Started on	Wednesday, 22 February 2017, 10:57 AM
State	Finished
Completed on	Wednesday, 22 February 2017, 11:51 AM
Time taken	54 mins 7 secs
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 15.00 out of 15.00

Q1b

Consider the sinusoidal voltage $v(t) = 100 \cos(240 \pi t + 45°)\ V_{rms}$.

a) What is the maximum amplitude of the voltage?

$V_m =$ 141.42 ✓ V

b) What is the frequency of v(t) in hertz?

f = 120 ✓ Hz

c) What is the frequency of v(t) in radians per second?

ω = 753.6 ✓ rad/sec

d) What is the phase angle in radians?

φ (phi) = .785 ✓ radians

e) What is the period in milliseconds?

T = 8.3 ✓ ms (milli sec)

Correct

Marks for this submission: 15.00/15.00.

Question 2

Correct

Mark 5.00 out of 5.00

Q2a

Given: $x(t) = 100 \cos(300 t + 45°) + 500 \cos(300 t - 60°)$

Use the concept of the phasor to combine this sinusoidal function into a single trigonometric expression in the form similar to $x(t) = A \cos(\omega t + \theta°)$.

Magnitude A of x(t) = 483.85 ✓

Angle θ of x(t) = -48.48 ✓ ° (Degree)

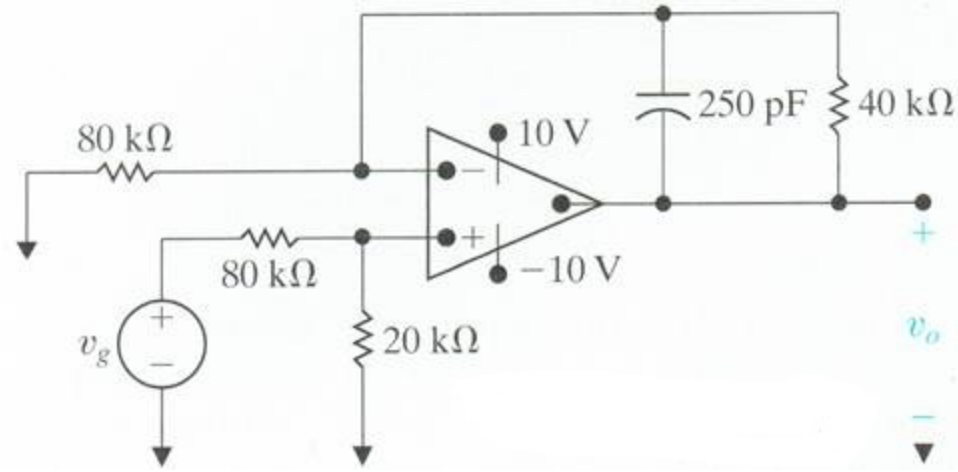
Correct

Marks for this submission: 5.00/5.00.

Question 3

Correct

Mark 15.00 out of 15.00



Q3c

Assume the operational amplifier is ideal.

Given $v_g(t)$ = -38.0 V (a constant voltage)

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

$v_0(t)$ = -10 ✓ Volts

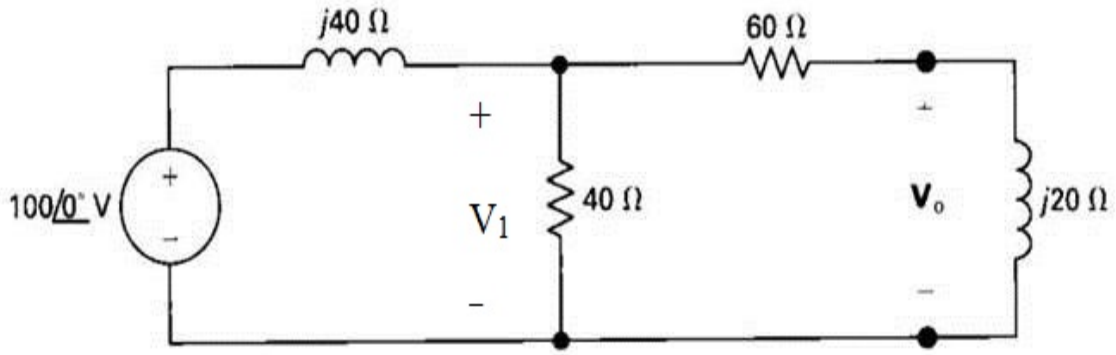
Correct

Marks for this submission: 15.00/15.00.

