Started on	Wednesday, 3 April 2019, 10:56 AM
State	Finished
Completed on	Wednesday, 3 April 2019, 11:36 AM
Time taken	39 mins 32 secs
Grade	**96.67** out of 100.00

Question 1

Correct

Mark 5.00 out of 5.00

Q1b

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

Select one:

- a. $\frac{s\omega}{s^2+\omega^2}$ ✓
- 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.

$\frac{s\omega}{s^2+\omega^2}$

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

Correct

Marks for this submission: 5.00/5.00.

Question 2

Correct

Mark 15.00 out of 15.00

Q2a

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 3

Correct

Mark 10.00 out of 10.00

Q3d

Given: $F(s)=\frac{40(s+4)}{(s+1)(s+5)}$ which has an inverse transform f(t).

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

f(t = 0) = 40 ✓

b) Find the final value of f(t → ∞)

f(t → ∞) = 0 ✓

Numeric Answer

a) f(t = 0) = 40

b) f(t → ∞) = 0

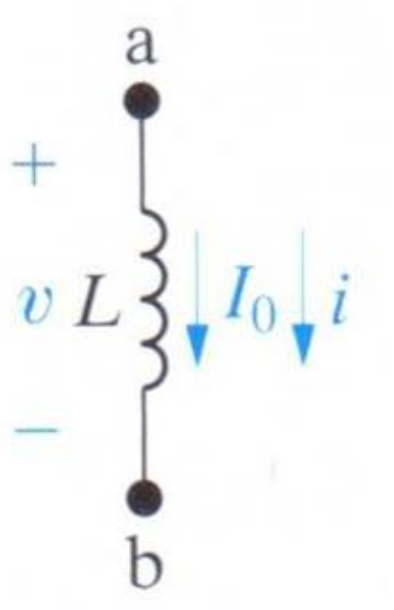
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 6.67 out of 10.00



Q4d

Given: This inductor has a value of 10 mH (milli H) and has an initial current of 15 A at $t = 0^-$.

Identify the Frequency Domain series form of the inductor.

Select one:

- a. $V = s(10 \times 10^{-3})I - 0.15$ ✓
- b. $V = s(10 \times 10^{-6})I - 0.00015$
- c. $I = \frac{V}{s(10 \times 10^{-3})} + \frac{15}{s}$
- d. $I = \frac{V}{s(10 \times 10^{-6})} + \frac{15}{s}$

Your answer is correct.

$$V = s(10 \times 10^{-3})I - 0.15$$

The correct answer is: $V = s(10 \times 10^{-3})I - 0.15$

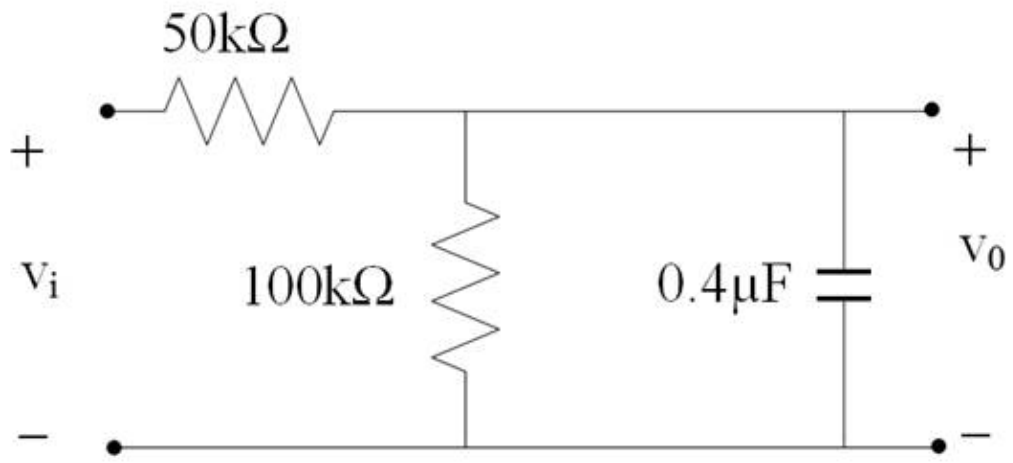
Correct

Marks for this submission: 10.00/10.00. Accounting for previous tries, this gives **6.67/10.00**.

