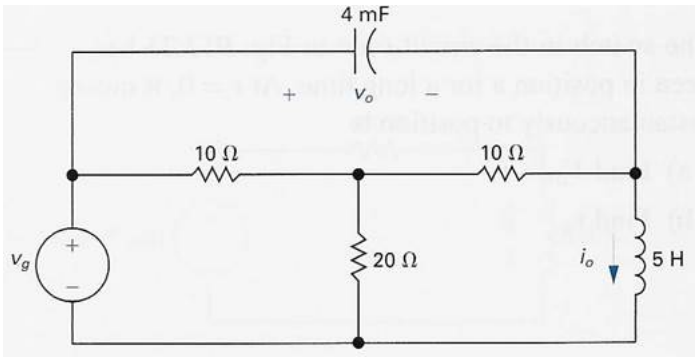
Started on	Sunday, 31 March 2019, 12:08 PM
State	Finished
Completed on	Sunday, 31 March 2019, 12:09 PM
Time taken	1 min 39 secs
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 10.00 out of 10.00



P13.27a_6ed

There is no energy stored in this circuit for t < 0.

Given that $v_g(t) = 75\ u(t)$ for $t \geq 0$.

a) For t > 0, Redraw this circuit in the frequency domain and find the Laplace form of the voltage $v_0(t)$.

$V_0(s) =$ 375 ✓ / [s (s + 5 ✓)]

b) Find the time domain $v_0(t)$.

$v_0(t) =$ 75 ✓ [1 - exp(-5 ✓ t)] u(t) V

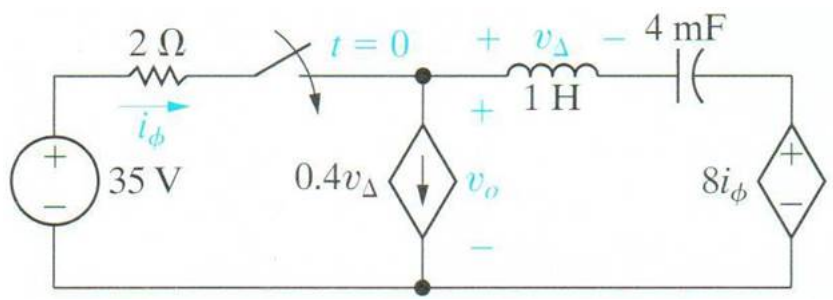
Correct

Marks for this submission: 10.00/10.00.

Question 2

Correct

Mark 10.00 out of 10.00



P13.13_6ed and P13.15_7ed

Given: No energy is stored in this circuit for t < 0.

At time t = 0, the switch closes (i.e. makes contact).

a) For t > 0, Redraw this circuit in the frequency domain and find the Laplace form of the voltage $v_0(t)$.

V(s) = 35 ✓ /s + (mag 2.863 ✓ Angle 167 ✓ º)/(s + 1 – j 7)

+ (mag 2.86 ✓ Angle -167 ✓ º)/(s + 1 + j 7)

b) Find the inverse transform to find the time domain $v_0(t)$.

$v_0(t) =$ [35 ✓ + 5.78 ✓ exp(-1 ✓ t) cos (7 ✓ t + 167 ✓ º] u(t) V

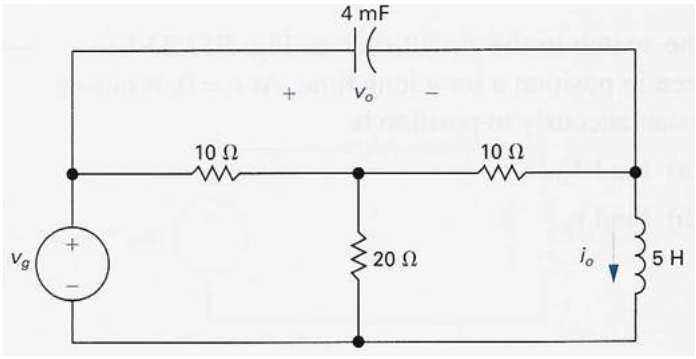
Correct

Marks for this submission: 10.00/10.00.

Question 3

Correct

Mark 10.00 out of 10.00



P13.27b_6ed

There is no energy stored in this circuit for t < 0.

