Started on	Sunday, 6 November 2016, 11:20 PM
State	Finished
Completed on	Sunday, 6 November 2016, 11:26 PM
Time taken	5 mins 54 secs
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 15.00 out of 15.00

P9.03_9ed

A sinusoidal current is zero at t = -625 μs (micro sec) and increasing at a rate of 8,000 π (pi) A/sec [Hint: rate of current change = di/dt].

The maximum amplitude of the current is 20 A.

a) What is the frequency of i(t) in radians per second?

ω (omega) = 1256.637 ✓ rad/sec

b) What the following parameters of the current i(t) cosine form expression?

The period of the current source?

T = 5 ✓ ms (millisec)

The phase angle φ_i (phi_i)?

φ_i (phi_i) = -45 ✓ ° (Degrees)

Numeric Answer

ω (omega) = 1,256.64 rad/sec

T = 5 ms (millisec)

Φ_i (phi_i) = -45 Degrees

Correct

Marks for this submission: 15.00/15.00.

Question 2

Correct

Mark 15.00 out of 15.00

P9.03_6ed

Consider the sinusoidal voltage v(t) = 170 cos(120 π t - 60°) V. v(t) without symbols is (170 cos(120 pi t – 60 degrees)

a) What is the maximum amplitude of the voltage? V_m = 170 ✓ V

b) What is the frequency of v(t) in hertz? f = 60 ✓ Hz

c) What is the frequency of v(t) in radians per second? ω (omega) = 376.99 ✓ rad/sec

d) What is the phase angle in radians? φ (phi) = -1.05 ✓ radians

e) What is the phase angle in degrees? φ (phi) = -60 ✓ ° (Degrees)

f) What is the period in milliseconds? T = 16.67 ✓ ms (milli sec)

g) What is the first time after t = 0 that v(t) = 170V? t = 2.78 ✓ ms (milli sec)

Numeric Answer

a) Vm = 170 V

b) f = 60 Hz

c) ω (omega) = 376.99 radians/sec

d) ϕ (phi) = -1.047 radians

e) ϕ (phi) = -60 Degrees

f) T = 16.67 ms

g) t = 2.778 ms

Correct

Marks for this submission: 15.00/15.00.

Question 3

Correct

Mark 15.00 out of 15.00

T9.03

Given v(t) = 53 cos(1,000 t + 73°) Volts

a) Find the frequency in hertz for this voltage.

f = 159.36 ✓ Hz

a) Find the rms value of the voltage.

V_{rms} = 37.48 ✓ Vrms

c) Find the voltage v(t) at t = 2 ms (milli sec).

v(t = 2 ms) = -52.56 ✓ V

Numeric Answer

a) f = 159.1549 Hz

b) V_{rms} = 37.4767 Vrms

c) v(t = 2 ms) = -52.5355 V

Correct

Marks for this submission: 15.00/15.00.

Question 4

Correct

Mark 15.00 out of 15.00

P9.02_9ed

At t = -2 ms (milli sec), a sinusoidal voltage is known to be zero and going positive.

[Hint: The easiest representation of the waveform at t = -2 ms is the sine and not the cosine form.]

The voltage is next zero at t = 8 ms (millisec).

It is also known that the voltage is 80.9V at t = 0.

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

f = 50 ✓ Hz

b) What are the following parameters of the voltage v(t)in the cosine form expression?

The frequency of the voltage source?

w (omega) = 314.159 ✓ radians/sec

The phase angle φ_v (phi_v)?

φ_v (phi_v) = -54 ✓ ° (Degree)

The maximum voltage V_m?

V_m = 137.64 ✓ V

Numeric Answer

f = 50 Hz

ω (omega) = 314.16 radians/sec

φ_v (phi_v) = -54 Degrees

V_m = 137.64 V

Correct

Marks for this submission: 15.00/15.00.

Question 5

Correct

Mark 15.00 out of 15.00

Ex9.01_9ed

A sinusoidal current has maximum amplitude of I_{peak} = 90 A.

The current passes through one complete cycle in T = 11.50 ms (milli sec).

a) What is the rms value of the current?

I_{rms} = 63.65 ✓ A_{rms}

b) What is the frequency f in hertz?

f = 86.96 ✓ Hz

c) What is the frequency ω in radians per second?

ω = 546.39 ✓ rad/sec

Numeric Answer

a) I_{rms} = 63.640 A_{rms}

b) f = 86.957 Hz

c) ω = 546.364 rad/sec

Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 15.00 out of 15.00

T9.04

Given v(t) = 100 sin(500 t - 23°) Volts

a) Translate the voltage into the cosine form.

v(t) = 100 ✓ cos(500 ✓ t + -113 ✓ °) Volts

b) Find the rms value of the voltage.

V_{rms} = 70.71 ✓ Vrms

c) Find the voltage v(t) at t = 5 ms (milli sec).

v(t = 5 ms) = 86.32 ✓ V

Numeric Answer

a) v(t) = 100 cos(500 t -113°) Volts

b) V_{rms} = 70.7107 Vrms

c) v(t = 5 ms) = 86.3928 V

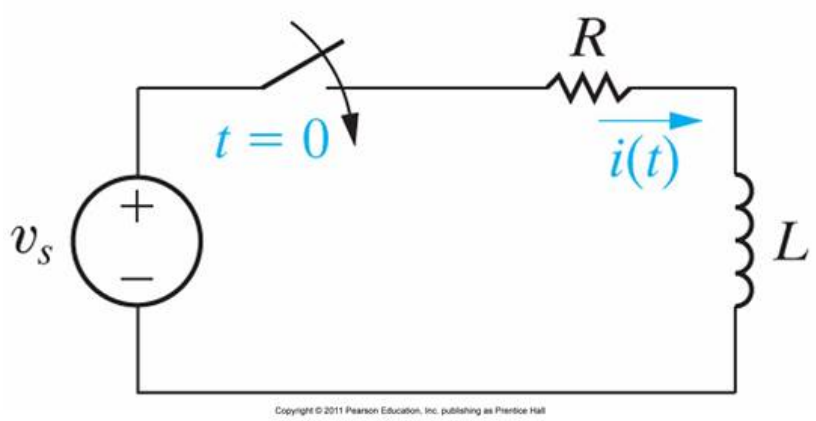
Correct

Marks for this submission: 15.00/15.00.

Question 7

Correct

Mark 10.00 out of 10.00



P9.09_10ed

The voltage applied to this circuit at t = 0 (when the switch closes) is $v_s(t) = 75 \cos(4{,}000t - 60°)$ Volts

Also given that R = 400 Ω (0hm) and L = 75 mH (milli Henry)

The initial inductor current is zero for $t < 0^-$.

For t = 750 µsec (micro sec) after the switch closed, find the following values.

a) Find the numerical value of the transient response of i.

$i_{transient}$ = 0.329 ✓ mA (milli Amp)

b) Find the numerical value of the steady state response of i.

i_{steady_state} = 38.75 ✓ mA (milli Amp)

c) Find the total response i.

i_{total} = 38.75 ✓ mA (milli Amp)

Numeric answer

a) $i_{transient}$ = 0.3286 mA (milli Amp)

b) i_{steady_state} = 38.779 mA (milli Amp)

c) i_{total} = 39.1076 mA (milli Amp)

Correct

Marks for this submission: 10.00/10.00.