Started on	Thursday, 19 August 2021, 12:20 PM
State	Finished
Completed on	Thursday, 19 August 2021, 1:35 PM
Time taken	1 hour 14 mins
Grade	**14.01** out of 25.00 (**56**%)

Question **1**

Partially correct

Mark 4.28 out of 4.50

Answer the questions below, (**Insert the numerical value only, do not use <,>,+, *, or /**)

The Relative error for your answer should be less than 0.01, which means if the answer was 50, then the error should not exceed 50*0.01= ±0.5!

if the answer was 230, then the error should not exceed 230*0.01= ±2.3!

if the answer was 2.31467*10^-3, then you should enter this value: 0.00231467, not this 0.0023 !!!!

Find the state equation only in phase-variable form for the following transfer function:

$T(S)=[8S+20]/[2S^4+16S^3+34S^2+6S+8]$

Follow this order:

$$\begin{bmatrix} d/dt(x1) \\ d/dt(x2) \\ d/dt(x3) \\ d/dt(x4) \end{bmatrix} = \begin{bmatrix} (1.1) & (1.2) & (1.3) & (1.4) \\ (2.1) & (2.2) & (2.3) & (2.4) \\ (3.1) & (3.2) & (3.3) & (3.4) \\ (4.1) & (4.2) & (4.3) & (4.4) \end{bmatrix} * \begin{bmatrix} x1 \\ x2 \\ x3 \\ x4 \end{bmatrix} + \begin{bmatrix} (1) \\ (2) \\ (3) \\ (4) \end{bmatrix} * r$$