Given that $v_g(t) = 75\ u(t)$ for $t \geq 0$.

a) For t > 0, Redraw this circuit in the frequency domain and find the Laplace form of the current $i_0(t)$.

$I_0(s) =$ 15 ✓ / [s (s + 5 ✓)]

b) Find the time domain $i_0(t)$.

$i_0(t) =$ 3 ✓ [1 - exp(-5 ✓ t)] u(t) A

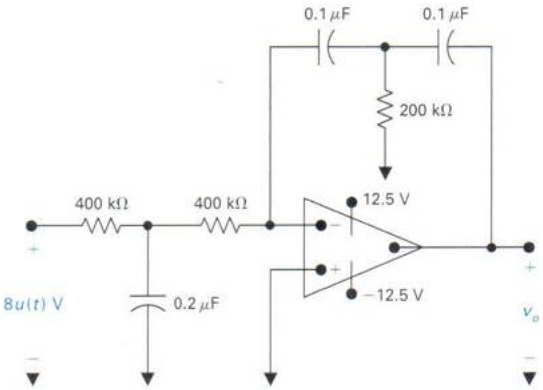
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 10.00 out of 10.00



P13.46_6ed

Given: No energy is stored in this circuit for t < 0 and you can assume the OpAmp is ideal.

a) For t > 0, Redraw this circuit in the frequency domain and find the Laplace form of the output voltage $v_0(t)$.

$V_0(s) =$ -5000 ✓ / s^3

b) Find the inverse transform and then determine the time domain output voltage $v_0(t)$.

$v_0(t) =$ -2500 ✓ t 2 ✓ u(t) V

c) Calculate how long in ms (milli sec) until the opamp saturates.

$t_{saturation} =$ 70.7 ✓ ms (milli sec)

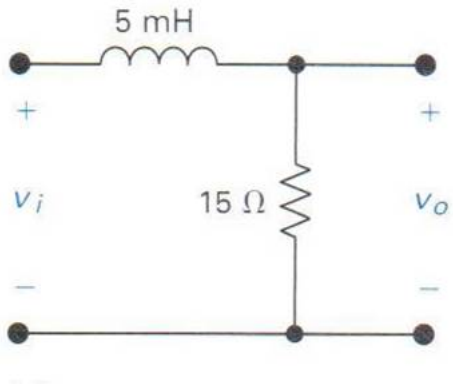
Correct

Marks for this submission: 10.00/10.00.

Question 5

Correct

Mark 10.00 out of 10.00



P13.49d_6ed

Find the s domain transfer function H(s) = V_0/V_i for this circuit.

H(s) = 3000 ✓ / (s + 3000 ✓)

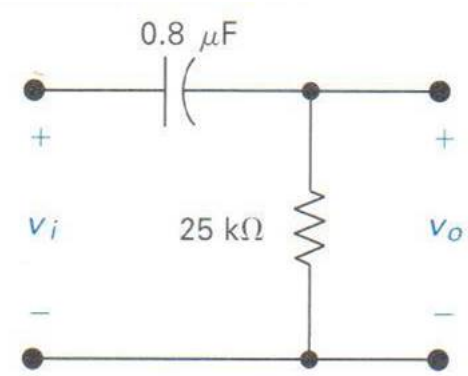
Correct

Marks for this submission: 10.00/10.00.

Question 6

Correct

Mark 10.00 out of 10.00



P13.49b_6ed

Find the s domain transfer function H(s) = V_0/V_i for this circuit.

H(s) = s / (s + 50 ✓)

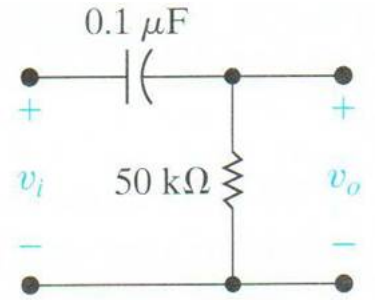
Correct

Marks for this submission: 10.00/10.00.

Question 7

Correct

Mark 10.00 out of 10.00



P13.49b_7ed

Find the s domain transfer function H(s) = V_0/V_i for this circuit.

