UNIT-1

Date: 01-03-21

1) Physical Systems can be represented in mathematical forms.
a) True
b) False

Date: 04-03-21

2) Traffic Light signal is
a) Open Loop System
b) Closed Loop System
c) Both
d) None of the above

3) Servomotor is an
a) Open Loop System
b) Closed Loop System
c) Both
d) None of the above

4) Laplace transform equation for mass
a) F = msX(s)
b) F = m(s*s)X(s)
c) F=mX(s)
d) F=sX(s)

5) Equation for Spring or stiffness
a) F = KX(s)
b) F=KsX(s)
c) F=sX(s)
d) None of the above

6) Equation for dashpot
a) F = CX(s)
b) F = CsX(s)
c) F = sX(s)
d) F = Cs

Date: 6-3-21

7) In dynamic system under consideration, time is independent variable and all other variables that are associated with the system are functions of
a) Input
b) Time
c) Output
d) Both input & output

8) Mathematical visualization of a dynamic system is _____. Where $S(\ )$ – system mapping; $u(t)$ – input and $y(t)$ – output
a) $\boldsymbol{y(t)=S(u(t))}$
b) $u(t)=S(y(t))$
c) $y(t)=S(t)$
d) None of the above

9) A _____ system is one that provides the same output for the same input irrespective of when the input is given.
a) Time varying
b) Non Linear
c) Time Invariant
d) All of the above

10) A causal system is
a) Non anticipative
b) anticipative
c) Both a & b
d) None of the above

11) SISO LTI Causal Dynamic system usually takes the form of
a) Non-linear ordinary differential equation
b) Linear ordinary differential equation with constant coefficients
c) Linear ordinary differential equation
d) Non-linear ordinary differential equation with constant coefficients

Date: 8-3-21

12) In an open loop control system
a) Output is independent of control input
b) Output is dependent on control input
c) Only system parameters have effect on the control output
d) None of the above

13) A control system in which the control action is somehow dependent on the output is known as
a) Closed loop system
b) Semiclosed loop system
c) Open system
d) None of the above

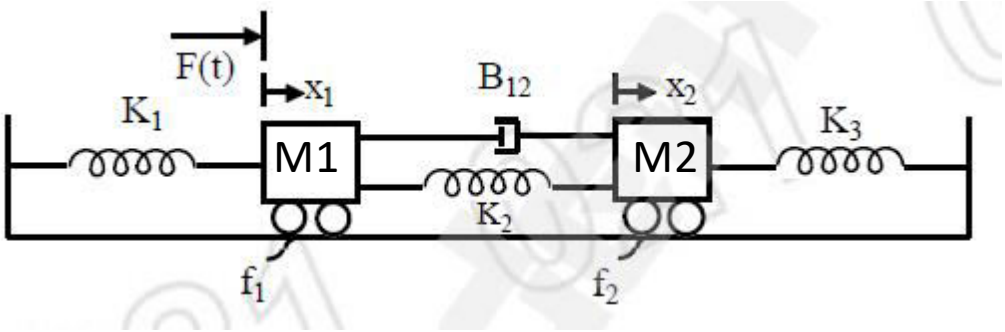
14) An automatic toaster is a _____ loop control system.
a) Closed
b) Open
c) Partially closed
d) Any of the above

Date: 20-3-21

15) Laplace transform equation for Inertia Element (Where T - torque, J - Polar Moment of Inertia, Q - Angular displacement)
a) T(s) = JsQ(s)
b) T(s) = J(s*s)Q(s)
c) T(s) = JQ(s)
d) T(s) = sQ(s)

16) Equation for torsional Spring or torsional stiffness (K)
a) T(s) = KQ(s)
b) T(s) = sQ(s)
c) T(s) = KsQ(s)
d) None of the above

17) Equation for dashpot in case of rotational system
a) F = CX(s)
b) T(s) = CsQ(s)
c) T(s) = sQ(s)
d) F = Cs



