Started on	Wednesday, 5 April 2017, 11:00 AM
State	Finished
Completed on	Wednesday, 5 April 2017, 11:48 AM
Time taken	48 mins 25 secs
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 5.00 out of 5.00

Q1d

Find the Laplace Transform of $\left\{\frac{d}{dt}\left[e^{-at}\cos(\omega t)\right]\right\} \Leftrightarrow$

Select one:

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

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)

Correct

Marks for this submission: 15.00/15.00.

Question 3

Correct

Mark 10.00 out of 10.00

Q3b

Given: $F(s)=\frac{10(s^2+40)}{(s+8)(s^2+12s+136)}$ which has an inverse transform f(t).

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

f(t = 0) = 10 ✓

b) Find the final value of f(t → ∞)

f(t → ∞) = 0 ✓

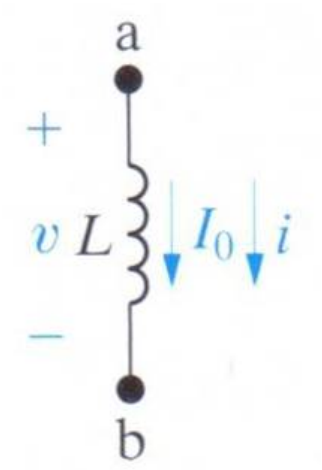
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 10.00 out of 10.00



Q4c

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

Identify the Frequency Domain parallel form of the inductor.

Select one:

- a. $I=\frac{V}{s(10\times10^{-3})}+\frac{10}{s}$ ✓
- b. $V=s(1\times10^{-3})(10)-0.01$
- c. $I=\frac{V}{s(10\times10^{-6})}+\frac{10}{s}$
- d. $V=s(1\times10^{-6})(10)-0.0001$

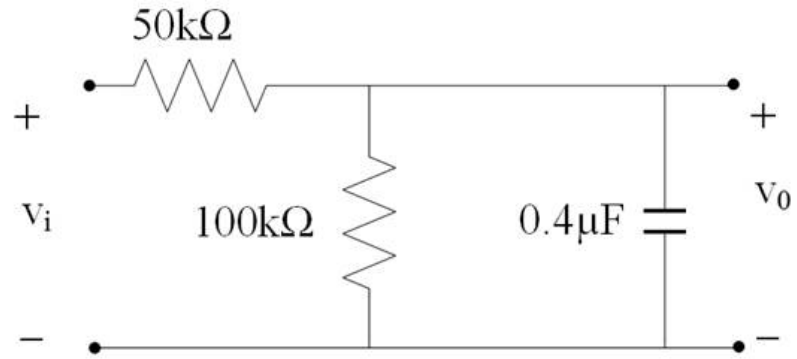
Correct

Marks for this submission: 10.00/10.00.

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 ✓)

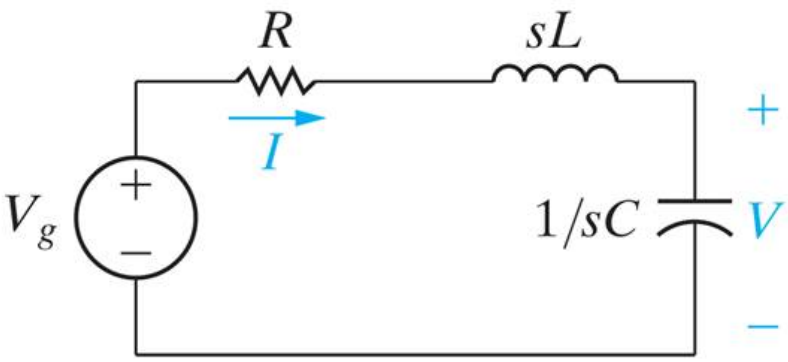
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 15.00 out of 15.00



Q6a

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 defined voltage V in the s domain.

V(s) = 10000 ✓ / [s (s^2 + 125 ✓ s + 1000 ✓]

Correct

Marks for this submission: 15.00/15.00.

Question 7

Correct

Mark 15.00 out of 15.00

Q7c

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)

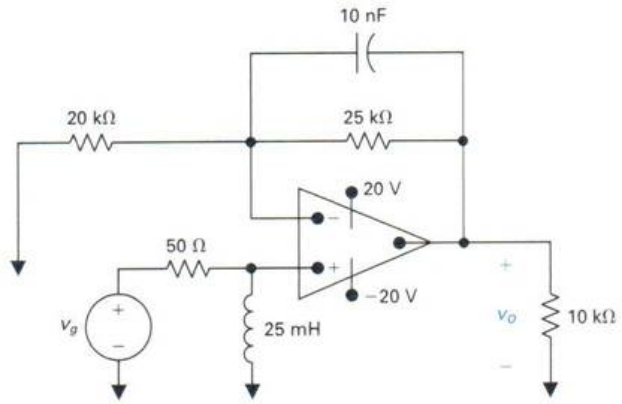
Correct

Marks for this submission: 15.00/15.00.

Question 8

Correct

Mark 15.00 out of 15.00



Q8b

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 $v_g(t) = 18\cos(30{,}000\,t)$ V.

$v_0(t)_{\text{steady-state}}$ = [18.585 ✓ cos (30000 ✓ t + -5.2902 ✓ °)] u(t) V

Correct

Marks for this submission: 15.00/15.00.