Started on	Thursday, 3 November 2016, 10:25 AM
State	Finished
Completed on	Thursday, 3 November 2016, 11:21 AM
Time taken	55 mins 56 secs
Grade	**100.00** out of 100.00

Question 1

Complete

Mark 20.00 out of 20.00

Q1

You have already completed a Bode Diagram in-class.

The instructor will manually grade your Bode Diagram and enter your score here.

Enter nothing here.

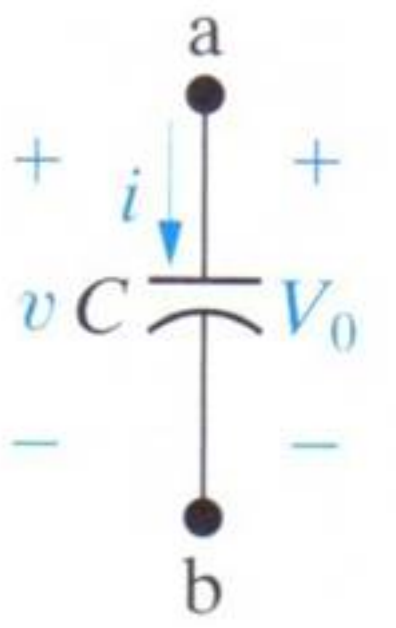
Move along to the next question.

Comment:

Question 2

Correct

Mark 10.00 out of 10.00



Q2b

Given: This capacitor has a value of 1 μF (micro F) and has an initial voltage of 45 V at t = 0^-.

Identify the Frequency Domain series form of the capacitor.

Select one:

- a. $V = \frac{1}{s(1\times10^{-6})} + \frac{45}{s}$ ✓
- b. $V = \frac{1}{s(1\times10^{-3})} + \frac{45}{s}$
- c. $I = s(1\times10^{-6})V - 45\times10^{-6}$
- d. $I = s(1\times10^{-3})V - 45\times10^{-3}$

Your answer is correct.

$$V = \frac{1}{s(1\times10^{-6})} + \frac{45}{s}$$

The correct answer is: $V = \frac{1}{s(1\times10^{-6})} + \frac{45}{s}$

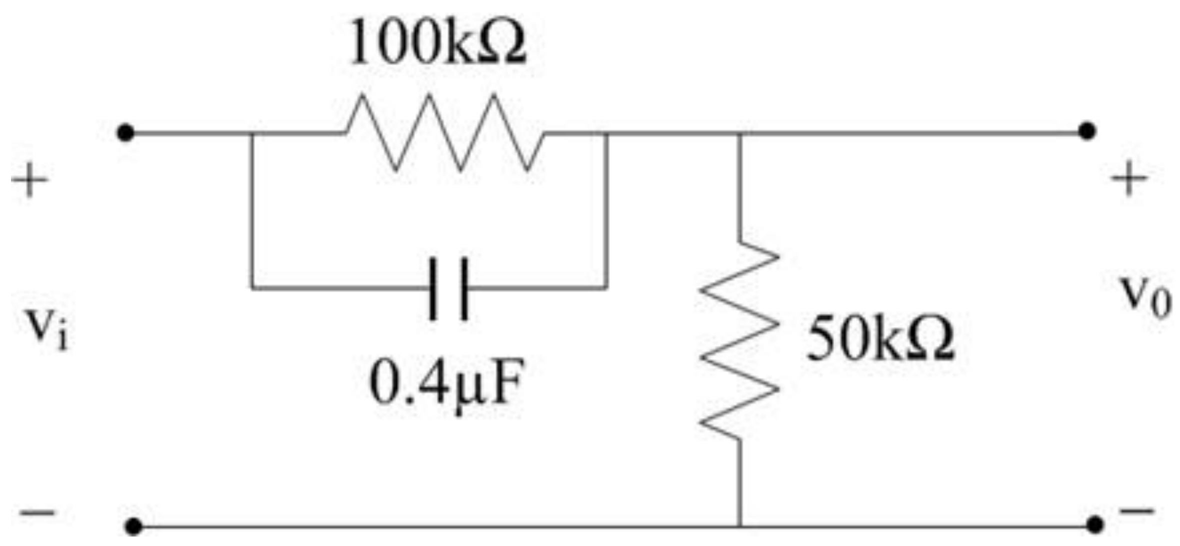
Correct

Marks for this submission: 10.00/10.00.