18) Which equation is correct for above mechanical system?
a) [(M1*s^2)+(B12*s)+(f1*s)+K1+K2] X1(s) - [(B12*s)+K2] X2(s) = F(s)
b) [(M1*s^2)+(B12*s)+(f1*s)+K1+K2] X1(s) - [(B12*s)+K2] X2(s) = 0
c) [(M1*s^2)+(B12*s)+K1+K2] X1(s) + [(B12*s)+K2] X2(s) = F(s)
d) [(M1*s)+(B12*s)+(f1*s)+K1+K2] X1(s) + [(B12*s)+K2] X2(s) = F(s)

19) Which equation is correct for above mechanical system?
a) [(M2*s^2)+(B12*s)+(f1*s)+K1+K2] X1(s) + [(B12*s)+K2] X2(s) = 0
b) [(B12*s)+K2] X1(s) + [(M1*s^2)+(B12*s)+(f1*s)+K1+K2]X2(s) = 0
c) - [(B12*s)+K2] X1(s) + [(M2*s^2)+(B12*s)+(f2*s)+K2+K3] X2(s) = 0
d) [(B12*s)+K2] X1(s) + [(M2*s^2)+(B12*s)+(f2*s)+K2+K3] X2(s) = 0

Date: 22-3-21

20) Laplace transform equation for resistor
a) V(s) = R I(s)
b) V(s) = R /I(s)
c) V(s) = I(s)/R
d) None of the above

21) Equation for Capacitor
a) V(s) = (1/CS) I(s)
b) V(s) = CS I(s)
c) V(s) = (1/CS)/ I(s)
d) V(s) = C I(s)

22) Equation for Inductor
a) V(t) = L (di/dt)
b) V(s) = L I(s)
c) V(s) = LS I(s)
d) V(s) = (L/S) I(s)

Date: 27-3-2021

23) What will be the transfer function of a body of mass M, in which input quantity is force and output quantity is displacement?
a) sM
b) (s^2)M
c) 1/sM
d) 1/((s^2) M)

24) Mass and Moment of inertia are equivalent quantities.
a) True
b) False

25) Linear and torsional springs are used to provide _____ and _____
a) Restoring force and torque respectively
b) Restoring torque and force respectively
c) Restoring torque only
d) None of the mentioned

26) Restoring force of a spring under stress is F(s) = _____
a) X(s)
b) KX(s)
c) K
d) None of the mentioned

27) Spring is a _____ order system.
a) Zero
b) First
c) Second
d) Third

28) In the control systems output is represented by
a) r(t)
b) c(t)
(c) x(t)
(d) y(t)

UNIT-2

Date: 17-4-2021

1) Any block diagram consist
a) Block & transfer function of element in it
b) Summing & Take-off Point
c) Arrows
d) All of the above

2) Transfer function of simple closed loop system with negative feedback is given by
a) G(s)/ [1 + G(s)H(s)]
b) G(s)/ [1 - G(s)H(s)]
c) G(s)H(s)/ [1 + G(s)H(s)]
d) G(s)/ [G(s)H(s) - 1]

3) The overall transfer function of two blocks in parallel are
a) Sum of individual gain
b) Product of individual gain
c) Difference of individual gain
d) Division of individual gain

4) The block diagram is reduced into simple form by using proper logic such that the output and value of feedback signal should
a) not get changed or disturbed
b) get modified
c) get improve
d) none of the above

5) At summing point, more than one signal can be added or _____
a) Subtracted
b) Multiplied
c) Both a and b
d) None of the above

Date: 19-4-2021

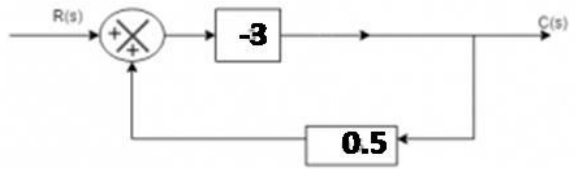
6) Overall transfer function by using Masson's Gain formula is given by
a) $\Sigma(Tk*\Delta k)/\Delta k$
b) $\Sigma(Tk*\Delta k)/\Delta$
c) $\Sigma(Tk*\Delta)/\Delta$
d) None of the above