according to the above arrangement of the matrix,

the value of (1.1) is: 0

One possible correct answer is: 0

the value of (1.2) is: 1

One possible correct answer is: 1

the value of (1.3) is: 0

One possible correct answer is: 0

the value of (1.4) is: 0

One possible correct answer is: 0

the value of (2.1) is: 0

One possible correct answer is: 0

the value of (2.2) is: 0

One possible correct answer is: 0

the value of (2.3) is: 1

One possible correct answer is: 1

the value of (2.4) is: 0

One possible correct answer is: 0

the value of (3.1) is: 0

One possible correct answer is: 0

the value of (3.2) is: 0

One possible correct answer is: 0

the value of (3.3) is: 0

One possible correct answer is: 0

the value of (3.4) is: 1

One possible correct answer is: 1

the value of (4.1) is: -4

One possible correct answer is: -4

the value of (4.2) is: -3

One possible correct answer is: -3

the value of (4.3) is: -17

One possible correct answer is: -17

the value of (4.4) is: -8

One possible correct answer is: -8

the value of (1) is: 0

One possible correct answer is: 0

the value of (2) is: 0

✔

One possible correct answer is: 0

the value of (3) is: 0

✔

One possible correct answer is: 0

the value of (4) is: 0.5

✖

One possible correct answer is: 1

Question **2**

Partially correct

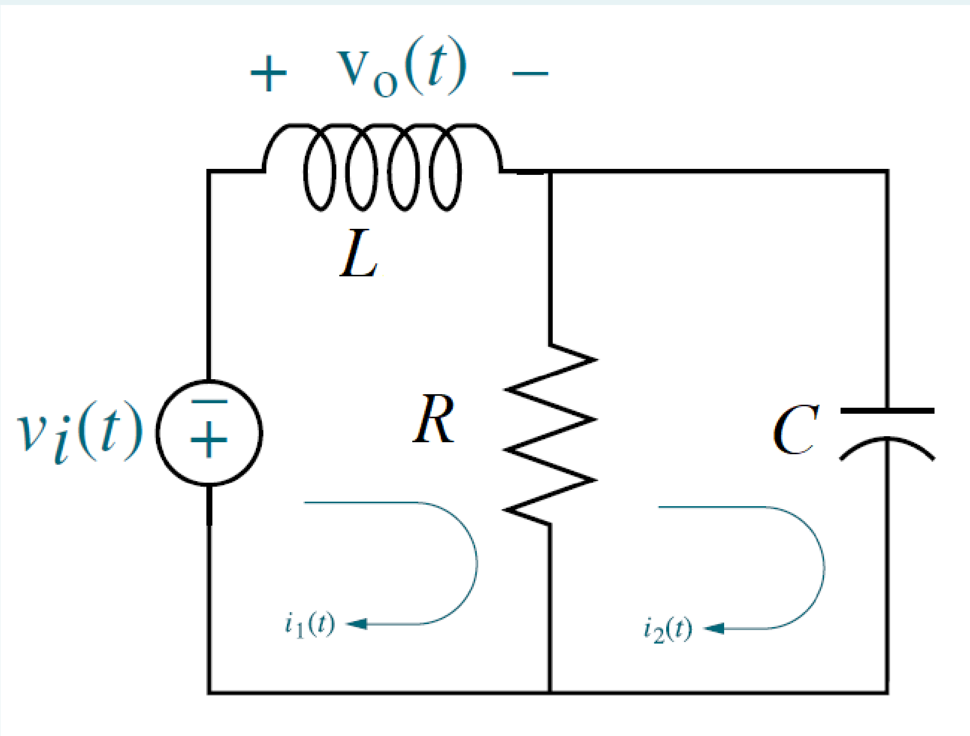
Mark 2.25 out of 4.50

Answer the questions below, (**Insert the numerical value only, do not use <,>,+, *, or /**)

The Relative error for your answer should be less than 0.01, which means if the answer was 50, then the error should not exceed 50*0.01= ±0.5!

if the answer was 230, then the error should not exceed 230*0.01= ±2.3!

if the answer was 2.31467*10^-3, then you should enter this value: 0.00231467, not this 0.0023 !!!!



If R=4 ohm, L=0.072 H, C=0.026 F and $\mathbf{V_i(t)}$=54 Volts.

For this circuit, use mesh analysis in order to find the current $\mathbf{I_1(s)}$, and it can be written in the following form (**NOTE that the coefficient of S^2 is unity**):

$$I_1(s) = \frac{As+B}{s(s^2+Cs+D)}$$

the value of **A** is:

-13.8 ✖

One possible correct answer is: -750

The value of **B** is:

-133. ✖

One possible correct answer is: -7211.5384615385

The value of **C** is:

9.62 ✔

One possible correct answer is: 9.6153846153846

The value of **D** is:

534.1 ✔

One possible correct answer is: 534.18803418803

Question **3**

Partially correct

Mark 1.00 out of 2.00

Answer the questions below, (**Insert the numerical value only, do not use <,>,+, *, or /**)

The Relative error for your answer should be less than 0.01, which means if the answer was 50, then the error should not exceed 50*0.01= ±0.5!

if the answer was 230, then the error should not exceed 230*0.01= ±2.3!

if the answer was 2.31467*10^-3, then you should enter this value: 0.00231467, not this 0.0023 !!!!

The open loop transfer function of a unity feedback system (negative feedback) is $\mathbf{K}(S+7)/[S^3+\mathbf{a}S^2+5S+1]$.

You are asked to fine the positive values of (**K**) and (**a**) such that the system oscillates at frequency of 8 rad/sec.

The value of **K** is:

11.20 ✖

One possible correct answer is: 59

The value of **a** is:

