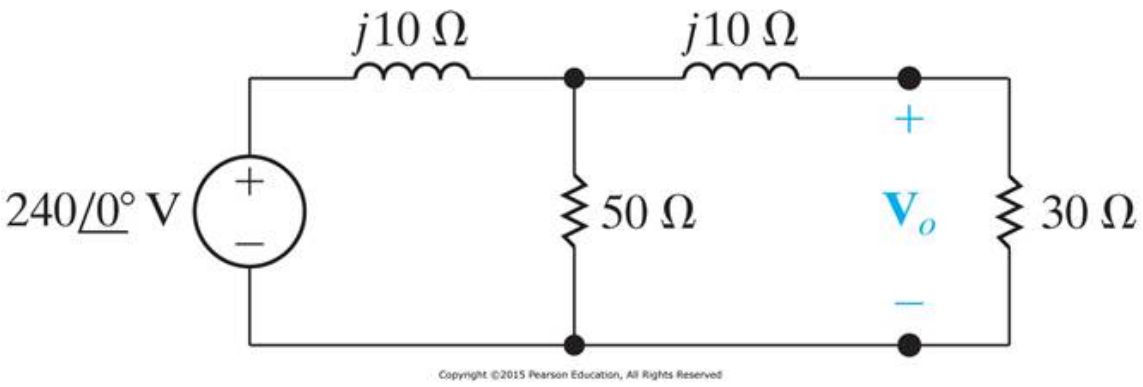
Correct

Marks for this submission: 10.00/10.00.

Question 6

Correct

Mark 10.00 out of 10.00



P9.54_10ed

Use the node-voltage method to find $\mathbf{V_0}$.

$\mathbf{V_0}$ = Magnitude 188.43 ✓ with Angle -42.88 ✓ ° (Degrees) Volts

Numeric answer

$\mathbf{V_0}$ = 188.432 at angle -42.88° Volts

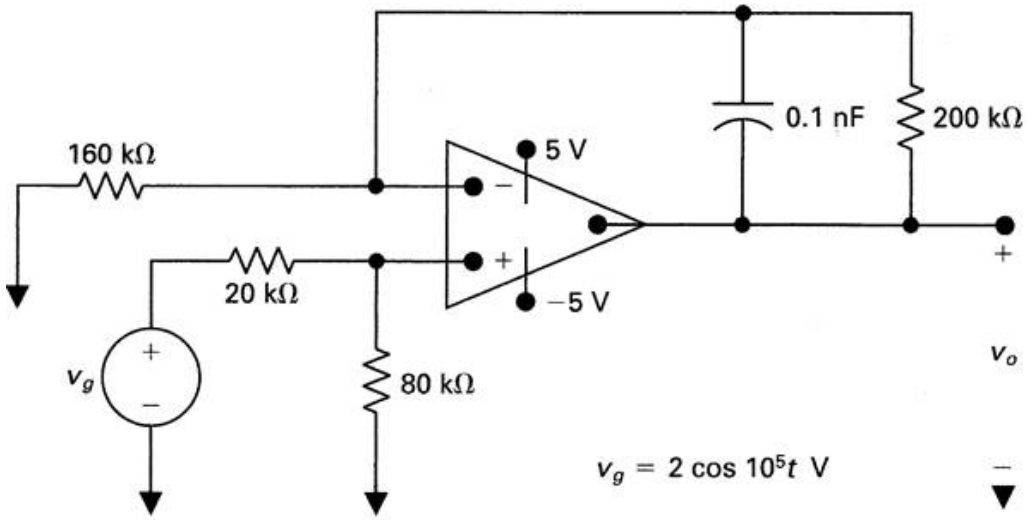
Correct

Marks for this submission: 10.00/10.00.

Question 7

Correct

Mark 10.00 out of 10.00



P9.72_6ed

The operational amplifier is ideal.

Given $v_g(t) = 2 \cos(100{,}000\ t)$ V

a) Find the steady-state output $v_0(t)$.