Question 3

Correct

Mark 10.00 out of 10.00



Q3b

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

H(s) = (s + 25 ✓

) / (s + 75 ✓)

$$H(s) = \frac{s+25}{s+75}$$

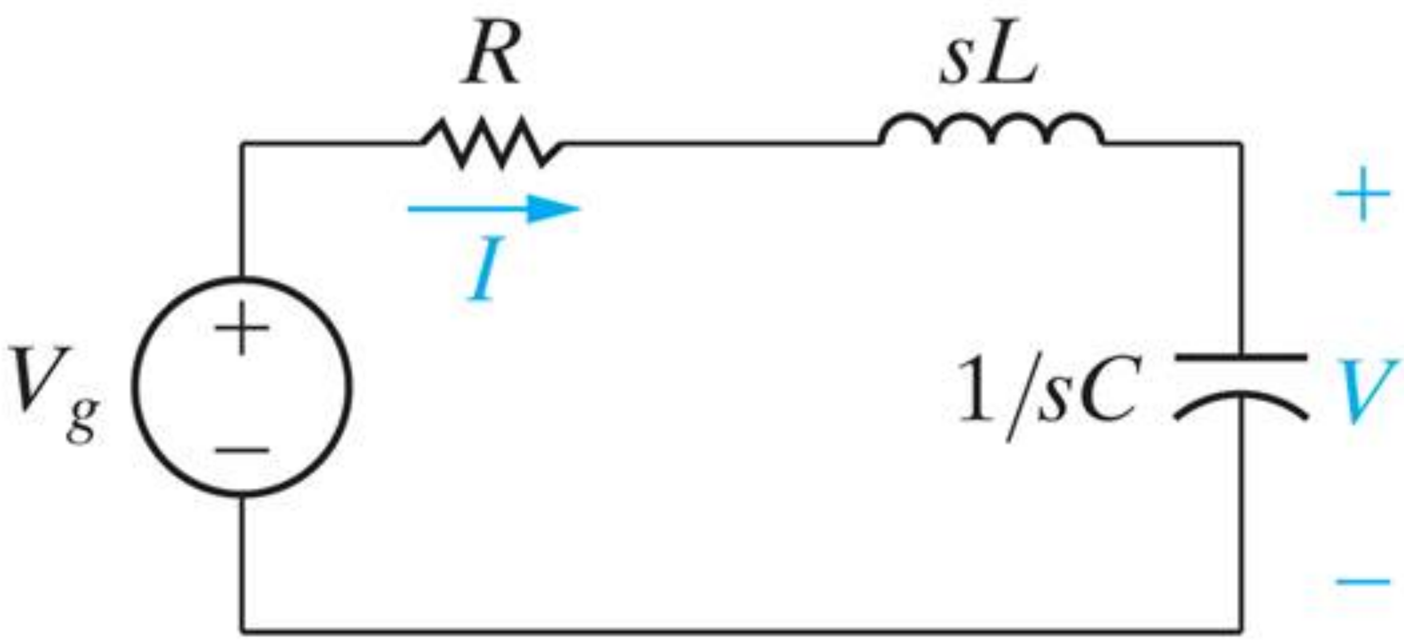
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 15.00 out of 15.00



Q4b

Given: There is no energy stored in this circuit prior to t = 0.

The voltage source $V_g = 25$ V for $t \geq 0^+$.

R = 250 Ω (Ohm) L = 1 H C = 2 mF (milli F)

Find defined voltage V in the s domain.

V(s) = 12500

/ [s (s^2 + 250 s + 500]

$$V(s) = \frac{12{,}500}{s(s^2+250s+500)}$$

Correct

Marks for this submission: 15.00/15.00.

Question 5

Correct

Mark 15.00 out of 15.00

Q5c

Given: $F(s) = \frac{25s+40}{s(s+10)}$

Find the partial fraction expansion of this transfer function.