7) Loop which do not possess any common node are said to be _____ loops.
a) Forward gain
b) Touching loops
c) Non touching loops

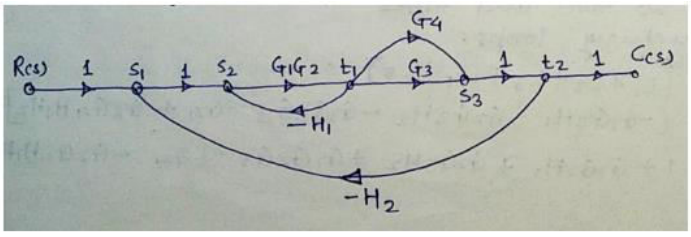
d) Feedback gain

8) Signal flow diagram consist
a) Nodes
b) Branches & transfer function on it
c) Arrows
d) All of the above

9) The closed loop gain of the system shown in the given figure is :



a) -9/5
b) -6/5
c) 6/5
d) 9/5



10) For the signal flow graph shown in figure-2, the number of forward path are _____
a) 2
b) 1
c) 3
d) 4

11) For the signal flow graph shown in figure-2, the number of loops are _____
a) 1
2) 2
3) 3
4) 4

12) For the signal flow graph shown in figure-2, the gain of forward path is
a) G1G2G3 & G1G2G4
b) G1G2G3 & G1G2
c) G1G2 & G1G2G4
d) G1G2G3

13) The direction of flow of signal from output to input is known as
a) Forward path
b) Feedback path
c) Loop
d) Branch

14) Transfer function of simple closed loop system with positive feedback is given by
a) G(s)/ [1 + G(s)H(s)]
b) G(s)/ [1 - G(s)H(s)]
c) G(s)H(s)/ [1 + G(s)H(s)]
d) G(s)/ [G(s)H(s) - 1]

15) In block diagram reduction technique, if the summing point is shifted beyond block having gain 'G', then a block with gain _____ is need to be added beyond which the take-off point is to be shifted in series with all the signals at that take-off point.
a) G
b) GH
c) H/G
d) 1/G

16) Associative law for summing point is applicable only to those summing points which are _____connected to each other.
a) Directly
b) Indirectly
c) Orthogonally
d) Diagonally

17) Signal flow graph is a
a) Bode plot
b) Polar plot
c) Topological representation of a set of differential equation
d) None of the above

18) In block diagram representation, what do the lines connecting the blocks, known as?
a. Branches
b. Nodes
c. Datums
d. Sources

19) The output signal is fed back at the input side from the _____point
a. Summing
b. Differential
c. Take-off
d. All of the above

20) If finite numbers of blocks are connected in series or cascade configuration, then how are the blocks combined algebraically?
a. By addition
b. By multiplication
c. By differentiation
d. By integration

UNIT-3

Date: 6-5-2021

1) The output variation during the time, it takes to achieve its final value is called as
a) Steady state response
b) Transient response
c) Time response
d) All of the above
Ans: b

2) The part of time response which remains after complete transient response vanishes from system output is called as
a) Steady state response
b) Transient response
c) Time response
d) All of the above
Ans: a

3) The various types of input are
a) Step input
b) Ramp input
c) parabolic input
d) All of the above
Ans: d

4) The Laplace transform of step input is given by
a) A/S
b) S
c) A
d) All of the above
Ans: a

5) For under damped system the damping ratio is
a) Equal to one
b) Less than one
c) Greater than one
d) Equal to zero
Ans: b

6) When unit ramp input is applied to the system, the steady state error (Ess) is given by
a) 1/Kv
b) Kv
c) both (a) & (b)
d) None of the above
Ans: a