$v_0(t) =$ 2.152 ✓ $\cos(100{,}000\ t +$ -22.08 ✓°) Volts

b) How large can the amplitude of $v_g(t)$ be before the amplifier saturates?

$|\ v_0(t)_{max}\ | \leq$ 4.646 ✓ Volts (less than or equal to)

Numeric answer

a) $v_0(t) = 2.154 \cos(100{,}000\ t - 21.80°)$ Volts

b) $|\ v_0(t)_{max}\ | \leq 4.634$ Volts

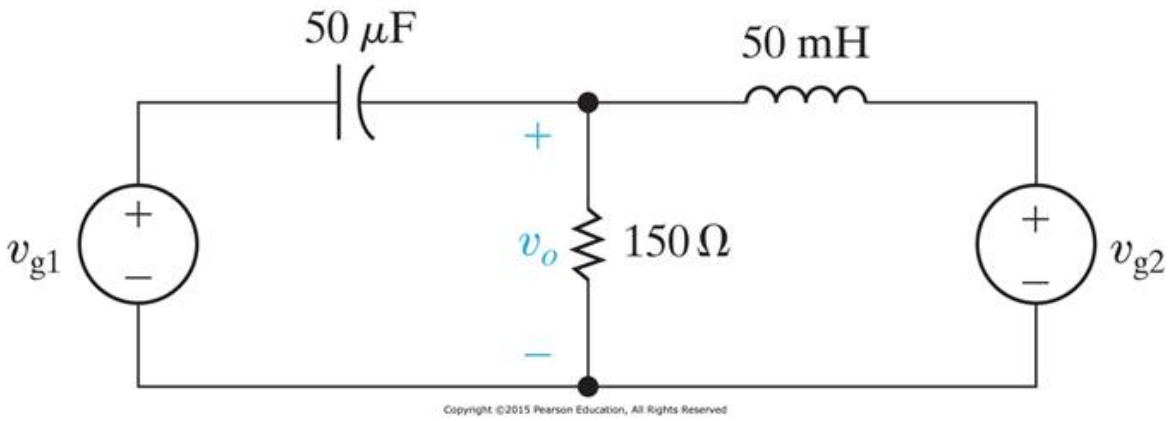
Correct

Marks for this submission: 10.00/10.00.

Question 8

Correct

Mark 10.00 out of 10.00



P9.61_10ed

Given: $v_{g1} = 25 \sin (400\,t + 143.12°)$ V and $v_{g2} = 18.03 \cos (400\,t + 33.69°)$ V

Use the mesh-current method to find the steady-state voltage of $v_0(t)$.

$v_0(t) =$ 15 ✓ cos (400 t + 0 ✓ °) (Degrees) V

Numeric answer

$v_0(t) = 15 \cos (400\,t + 0°)$ V

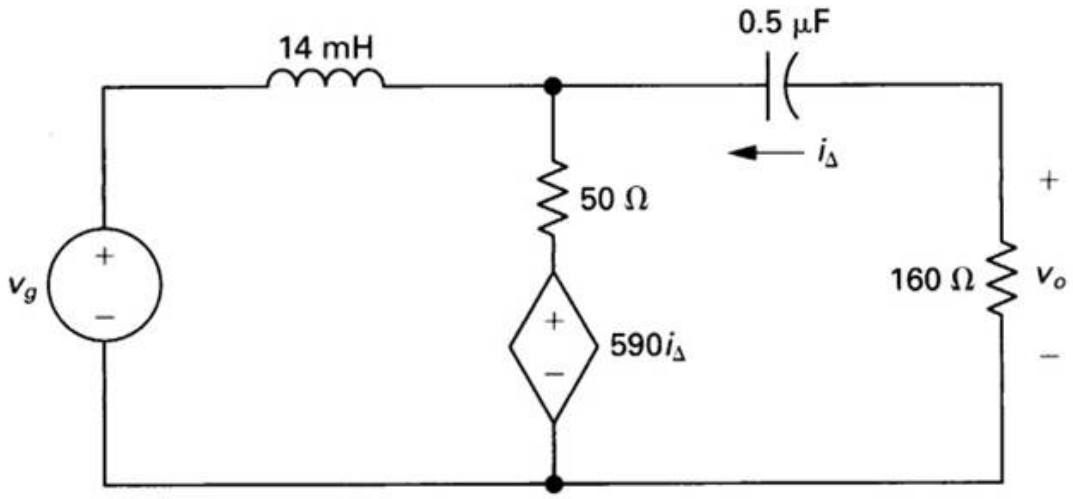
Correct

Marks for this submission: 10.00/10.00.