6.508 ✔

One possible correct answer is: 6.46875

Question **4**

Not answered

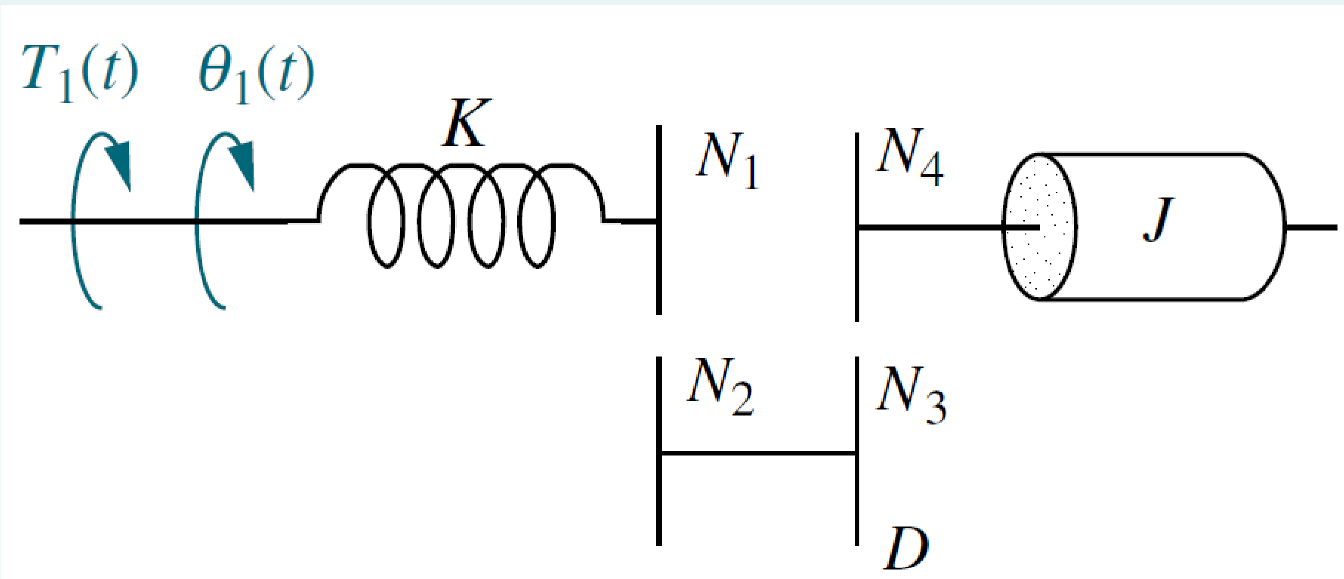
Marked out of 4.50

Answer the questions below, (**Insert the numerical value only, do not use <,>,+, *, or /**)

The Relative error for your answer should be less than 0.01, which means if the answer was 50, then the error should not exceed 50*0.01= ±0.5!

if the answer was 230, then the error should not exceed 230*0.01= ±2.3!

if the answer was 2.31467*10^-3, then you should enter this value: 0.00231467, not this 0.0023 !!!!



For this mechanical system, the parameters are as follow:

K=5, J=13, N1=9, N2=3, N3=6, N4=8, the value of D is unknown.

the transfer function $\frac{\theta_1(s)}{T_1(s)}$ can be written in terms of D in the following form:

$$\frac{\theta_1(s)}{T_1(s)} = \frac{(c1)s^2+(c2)s+(c3)}{(c4)s^2+[(c5)*\boldsymbol{D}]s+(c6)}$$

where c1, c2, c3, c4, c5 and c6 are constants. **the value of c6 is given in order to get a unique solution. So, the value of c6 is 5.**

The value of c1 is:

One possible correct answer is: 0

The value of c2 is:

One possible correct answer is: 0

The value of c3 is:

One possible correct answer is: 1

The value of c4 is:

One possible correct answer is: 65.8125

The value of c5 is:

One possible correct answer is: 9

Find the value of D such that there is 80% overshoot in the system.

the value of D is:

One possible correct answer is: 0.28575082698692

Question **5**

Partially correct

Mark 3.33 out of 5.00

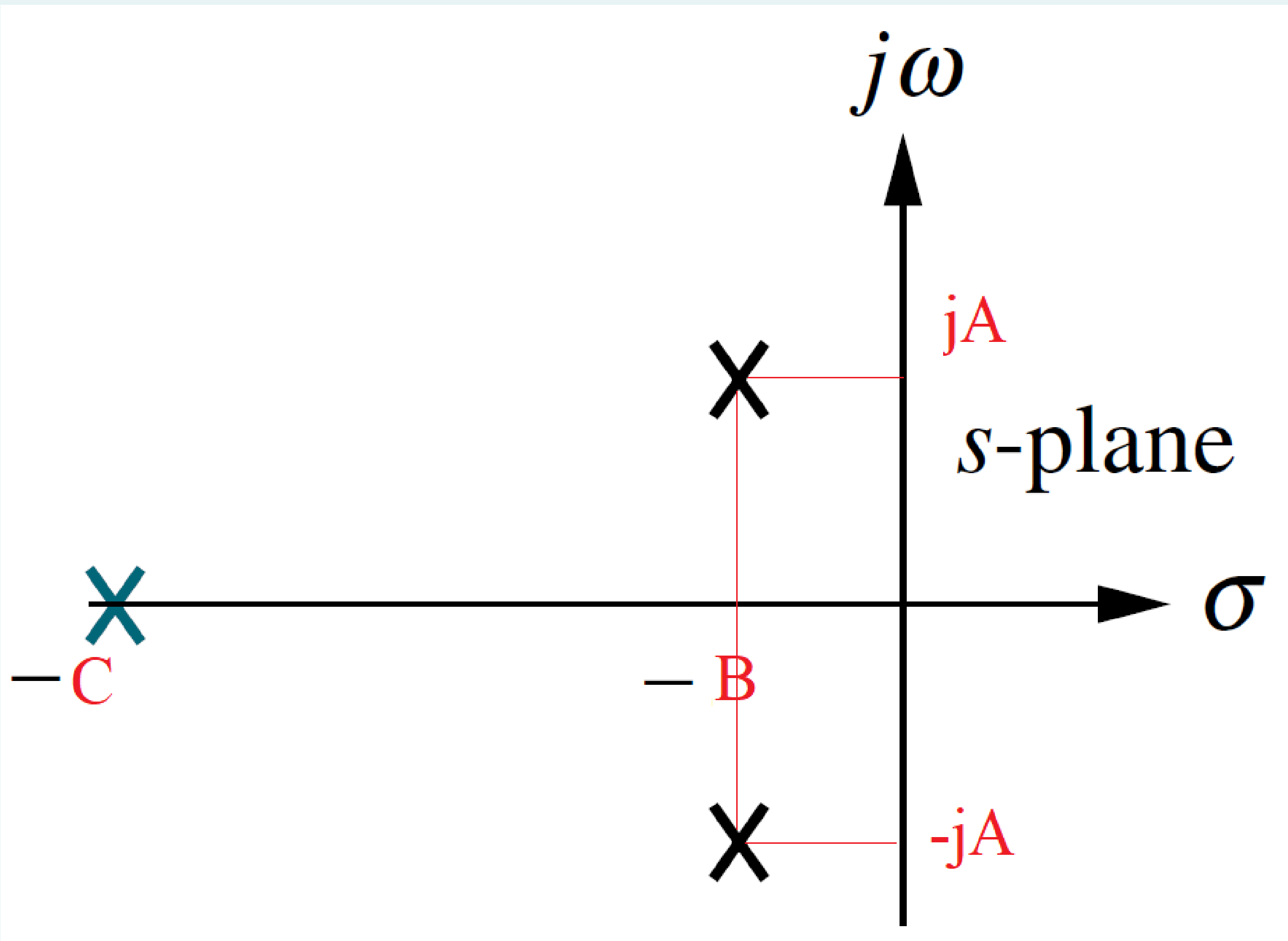
Answer the questions below, (**Insert the numerical value only, do not use <,>,+, *, or /**)

The Relative error for your answer should be less than 0.01, which means if the answer was 50, then the error should not exceed 50*0.01= ±0.5!

if the answer was 230, then the error should not exceed 230*0.01= ±2.3!

if the answer was 2.31467*10^-3, then you should enter this value: 0.00231467, not this 0.0023 !!!!

Assume that a unity feedback system has the closed loop poles in the S-plane as shown in this figure:



the the closed loop system has a unity DC gain, and If the value of A is 36,the value of B is 3 and the value of C is 30. Then, the EXACT closed-loop Transfer function of the system is:

$$T(S) = \frac{k1}{s^3 + (k2)s^2 + (k3)s + (k4)}$$

the value of k1 is:

3915 ✖

One possible correct answer is: 39150

the value of k2 is:

36 ✔

One possible correct answer is: 36

the value of k3 is:

1485 ✔

One possible correct answer is: 1485

the value of k4 is:

3915 ✖

One possible correct answer is: 39150

If the second order approximation is valid, answer the following question, if not, do not solve:

The Natural frequency of the system is: 36.1 rad/sec.

