Started on	Thursday, 6 October 2016, 10:25 AM
State	Finished
Completed on	Thursday, 6 October 2016, 11:40 AM
Time taken	1 hour 15 mins
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)

Numeric Answer

a) V_m = 424.2641 V

b) f = 100 Hz

c) ω = 628.3185 rad/sec

d) ϕ (phi) = -1.0472 radians

e) T = 10.0 ms (milli sec)

Correct

Marks for this submission: 15.00/15.00.

Question 2

Correct

Mark 5.00 out of 5.00

Q2e

Given: $x(t) = 120 \cos(300\,t + 55°) + 415 \cos(300\,t - 25°)$

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) = 451.6

Angle θ of x(t) = -9.8

° (Degree)

Numeric Answer

x(t) = 451.5754 cos(300 t - 9.8291°)

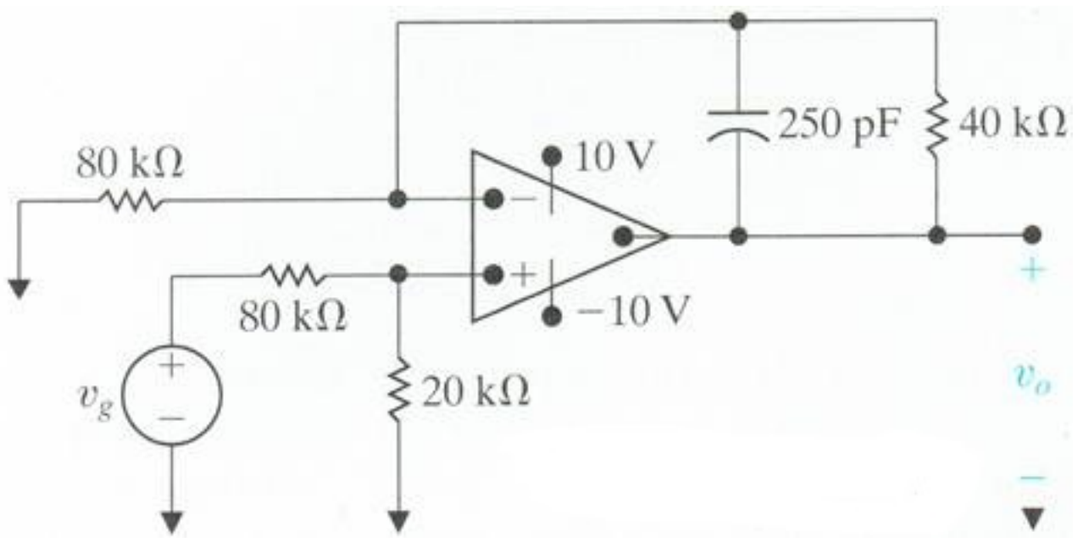
Correct

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

Numeric Answer

$v_0(t)$ = -10 V since the opamp is in saturation at the negative power supply rail.