Question 9

Correct

Mark 10.00 out of 10.00



P9.48_6ed

Given: $v_g = 72\cos(5{,}000t)$ V

Find the steady-state expression for $v_0(t)$ in this circuit.

$v_0(t) =$ 11.31 ✓ $\cos(5{,}000\,t +$ -45 ✓ °) (Degrees) V

Numeric answer

$v_0(t) = 11.314\cos(5{,}000t - 45°)$ V

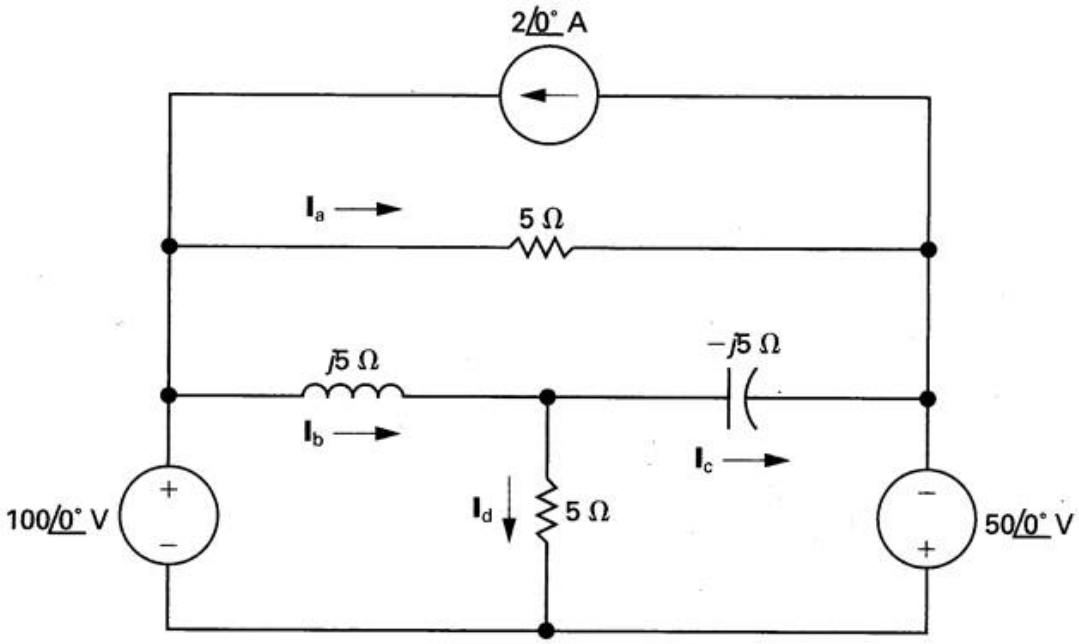
Correct

Marks for this submission: 10.00/10.00.

Question 10

Partially correct

Mark 8.75 out of 10.00



P9.52_6ed

Use the Mesh method and find the following currents:

I_a = Magnitude 30 ✓ with Angle 0 ✓° (Degrees) Amps

I_b = Magnitude 36.05 ✓ with Angle -33.69 ✓° (Degrees) Amps

I_c = Magnitude 31.62 ✓ with Angle 18.43 ✓° (Degrees) Amps

I_d = Magnitude 10 ✗ with Angle -90 ✓° (Degrees) Amps

Numeric Answer

I_a = 30 at angle 0° A

I_b = 36.056 at angle -33.69° A

I_c = 31.623 at angle 18.43° A

I_d = 30 at angle -90° A

Partially correct

Marks for this submission: 8.75/10.00.