Started on	Wednesday, 5 April 2017, 11:01 AM
State	Finished
Completed on	Wednesday, 5 April 2017, 11:48 AM
Time taken	47 mins 6 secs
Grade	**96.67** out of 100.00

Question 1

Correct

Mark 5.00 out of 5.00

Q1c

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

Select one:

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

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

c. $\frac{2sa}{(s+a)^2+\omega^2}$

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

Your answer is correct.

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

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

Correct

Marks for this submission: 5.00/5.00.

Question 2

Correct

Mark 15.00 out of 15.00

Q2d

Given

$$F(s)=\frac{400}{(s+4)(s^2+4s+5)}=\frac{400}{(s+4)(s+2-j)(s+2+j)}$$

Find the partial fraction expansion of F(s) and then use the Laplace transform tables to find f(t).

f(t) = [80 e -4 t + 178.8 e -2 t cos(1 t + -116 °] u(t)

$$f(t)=\left[80e^{-4t}+178.8854e^{-2t}\cos(t-116.57^\circ)\right]u(t)$$

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

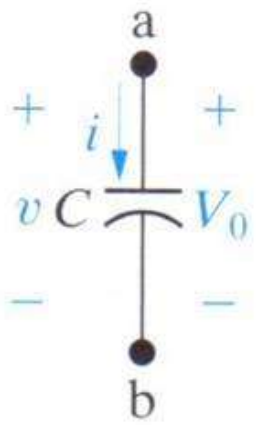
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 6.67 out of 10.00



Q4a

Given: This capacitor has a value of 1 μF (micro F) and has an initial voltage of 15 V at t = 0^-.

Identify the Frequency Domain parallel form of the capacitor

Select one:

a. $V = \frac{1}{s(1\times10^{-6})} + \frac{15}{s}$

b. $I = s(1\times10^{-6})V - 15\times10^{-6}$ ✓

c. $I = s(1\times10^{-3})V - 15\times10^{-3}$

d. $V = \frac{1}{s(1\times10^{-3})} + \frac{15}{s}$

Your answer is correct.

$I = s(1\times10^{-6})V - 15\times10^{-6}$

The correct answer is: $I = s(1\times10^{-6})V - 15\times10^{-6}$

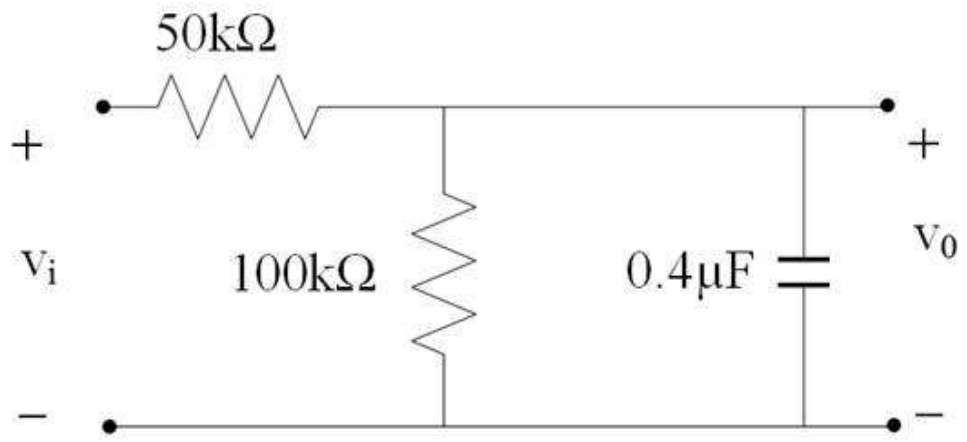
Correct

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 ✓)

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

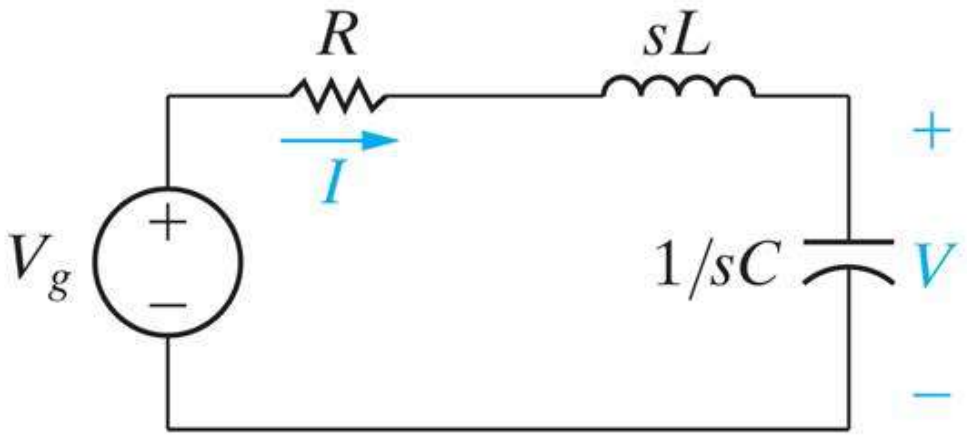
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 15.00 out of 15.00



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 ✓]

$$V(s)=\frac{10{,}000}{s(s^2+125s+1{,}000)}$$

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 ✓ at Angle 11.31 ✓] / (s + 7 – j24)

+ [5 ✓ at Angle -11.31 ✓] / (s + 7 + j24)

State the angle in each case as a positive angle.

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

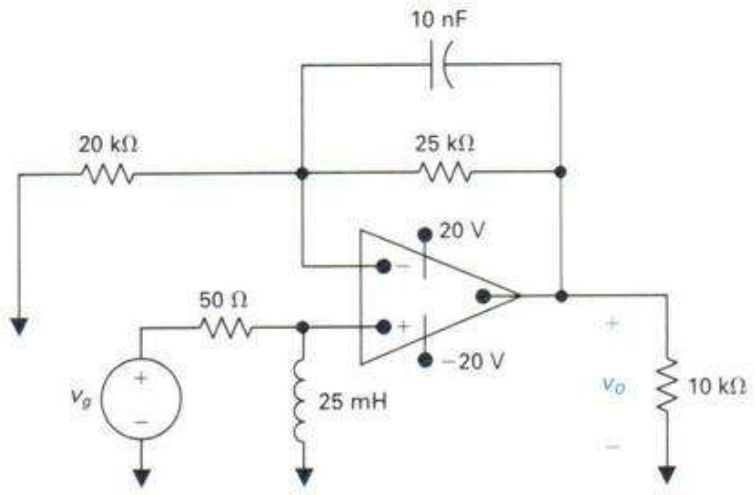
Correct

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.

$v_0(t)_{steady\text{-}state}$ = [14.7 ✓ cos (10000 ✓ t + -8.8 ✓ °)] 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.