Question 5

Correct

Mark 15.00 out of 15.00



Q5a

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

H(s) = 50 ✓ / (s + 75 ✓)

$$H(s)=\frac{50}{s+75}$$

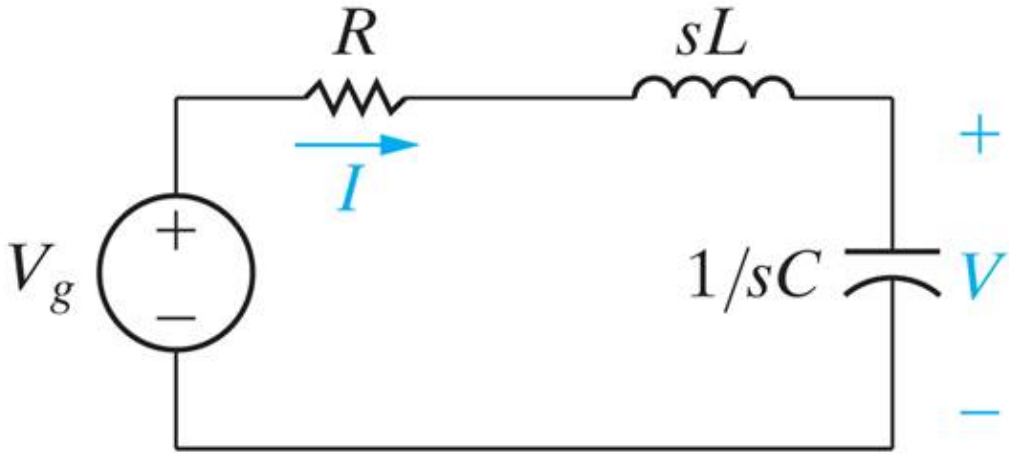
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 15.00 out of 15.00



Q6c

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

The voltage source V_g = 10V for $t \geq 0^+$.

R = 125 Ω (Ohm) L = 1 H C = 1 mF (milli F)

Find the defined current I in the s domain.

I(s) = [10] / (s^2 + [125] s + [1000]]

$$H(s) = \frac{V}{V_g} = \frac{10{,}000}{s(s^2+s125+1{,}000)}$$

Correct

Marks for this submission: 15.00/15.00.

Question 7

Correct

Mark 15.00 out of 15.00

Q7e

Given: $F(s) = \frac{2(5s+11)}{s^2+14s+625} = \frac{2(5s+11)}{(s+7-j24)(s+7+j24)}$

Find the partial fraction expansion of this transfer function.

F(s) = [5.09 at Angle 11.3] / (s + 7 – j24)

\+ [5.09 at Angle -11.3] / (s + 7 + j24)

State the angle in each case as a positive angle.

$$F(s) = \frac{2(5s+11)}{s^2+14s+625} = \frac{5.0990 \angle 11.31^\circ}{s+7-j24} + \frac{5.0990 \angle [?][?] -11.31^\circ}{s+7+j24}$$

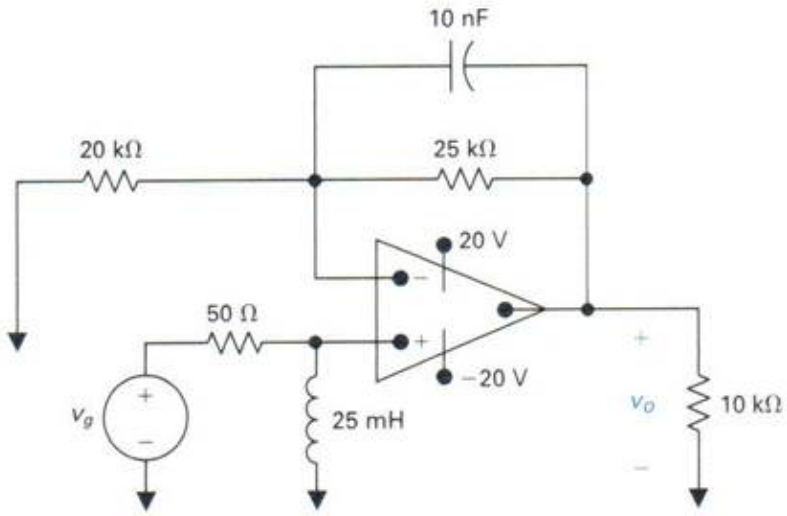
Correct

Marks for this submission: 15.00/15.00.

Question 8

Correct

Mark 15.00 out of 15.00



Q8c

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 $v_g(t) = 12\cos(10{,}000\,t)$ V.

$v_0(t)_{\text{steady-state}}$ = [14.69 ✓ cos (10000 ✓ t + -8.88 ✓ °)] u(t) V

Numeric Answer

$v_0(t)_{\text{steady-state}} = 14.6980 \cos(10{,}000\,t - 8.86°)\ u(t)$ V

Correct

Marks for this submission: 15.00/15.00.

◄ Quiz 7 - Chapter 13

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Quiz 8 - Bode Diagrams ►