Started on	Wednesday, 5 April 2017, 11:01 AM
State	Finished
Completed on	Wednesday, 5 April 2017, 11:44 AM
Time taken	42 mins 52 secs
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 5.00 out of 5.00

Q1a

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

Select one:

a. $\frac{1}{s^2+\omega^2}$

b. $\frac{-\omega^2}{s^2+\omega^2}$ ✓

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

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

Correct

Marks for this submission: 5.00/5.00.

Question 2

Correct

Mark 15.00 out of 15.00

Q2c

Given

$$F(s)=\frac{25(s+3)}{(s+6)(s^2+6s+25)}=\frac{25(s+3)}{(s+6)(s+3-j4)(s+3+j4)}$$

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

f(t) = [-3 ✓ e -6 ✓ t + 5 ✓ e -3 ✓ t cos(4 ✓ t + -53.13 ✓ °] 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 ✓

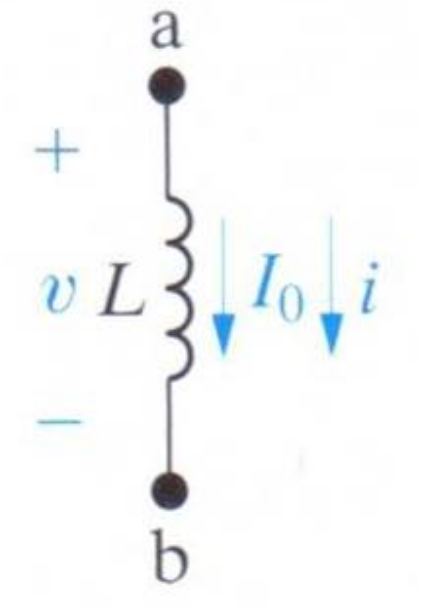
Correct

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. $V = s(1\times10^{-6})(10) - 0.0001$

d. $I = \frac{V}{s(10\times10^{-6})} + \frac{10}{s}$

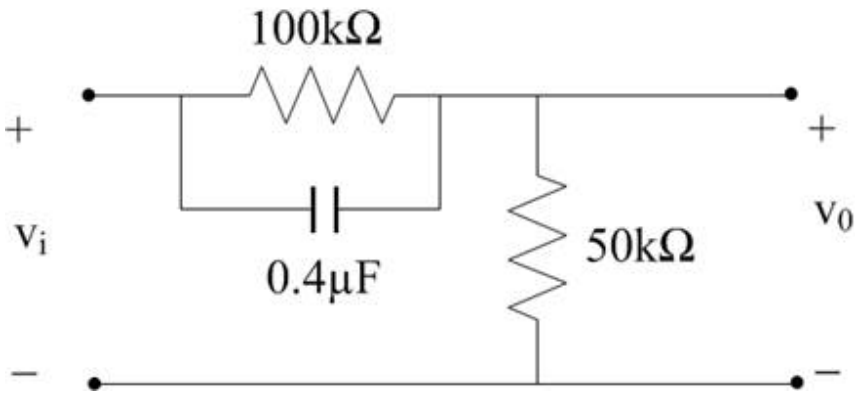
Correct

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 ✓)

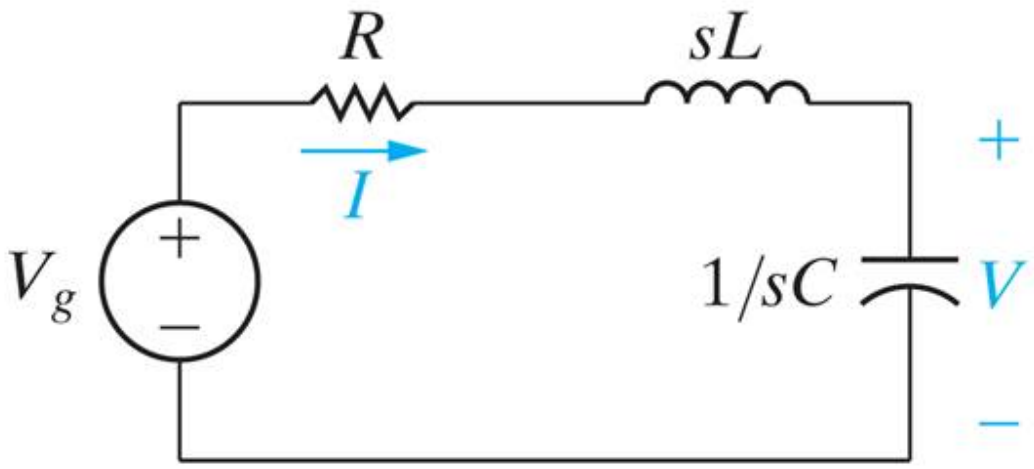
Correct

Marks for this submission: 15.00/15.00.

Question 6

Correct

Mark 15.00 out of 15.00



Q6b

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 defined voltage V in the s domain.

V(s) = 12500 ✓ / [s (s^2 + 250 ✓ s + 500 ✓]

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)

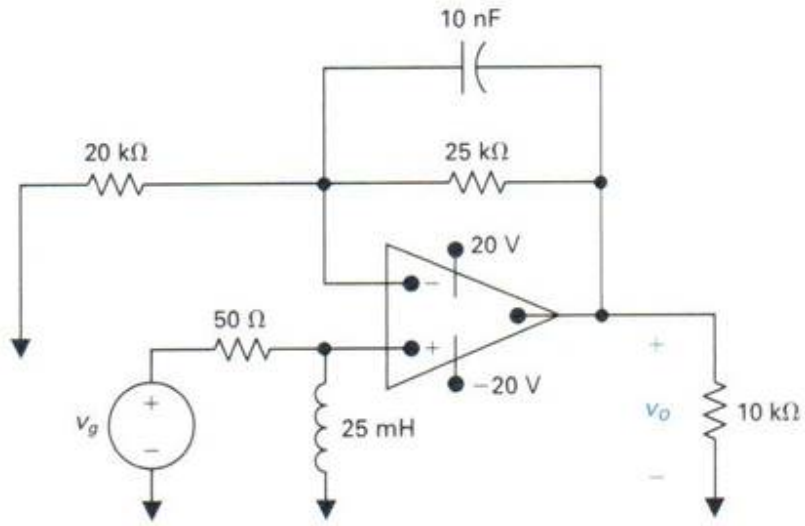
Correct

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.

$v_0(t)_{\text{steady-state}}$ = [18.6 ✓ cos (30000 ✓ t + -5.3 ✓ °)] u(t) V

Correct

Marks for this submission: 15.00/15.00.