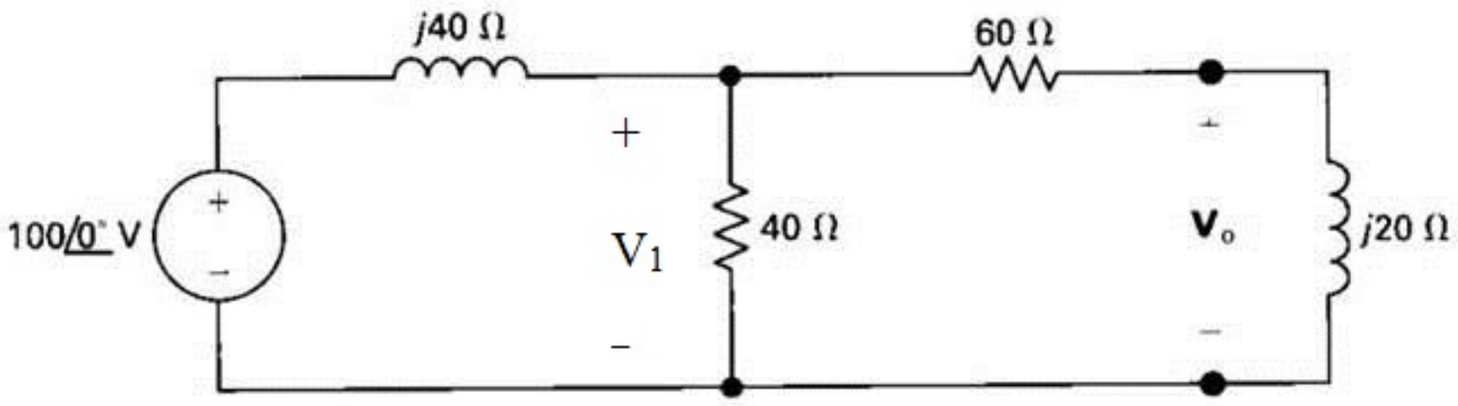
Correct

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.

Numeric Answer

V_0 = 15.811 at angle 18.43° Volts

V_1 = 50.0 at angle -53.13° Volts

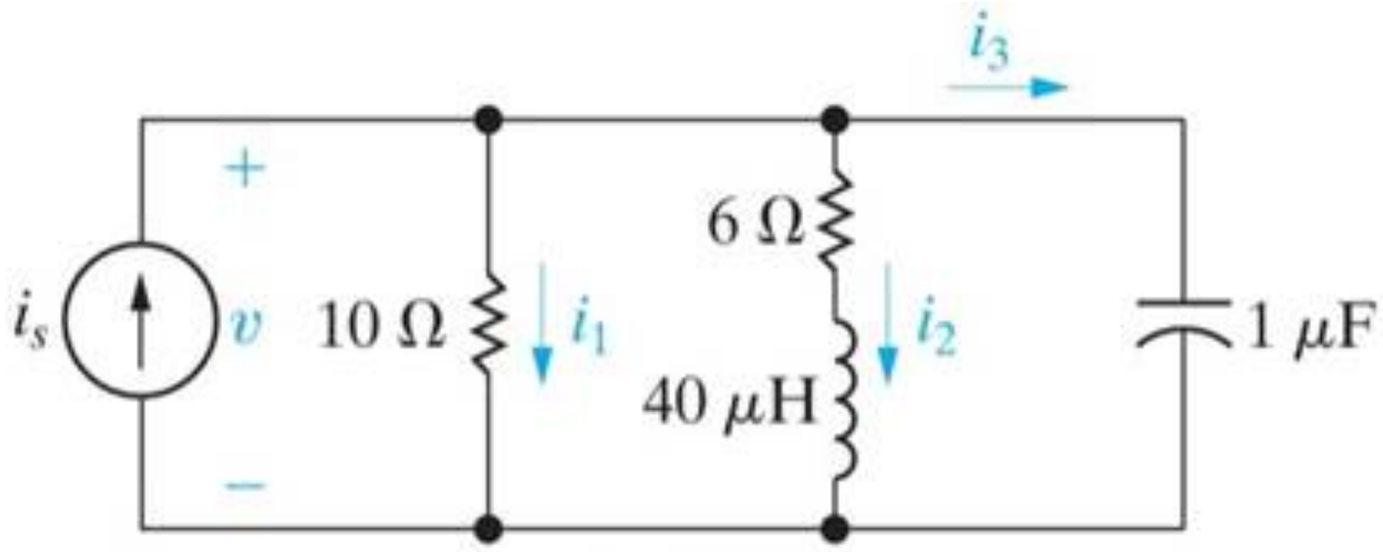
Correct

Marks for this submission: 10.00/10.00.

Question 5

Correct

Mark 15.00 out of 15.00



Q5a

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 10 Ω (Ohm) resistor.

