Started on	Wednesday, 22 February 2017, 10:56 AM
State	Finished
Completed on	Wednesday, 22 February 2017, 11:54 AM
Time taken	58 mins 7 secs
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 15.00 out of 15.00

Q1c

Consider the sinusoidal voltage $v(t) = 300 \cos(200 \pi t - 60°)$ V_{rms}.

a) What is the maximum amplitude of the voltage?

V_m = 424.26 ✓ V

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

f = 100 ✓ Hz

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

ω = 628.32 ✓ rad/sec

d) What is the phase angle in radians?

φ (phi) = -1.05 ✓ radians

e) What is the period in milliseconds?

T = 10 ✓ ms (milli sec)

Correct

Marks for this submission: 15.00/15.00.

Question 2

Correct

Mark 5.00 out of 5.00

Q2b

Given: $x(t) = 150 \cos(300\,t + 35°) + 450 \cos(300\,t - 55°)$

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) = 474.34 ✓

Angle θ of x(t) = -36.6 ✓ ° (Degree)

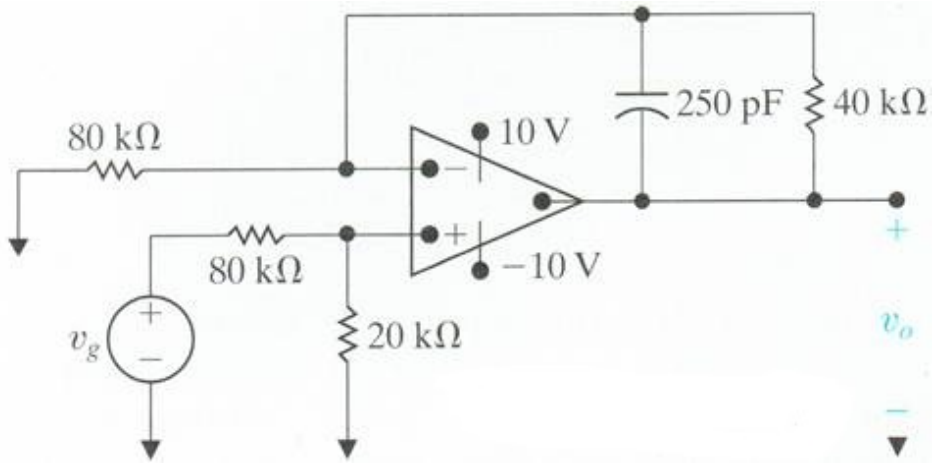
Correct

Marks for this submission: 5.00/5.00.

Question 3

Correct

Mark 15.00 out of 15.00



Q3d

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

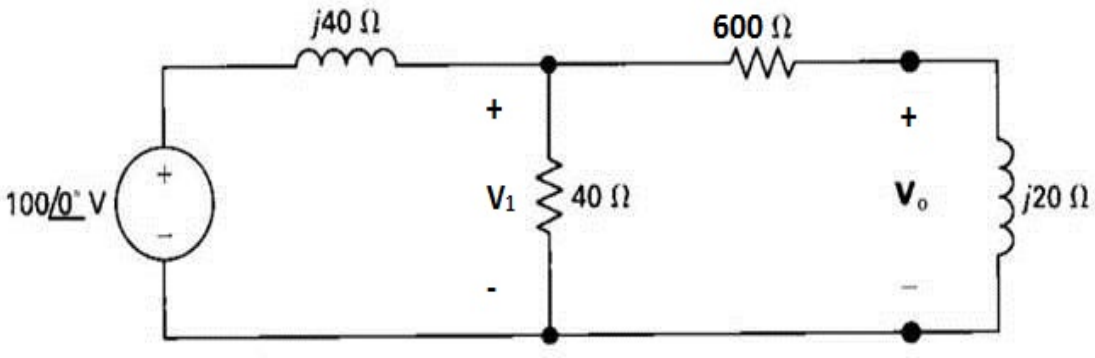
Correct

Marks for this submission: 15.00/15.00.

