CONTROL ENGINEERING (17ME73/15ME73) IAT 1

1 HOUR
50 MARKS

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* Required

The principle of homogeneity and superposition are applied to: *   2 points

- ⦿ Linear systems
- ◯ Time invariant systems
- ◯ Closed Systems
- ◯ Discrete systems

The output of the feedback control system must be a function of: *   2 points

- ◯ Reference input
- ◯ Reference output
- ◯ Output and feedback signal
- ⦿ Input and feedback signal

A linear system at rest is subject to an input signal r(t)=1-exp(-t). The response of the system for t>0 is given by c(t)=1-exp(-2t). The transfer function of the system is: *   2 points

○ (s+2)/(s+1)
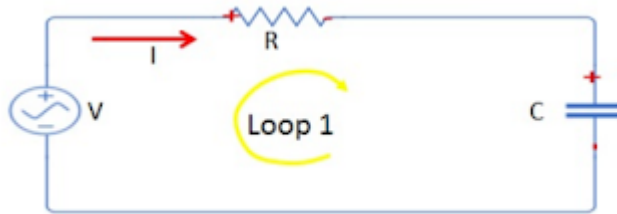
○ (s+1)/(s+2)

◉ 2(s+1)/(s+2)

○ (s+1)/2(s+2)

Zeros of transfer function are the laplace transform variable values which causes the transfer function to become _____ *   2 points

◉ Zero

○ Unity

○ Infinite

○ Average value

What is the equation pertaining to Kirchhoff's voltage law around loop 1 in Fig *   2 points
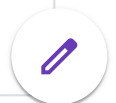

○ V(s) = I(s)[(1/sR) + (1/sC)]

○ V(s) = I(s)[(sR) + (1/C)]

◉ V(s) = I(s)[(R) + (1/sC)]

○ V(s) = I(s)[(R) + (sC)]

Which of the following is a linear system: *   2 points

◉ y(t) = 2t + 5

○ y(t) = t^2 + 5

○ y(t) = t sin(t)

○ y(t) = t(1 + t)

In an open loop control system *   2 points

○ Output is independent of control input

◉ Output is dependent on control input

○ Only system parameters have effect on the control output

○ None of the above

___has tendency to oscillate. *   2 points

○ Open loop system

◉ Closed loop system

○ Both (a) and (b)

○ Neither (a) nor (b)

Any externally introduced signal affecting the controlled output is called a   2 points
*

○ feedback

◉ disturbance

○ signal

○ gain control

A.C. servomotor resembles *   2 points

◉ two phase induction motor

○ Three phase induction motor

○ direct current series motor

○ universal motor

If an impulse response of a system is e-5t, what would be its transfer function? *   2 points

○ 1/ s - 5

● 1/ s + 5

○ (s+1) / (s+5)

○ (s2 - 5s)/ (s-5)

For the transfer function given below, where does the zero of the system lie? G(s) = (5s –1) / (s^2 + 5s + 4) *   2 points

○ s = -1 & s = -1/4

○ s = -4 & s = -1

● s = 1/5

○ s = -1/5

By equating the denominator of transfer function to zero, which among the following will be obtained? *   2 points

● Poles

○ Zeros

○ Both a and b

○ None of the above

For open loop control system which of the following statements is incorrect? *   2 points

○ Less expensive

● Recalibration is not required for maintaining the required quality of the output

○ Construction is simple and maintenance easy
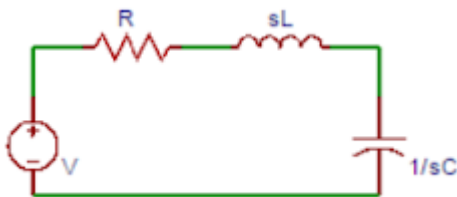
○ Errors are caused by disturbances

The transfer function of a system having the input as X(s) and output as Y(s) is? *   2 points

● Y(s)/X(s)

○ Y(s) * X(s)

○ Y(s) + X(s)

○ Y(s) − X(s)

In the circuit shown below, if current is defined as the response signal of the circuit, then determine the transfer function. *   2 points

○ C/(S^2 LC+RCS+1)

○ SC/(S^2 LC-RCS+1)

● SC/(S^2 LC+RCS+1)

○ SC/(S^2 LC+RCS-1)

Let us assume x (t) = A cos(ωt + φ), then the Laplace transform of x (t) is?   2 points
*

○ X(S)=A(Scos Ø-ω sinØ)/(S^2-ω^2)

○ X(S)=A(Scos Ø+ω sinØ)/(S^2+ω^2)

○ X(S)=A(Scos Ø+ω sinØ)/(S^2-ω^2)

◉ X(S)=A(Scos Ø-ω sinØ)/(S^2+ω^2)

Laplace transform changes the ____ domain function to the _____ domain   2 points
function. *

○ time, time

◉ time, frequency

○ frequency, time

○ frequency, frequency

The relation between current and voltage in case of inductor is? *   2 points

○ v=Ldt/di

◉ v=Ldi/dt

○ v=dt/di

○ v=di/dt

If the poles or zeros are not repeated, then the function is said to be having _____ poles or _____ zeros. * `2 points`

- ○ simple, multiple
- ○ multiple, simple
- ● simple, simple
- ○ multiple, multiple

An automatic toaster is a _____ loop control system. * `2 points`

- ● open
- ○ closed
- ○ partially closed
- ○ any of the above

_____ is a closed loop system. * `2 points`

- ● Auto-pilot for an aircraft
- ○ Direct current generator
- ○ Car starter
- ○ Electric switch

Transfer function for a system is given by : [2(2s+4)(s-5)]/s^5(s^2+2s+2)   2 points
(s+5). What is the gain factor? *

○ 1

○ 2

○ 3

◉ 4

Transfer function for a system is given by : [2(2s+4)(s-5)]/s^5(s^2+2s+2)   2 points
(s+5). What is the number of poles at origin? *

○ 2

○ 6

◉ 5

○ 4

Transfer function for a system is given by : [2(2s+4)(s-5)]/s^5(s^2+2s+2)   2 points
(s+5). What is the order of the system? *

◉ 8

○ 6

○ 4

○ 2

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