H(s) = s / (s + 200 ✓)

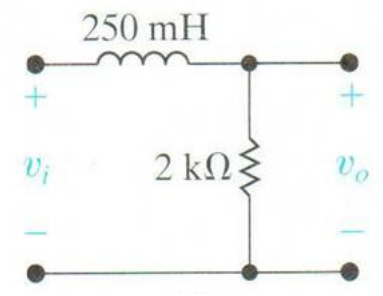
Correct

Marks for this submission: 10.00/10.00.

Question 8

Correct

Mark 10.00 out of 10.00



P13.49d_7ed

Find the s domain transfer function H(s) = V_0/V_i for this circuit.

H(s) = 8000 ✓ / (s + 8000 ✓)

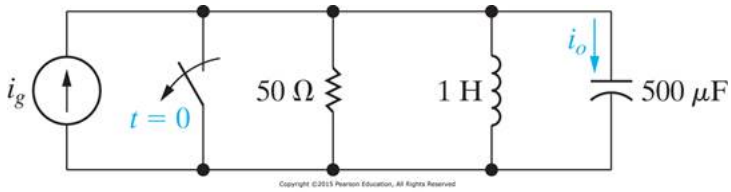
Correct

Marks for this submission: 10.00/10.00.

Question 9

Correct

Mark 10.00 out of 10.00



P13.56_10ed

There is no energy stored in this circuit at the time the switch is opened. The sinusoidal current source is generating the signal 25 cos (200 t) mA (milli Amp). The desired response signal is the current $i_0(t)$.

a) Find the s domain transfer function H(s) = I_0/I_g for this circuit.

H(s) = s^2 / (s^2 + 40 ✓ s + 2000 ✓)

b) Find the s domain form for $I_0(s)$.

$I_0(s)$ = .025 ✓ s^3 / (There are four factors in the denominator – list each one separately)

Factor 1: s + 20 – j 40 ✓

Factor 2: s + 20 + j 40 ✓

Factor 3: s + 0 - j 200 ✓

Factor 4: s + 0 + j 200 ✓

c) Find the time domain form $i_0(t)$.

$i_0(t)$ = [1.44 ✓ exp(-20 ✓ t) cos(40 ✓ t + -97.9 ✓ °) + 26 ✓ cos(200 ✓ t + 11.9 ✓ °)] u(t) mA (milli A)

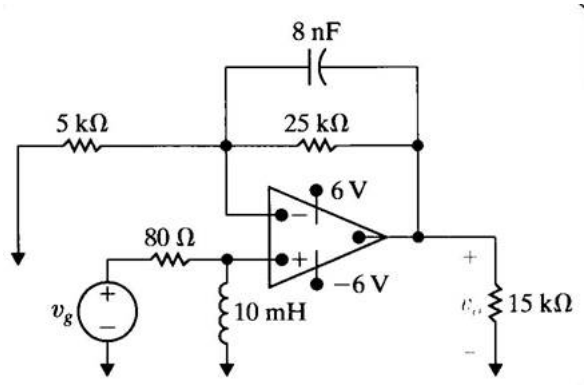
Correct

Marks for this submission: 10.00/10.00.

Question 10

Correct

Mark 10.00 out of 10.00



P13.78_7ed and P13.77_10ed

You may assume the opamp is ideal.

a) Find the s domain transfer function $H(s) = V_0/V_g$ for this circuit.

$H(s) = s * (s +$ 30000 ✓ $/ [(s + 5{,}000) * (s +$ 8000 ✓ $)]$

b) Find the time domain $v_0(t)$ if $v_g(t) = 600\ u(t)$ mV (milli V).

$v_0(t) = [$ 5 ✓ $e^{-5{,}000t} +$ -4.4 ✓ $\exp($ -8000 ✓ $t)]\ u(t)$ V

c) Find the steady-state express for $v_0(t)$ if $v_g(t) = 2 \cos(10{,}000\ t)$ V.

$v_0(t)_{steady\text{-}state} = [$ 4.42 ✓ $\cos($ 10000 ✓ $t +$ -6.3 ✓ $°]\ u(t)$ V

Correct

Marks for this submission: 10.00/10.00.

◄ Homework 8 - Chapter 12

Jump to...

Homework 10 - Bode Diagrams ►