Question 4

Correct

Mark 10.00 out of 10.00



Q4c

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

V_0 = 2.312 ✓ at angle 41.308 ✓° (Degrees) Volts

V_1 = 69.44 ✓ at angle -46.78 ✓° (Degrees) Volts

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

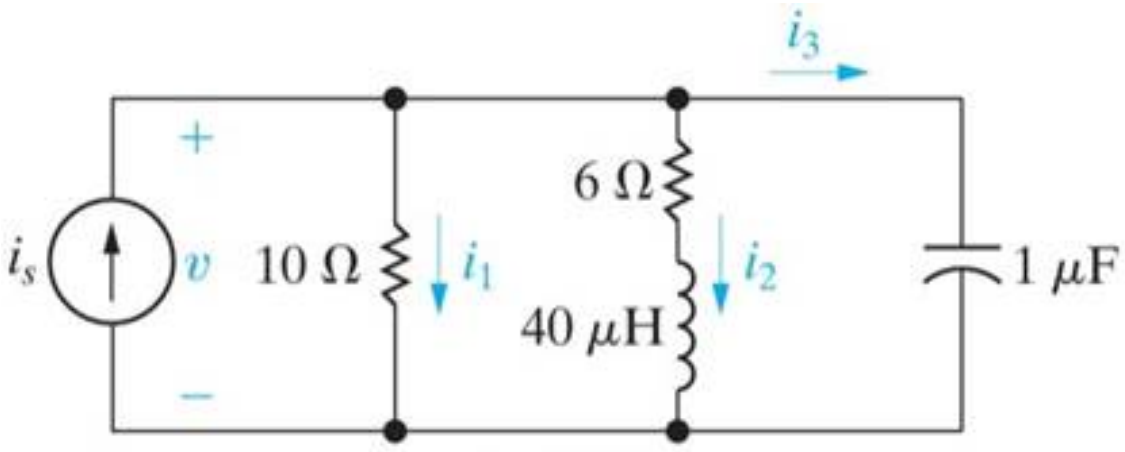
Correct

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

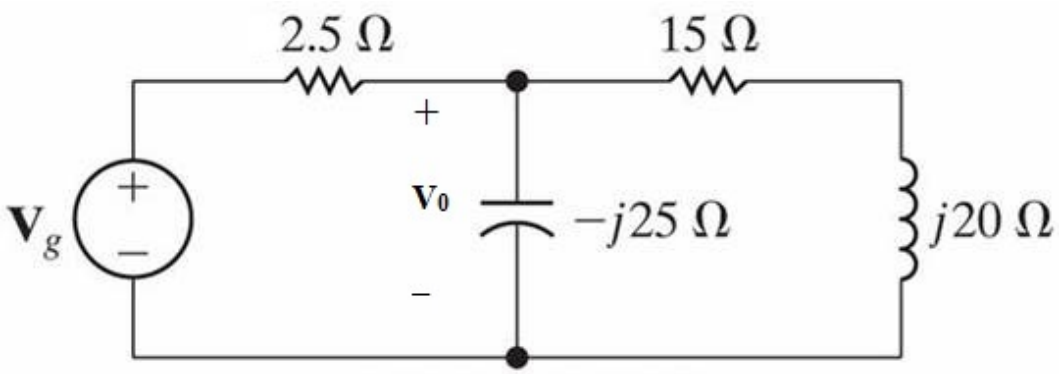
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 10.00 out of 10.00



Q6d

Given:

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

and the voltage V_0 = 139.0763 at angle 4.40° V_{rms}.

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

S_g = -273.0667 ✓ + j -136.533 ✓ VA

"+" = absorbed and "-" = delivered

Correct

Marks for this submission: 10.00/10.00.

Question 7

Correct

Mark 5.00 out of 5.00

Q7c

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

v_a = 170 cos(ωt + 23°) V.

Find the other two phase voltages.

v_b = 170 ✓ cos(ωt + -97 ✓°) V

v_c = 170 ✓ cos(ωt + 143 ✓°) V

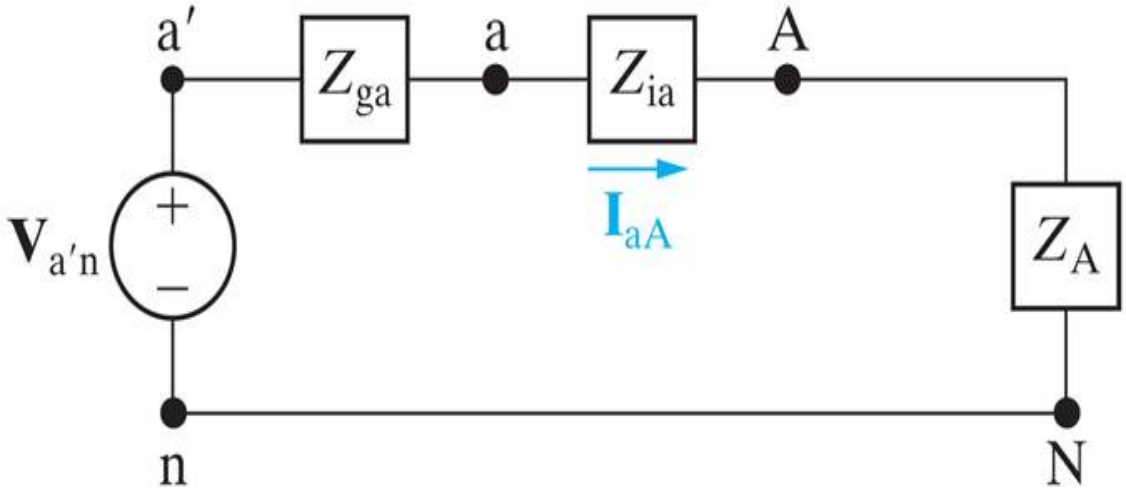
Correct

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} = 2.121 ✓ at angle -45 ✓ ° (Degrees) A_{rms}

I_{bB} = 2.121 ✓ at angle -165 ✓ ° (Degrees) A_{rms}

I_{cC} = 2.121 ✓ 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.