F(s) = 4

/ s + 21 / (s + 10)

$$F(s) = \frac{25s+40}{s(s+10)} = \frac{4}{s} + \frac{21}{s+10}$$

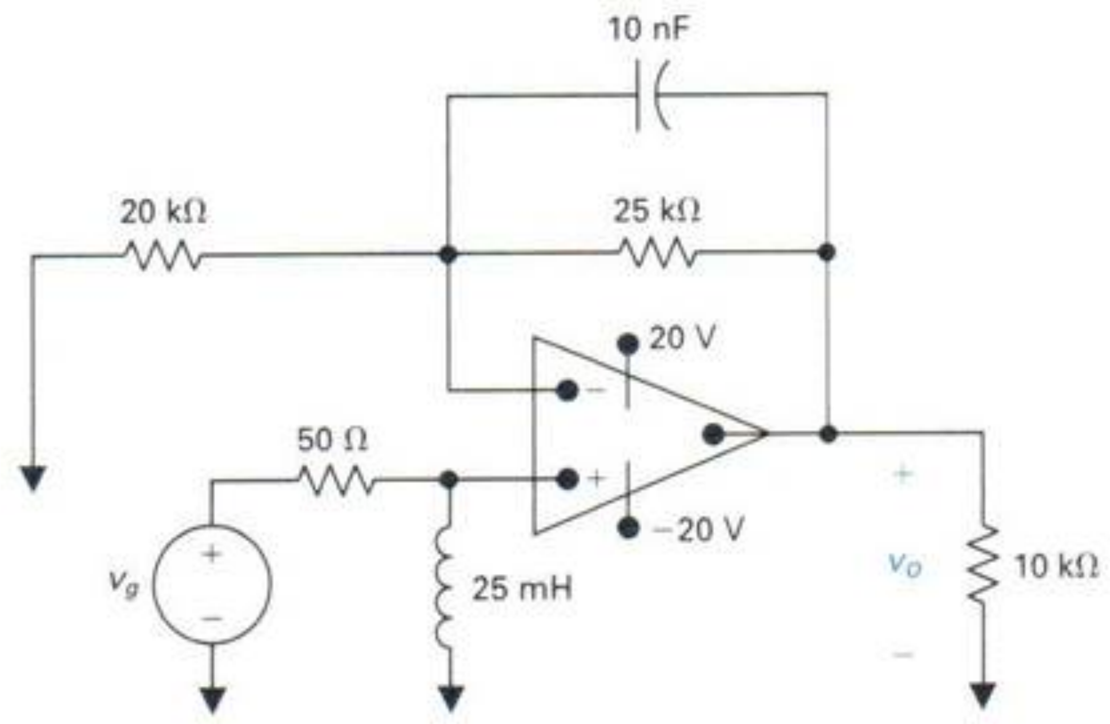
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 15.00 out of 15.00



Q6d

Given: The opamp is ideal.

$$H(s)=\frac{V_0}{V_g}=\frac{s(s+9{,}000)}{(s+2{,}000)(s+4{,}000)}$$

Find the steady-state response when the input $v_g(t) = 11\cos(5{,}000\,t)$ V.

$v_0(t)_{steady\text{-}state}$ = [16.4

cos (5000 t + -0.48 °)] u(t) V

Numeric Answer

$v_0(t)_{steady\text{-}state} = 16.4219\cos(5{,}000\,t - 0.484°)\,u(t)$ V

Correct

Marks for this submission: 10.00/15.00. Accounting for previous tries, this gives **10.00/15.00**.

Comment:

Your answer is correct. Answer guide was rounded incorrectly. Score adjusted.

Question 7

Correct

Mark 15.00 out of 15.00

Q7c

Given $H(s) = \frac{(45{,}000)(s+200)}{(s+2{,}000)(s+9{,}000)}$

a) What is the zero of this function in the form $s + z_1$?

z_1 = 200 ✓

b) What are the two poles of this function in the form $s + p_{1,2}$?

p_1 = 2000 ✓

(positive lower value)

p_2 = 9000 ✓

(positive higher value)

c) What is the *gain K* in dB after putting this function in *Standard Form*?

K = -6.02 ✓

dB

For the following use the Bode diagram straight-line approximation conventions (do not plot the function)

d) Find the magnitude of this transfer function at ω = 2,000 rad/sec.

| H(jω = 2,000 rad/sec) | = 13.98 ✓

dB

e) Find the phase angle at ω = 2,000 rad/sec

θ(jω = 2,000 rad/sec) = 45 ✓

° (Degrees)

Numeric Answer

a) z_1 = 200

b) p_1 = 2,000 p_2 = 9,000

c) K in dB = -6.0206 dB

d) | H(jω = 2,000 rad/sec) | = 14 dB

e) θ(jω = 200 rad/sec) = 45°

Correct

Marks for this submission: 15.00/15.00.