Question 4

Correct

Mark 10.00 out of 10.00



Q4a

Find the phasor voltages V_0 and V_1. I suggest you use the Node Method.

V_0 = 15.8 ✓ at angle 18.4 ✓ ° (Degrees) Volts

V_1 = 49.9 ✓ at angle -53.1 ✓ ° (Degrees) Volts

Express your answer as a positive magnitude and then the angle in the appropriate quadrant.

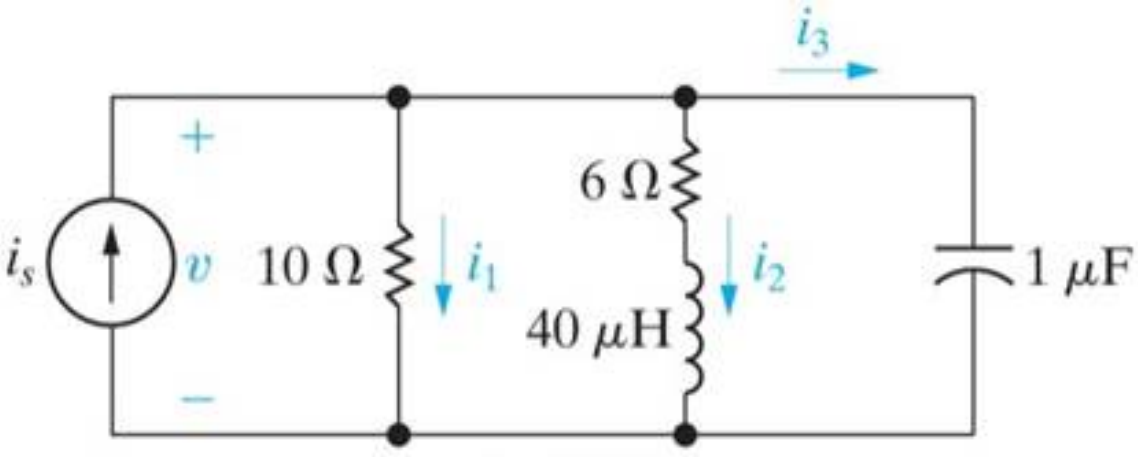
Correct

Marks for this submission: 10.00/10.00.

Question 5

Correct

Mark 15.00 out of 15.00



Q5b

Given $i_s = 20\cos(100{,}000\,t + 6.12°)$ Amps

The equivalent admittance of the circuit is $Y_{Eq} = 0.2166$ at angle 6.12° (Degrees) Siemens

Calculate the average power absorbed/delivered by the 6 Ω (Ohm) resistor.

$P_{6\Omega}$ = 491.8033 ✓ W "+" = absorbed "-" = delivered

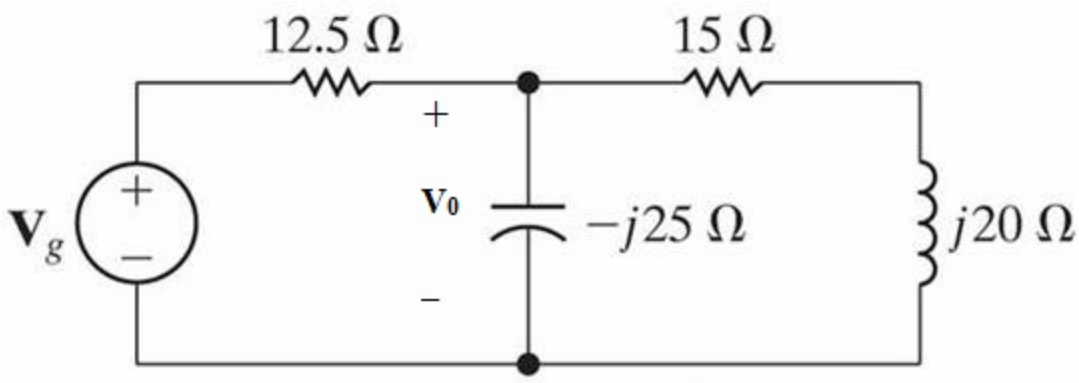
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 10.00 out of 10.00



Q6a

Given:

The voltage source $V_g = 160$ at angle 0° V_{rms}

and the voltage $V_0 = 122.714$ at angle -4.40° V_{rms}

Find the average and reactive power for the voltage source V_g.

