Started on	Wednesday, 5 April 2017, 11:03 AM
State	Finished
Completed on	Wednesday, 5 April 2017, 11:42 AM
Time taken	38 mins 48 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. $\frac{\omega^2}{(s+a)^2+\omega^2}$
- c. $\frac{-s^2}{(s+a)^2+\omega^2}$
- d. $\frac{s(s+a)^2}{(s+a)^2+\omega^2}$

Your answer is correct.

$-\frac{a(s+a)+\omega^2}{(s+a)^2+\omega^2}$

The correct answer is: $-\frac{a(s+a)+\omega^2}{(s+a)^2+\omega^2}$

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)

$$f(t)=\left[100e^{-10t}+83.33e^{-5t}\cos(12t+90^\circ)\right]u(t)$$

Correct

Marks for this submission: 15.00/15.00.

Question 3

Correct

Mark 10.00 out of 10.00

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 ✓

Numeric Answer

a) f(t = 0) = 10

b) f(t → ∞) = 0

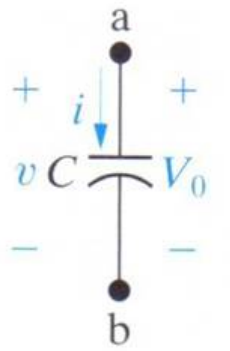
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 10.00 out of 10.00



Q4b

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

Your answer is correct.

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

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

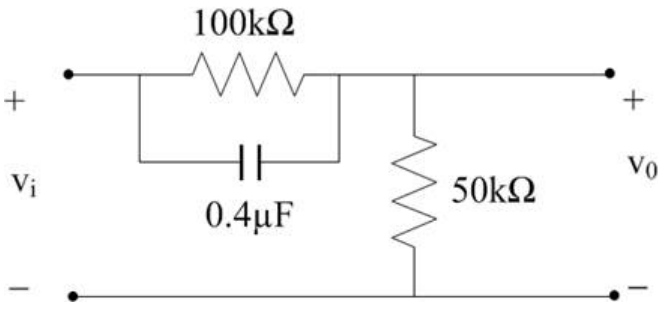
Correct

Marks for this submission: 10.00/10.00.

Question 5

Correct

Mark 15.00 out of 15.00



Q5b

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

H(s) = (s + 25 ✓

) / (s + 75 ✓)

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

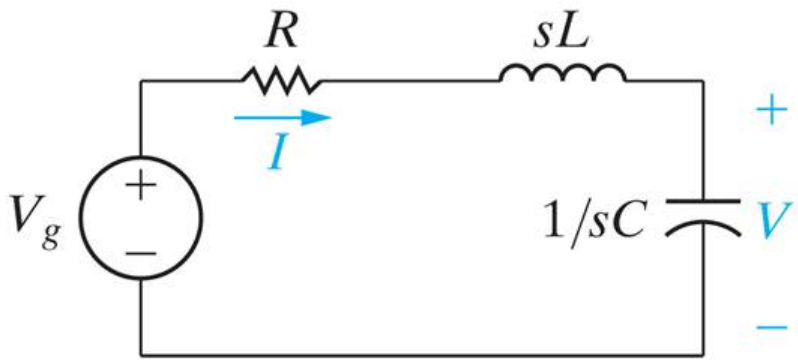
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 15.00 out of 15.00



Q6d

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 the defined current I in the s domain.

I(s) = 25 ✓

/ (s^2 + 250 ✓ s + 500 ✓]

$$I=\frac{25}{s^2+250s+500}$$

Correct

Marks for this submission: 15.00/15.00.

Question 7

Correct

Mark 15.00 out of 15.00

Q7d

Given: $F(s)=\frac{8(s^2-5s+50)}{s(s+10)}$

Find the partial fraction expansion of this transfer function.

F(s) = 40 ✓

/ s + -160 ✓ / (s + 10)

$$F(s)=\frac{8(s^2-5s+50)}{s(s+10)}=\frac{40}{s}+\frac{-160}{s+10}$$

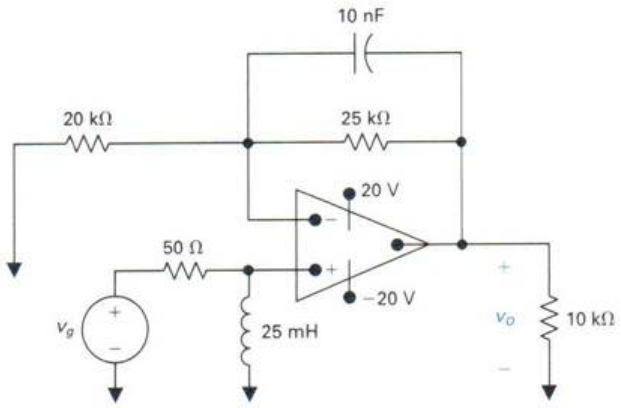
Correct

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.

$v_0(t)_{steady\text{-}state}$ = [14.69 ✓

cos (10000 ✓ t + -8.88 ✓ °)] u(t) V

Numeric Answer

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

Correct

Marks for this submission: 15.00/15.00.