✔

One possible correct answer is: 36.124783736377

the value of the damping ratio is : 0.08

✔

One possible correct answer is: 0.08304547985374

The Settling time is: 1.33 seconds

✔

One possible correct answer is: 1.3333333333333

The Peak time is: 0.08 seconds

✔

One possible correct answer is: 0.087266462599722

The percent overshoot is: 71.8 %

✖

One possible correct answer is: 76.966541249323

Question **6**

Partially correct

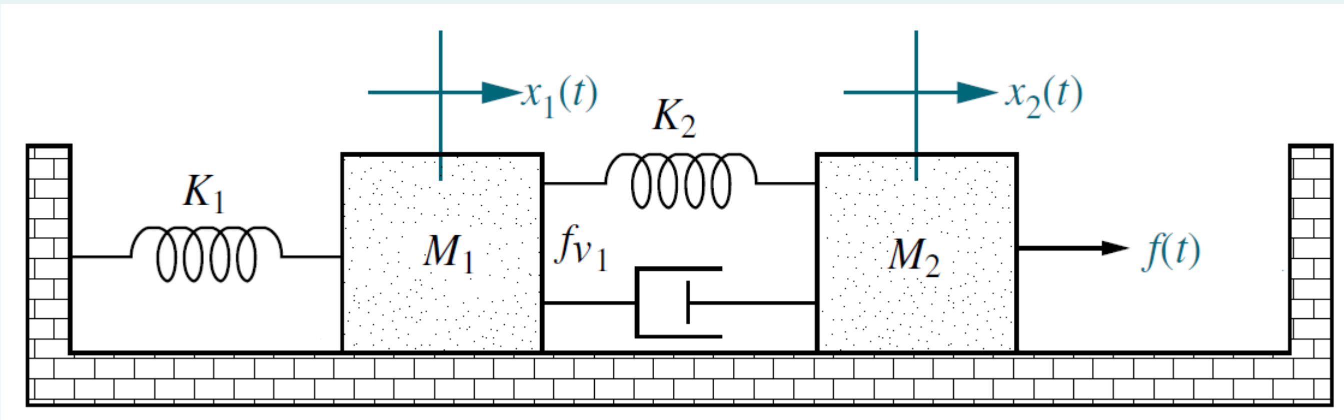
Mark 3.15 out of 4.50

Answer the questions below, (**Insert the numerical value only, do not use <,>,+, *, or /**)

The Relative error for your answer should be less than 0.01, which means if the answer was 50, then the error should not exceed 50*0.01= ±0.5!

if the answer was 230, then the error should not exceed 230*0.01= ±2.3!

if the answer was 2.31467*10^-3, then you should enter this value: 0.00231467, not this 0.0023 !!!!



if M1=3, M2=2, fv1=2, K1=4, K2=2.

Find the state equations for the translational mechanical system shown in Figure.

$$\begin{bmatrix} d/dt(x1) \\ d/dt(v1) \\ d/dt(x2) \\ d/dt(v2) \end{bmatrix} = \begin{bmatrix} (1.1) & (1.2) & (1.3) & (1.4) \\ (2.1) & (2.2) & (2.3) & (2.4) \\ (3.1) & (3.2) & (3.3) & (3.4) \\ (4.1) & (4.2) & (4.3) & (4.4) \end{bmatrix} * \begin{bmatrix} x1 \\ v1 \\ x2 \\ v2 \end{bmatrix} + \begin{bmatrix} (1) \\ (2) \\ (3) \\ (4) \end{bmatrix} * f(t)$$

according to the above arrangement of the matrix,

the value of (1.1) is: 0

✔

One possible correct answer is: 0

the value of (1.2) is: 1

✔

One possible correct answer is: 1

the value of (1.3) is: 0

✔

One possible correct answer is: 0

the value of (1.4) is: 0

✔

One possible correct answer is: 0

the value of (2.1) is: -2

One possible correct answer is: -2

the value of (2.2) is: -0.66

One possible correct answer is: -0.66666666666667

the value of (2.3) is: 0.666

One possible correct answer is: 0.66666666666667

the value of (2.4) is: 0.666

One possible correct answer is: 0.66666666666667

the value of (3.1) is: 0

One possible correct answer is: 0

the value of (3.2) is: 0

One possible correct answer is: 0

the value of (3.3) is: 0

One possible correct answer is: 0

the value of (3.4) is: 1

One possible correct answer is: 1

the value of (4.1) is: -1

One possible correct answer is: 1

the value of (4.2) is: -1

One possible correct answer is: 1

the value of (4.3) is: -1

One possible correct answer is: -1

the value of (4.4) is: -1

✔

One possible correct answer is: -1

the value of (1) is: -1

✖

One possible correct answer is: 0

the value of (2) is:

✖

One possible correct answer is: 0

the value of (3) is:

✖

One possible correct answer is: 0

the value of (4) is:

✖

One possible correct answer is: 0.5

◀ Quiz #6

Jump to...

Data retention summary