S_g = -481.2 ✓ + j 120.24 ✓ VA

"+" = absorbed and "-" = delivered

Correct

Marks for this submission: 10.00/10.00.

Question 7

Correct

Mark 5.00 out of 5.00

Q7d

Given that a balanced three-phase set of voltages is in the negative phase sequence where

$v_a = 240 \cos(\omega t - 41°)$ V.

Find the other two phase voltages.

v_b = 240 ✓ cos(ωt + 79 ✓°) V

v_c = 240 ✓ cos(ωt + -161 ✓°) V

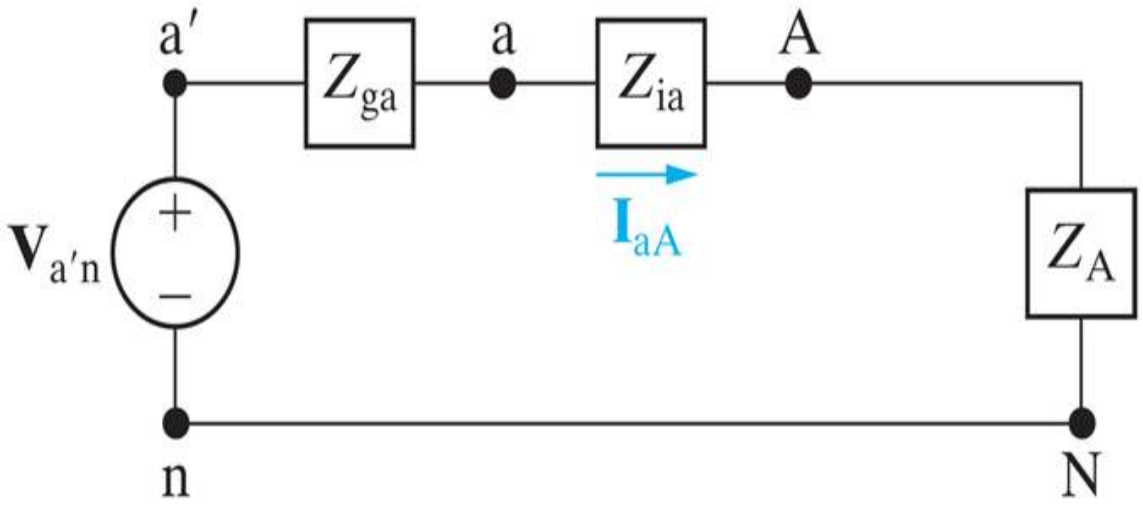
Correct

Marks for this submission: 5.00/5.00.

Question 8

Correct

Mark 15.00 out of 15.00



Q8a

Given: $V_{a'n}$ = 120 at angle 0° V_{rms} in a balanced three phase system with a positive phase sequence.

The source and load are Y connected.

Z_{ga} = 1 + j15 Ω Z_{ia} = 19 + j5 Ω Z_A = 20 + j20 Ω

Calculate the single phase equivalent line currents I_{aA}, I_{bB} and I_{cC}.

I_{aA} = 2.12 ✓ at angle -45 ✓ ° (Degrees) A_{rms}

I_{bB} = 2.12 ✓ at angle -165 ✓ ° (Degrees) A_{rms}

I_{cC} = 2.12 ✓ at angle 75 ✓ ° (Degrees) A_{rms}

Calculate the line to line voltages V_{AB}, V_{BC}, and V_{CA}.

V_{AB} = 103.92 ✓ at angle 30 ✓ ° (Degrees) V_{rms}

V_{BC} = 103.92 ✓ at angle -90 ✓ ° (Degrees) V_{rms}

V_{CA} = 103.92 ✓ at angle 150 ✓ ° (Degrees) V_{rms}

Correct

Marks for this submission: 15.00/15.00.

Question 9

Correct

Mark 10.00 out of 10.00

Q9a

The total apparent power supplied in a balanced three-phase Y-D system is 3,600 VA. The source line to neutral voltage is 240 V_{rms}. The line impedance is negligible and the power factor angle of the load is 35° lagging.

Determine the impedance of the load.

$Z_{\Delta,load}$ = 39.32 ✓ + j 27.5 ✓ Ω (Ohms)

Correct

Marks for this submission: 10.00/10.00.