Started on	Wednesday, 5 April 2017, 11:00 AM
State	Finished
Completed on	Wednesday, 5 April 2017, 11:50 AM
Time taken	49 mins 49 secs
Grade	**93.33** out of 100.00

Question 1

Correct

Mark 5.00 out of 5.00

Q1d

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

Select one:

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

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

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

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

Correct

Marks for this submission: 5.00/5.00.

Question 2

Correct

Mark 15.00 out of 15.00

Q2b

Given $F(s)=\frac{10(s^2+40)}{(s+8)(s^2+12s+136)}=\frac{10(s^2+40)}{(s+8)(s+6-j10)(s+6+j10)}$

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

f(t) = [10 ✓ e -8 ✓ t + 12 ✓ e -6 ✓ t cos(10 ✓ t + 90 ✓°] u(t)

Correct

Marks for this submission: 15.00/15.00.

Question 3

Correct

Mark 10.00 out of 10.00

Q3a

Given: $F(s)=\frac{7s^2+63s+134}{(s+3)(s+4)(s+5)}$ which has an inverse transform f(t).

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

f(t = 0) = 7 ✓

b) Find the final value of $f(t \to \infty)$

$f(t \to \infty)$ = 0 ✓

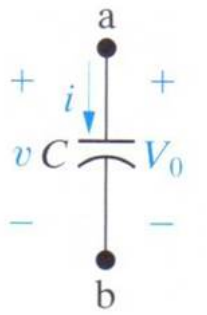
Correct

Marks for this submission: 10.00/10.00.

Question 4

Correct

Mark 3.33 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. $V = \frac{1}{s(1\times10^{-3})} + \frac{15}{s}$

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

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

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

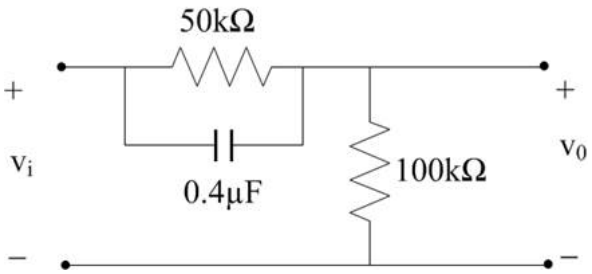
Correct

Marks for this submission: 10.00/10.00. Accounting for previous tries, this gives **3.33/10.00**.

Question 5

Correct

Mark 15.00 out of 15.00



Q5d

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

H(s) = (s + 50 ✓) / (s + 75 ✓)

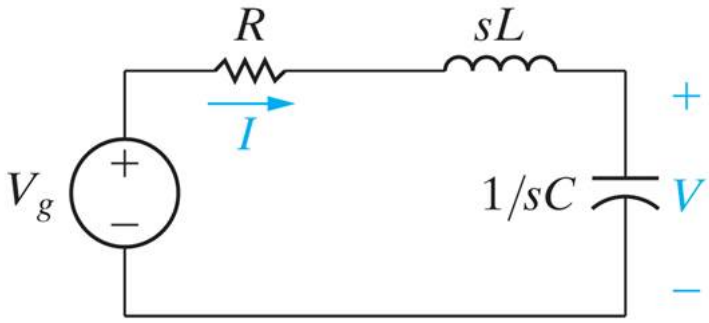
Correct

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]]

Correct

Marks for this submission: 15.00/15.00.

Question 7

Correct

Mark 15.00 out of 15.00

Q7a

Given: $F(s) = \frac{6(3s+11)}{(s+1)(s+2)}$

Find the partial fraction expansion of this transfer function.

F(s) = [48] / (s + 1) + [-30] / (s + 2)

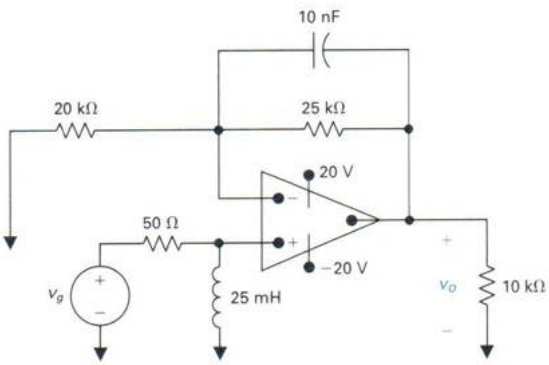
Correct

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.

$v_0(t)_{steady\text{-}state}$ = [[18.8] cos ([30000] t + [-5.29]°)] u(t) V

Correct

Marks for this submission: 15.00/15.00.