$P_{10\Omega}$ = 426.89 ✓

W

Numeric Answer

$P_{10\Omega} = 426.2295$ W

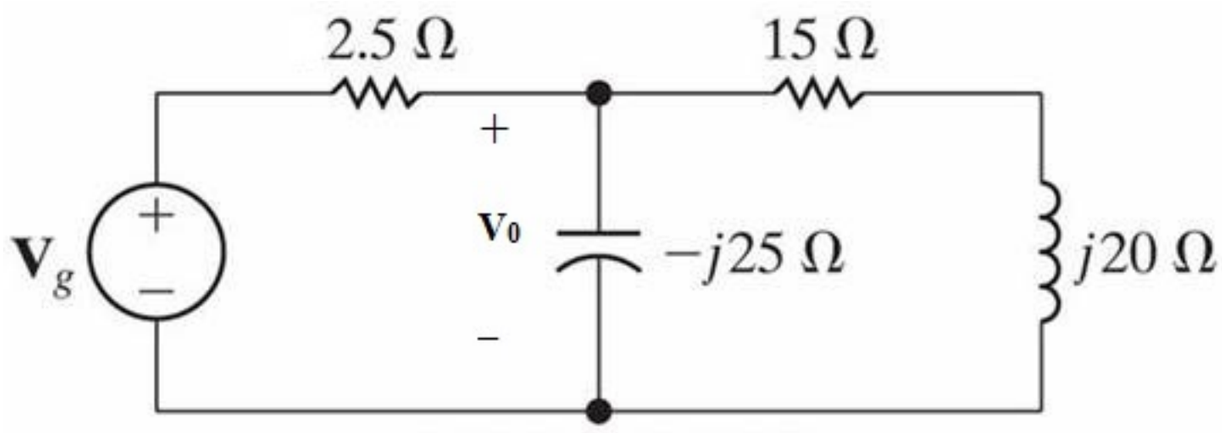
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 10.00 out of 10.00



Q6c

Given:

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

and the voltage V_0 = 150.9165 at angle -1.08° V_{rms}.

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

S_g = -583.42 ✓

+ j 182.16 ✓ VA

"+" = absorbed and "-" = delivered

Numeric Answer

S_g = -583.0605 + j 182.2064 VA

Correct

Marks for this submission: 0.00/10.00.

Comment:

Your answers are correct.

Due to error in answer guide the answers will be accepted a full points.

Question 7

Correct

Mark 5.00 out of 5.00

Q7a

Find the Laplace Transform of $\left\{\frac{d}{dt}\cos\omega t\right\}$

Select one:

- a. $\frac{-\omega^2}{s^2+\omega^2}$ ✓
- b. $\frac{-s^2}{s^2+\omega^2}$
- c. $\frac{1}{s^2+\omega^2}$
- d. $\frac{\omega}{s^2+\omega^2}$

Your answer is correct.

$$L\left\{\frac{d}{dt}\cos\omega t\right\}=\frac{-\omega^2}{s^2+\omega^2}$$

The correct answer is: $\frac{-\omega^2}{s^2+\omega^2}$

Correct

Marks for this submission: 5.00/5.00.

Question 8

Correct

Mark 15.00 out of 15.00

Q8a

Given $F(s)=\frac{100(s^2+69)}{(s+10)(s^2+10s+169)}=\frac{100(s^2+69)}{(s+10)(s+5-j12)(s+5+j12)}$

Find the partial fraction expansion of F(s) and then use the Laplace transform tables to find f(t).

f(t) = [100 ✓

e -10 ✓ t + 83.33 ✓ e -5 ✓ t cos(12 ✓ t + 90 ✓ °] u(t)

$$f(t)=\left[100e^{-10t}+83.33e^{-5t}\cos(12t+90^\circ\right]u(t)$$

Correct

Marks for this submission: 15.00/15.00.

Question 9

Correct

Mark 10.00 out of 10.00

Q9c

Given: $F(s) = \dfrac{45(s+3)}{(s+6)(s^2+6s+25)}$ which has an inverse transform f(t).

a) Find the initial value of f(t = 0).

f(t = 0) = 0

b) Find the final value of f(t → ∞)

f(t → ∞) = 0

Numeric Answer

a) f(t = 0) = 0

b) f(t → ∞) = 0

Correct

Marks for this submission: 10.00/10.00.