7) When step input is applied to the Type zero system, the steady state error (Ess) is given by

a) A/K
b) A/(1+K)
c) (1+K)
d) K
Ans: b

8) When unit parabolic input is applied to the system, the steady state error (Ess) is given by
a) 1/Kv
b) 1/Ka
c) both (a) & (b)
d) None of the above
Ans: b

9) Type zero system follows
a) Step Input
b) Ramp Input
c) Parabolic Input
d) All of the above
Ans: a

10) Type two system follows
a) Step Input
b) Ramp Input
c) Parabolic Input
d) All of the above
Ans: d

11) Type One system follows
a) Step Input
b) Ramp Input
c) Parabolic Input
d) both (a) & (b)
Ans: d

12) Type One system does not follows
a) Step Input
b) Ramp Input
c) Parabolic Input
d) both (a) & (b)
Ans: c

13) The time required for the response to reach its peak value is called
a) Rise time
b) Settling time
c) Peak time
d) Delay time
Ans: c

14) Which among the following is represented by a parabolic input signal?
a) Position
b) Force
c) Velocity
d) Acceleration
Ans: d

15) For Underdamped system, the time required to reach from 0 to 100% of the final value is called as ____
a) Rise time
b) Settling time
c) Peak time
d) Delay time
Ans: a

16) The error coefficients involved in steady state error analysis are
a) Potential error coefficient
b) Velocity error coefficient
c) Acceleration error coefficient
d) All of the above
Ans: d

17) The output response from the first order system when unit step input applied to it is _____
a) C(t) = 1 – e^(t)
b) C(t) = 1 – e^(t/T)
c) C(t) = 1 – e^(-t/T)
d) C(t) = 1 – e^(T)
Ans: c

18) The largest error between reference input and output during the transient period is called as
a) Rise time
b) Peak Overshoot
c) Delay time
d) Overshoot
Ans: b

19) For underdamped system, the damping ratio is
a) less than one
b) greater than one
c) equal to one
d) None of the above

20) For overdamped system, the damping ratio is
a) less than one
b) greater than one
c) equal to one
d) None of the above

21) For critically damped system, the damping ratio is
a) less than one

b) greater than one
c) equal to one
d) None of the above

22) The time required for the response to reach 50% of its final value in the first attempt is called as
a) Delay time
b) Peak time
c) Rise time
d) Settling time

23) Rise time is given by (where "ωd" is damped frequency of the system)
a) $Tr = (\pi - \theta)/(\omega d)$
b) $Tr = (\pi + \theta)/(\omega d)$
c) $Tr = (\pi\ \theta)/(\omega d)$
d) None of the above

24) The time required for the response to reach its peak value is given by (where "ωd" is damped frequency of the system and "ωn" is natural frequency of the system)
a) $Tp = \theta/(\omega d)$
b) $Tp = \pi/(\omega d)$
c) $Tp = \pi\theta/(\omega d)$
d) $Tp = \pi/(\omega n)$

UNIT-4

Date: 17-05-21

1) Routh Hurwitz criterion gives
a) Number of roots in the right half of s-plane
b) Value of roots
c) Number of roots in the left half of s-plane
d) None of the above
Ans: a

2) If there is sign change in first column of Routh Array, then the system is
a) Stable
b) Unstable
c) both (a) & (b)
d) None of the above

3) If there is no sign change in first column of Routh Array, then the system is
a) Stable
b) Unstable
c) both (a) & (b)
d) None of the above

4) If there are two sign change in first column of Routh Array, then
a) One root lies on right half of S-plane
b) Two roots lie on left half of S-plane
c) Two roots lie on right half of S-plane
d) All roots lie on right half of S-plane

Date: 20-05-21

Date: 24-05-21

5) The order of the auxiliary polynomial is always:
a) Even
b) Odd
c) May be even or odd
d) None of the mentioned

6) The characteristic equation of a system is given as3s4+10s3+5s2+2=0. This system is:
a) Stable
b) Marginally stable
c) Unstable
d) Linear

7) Routh Hurwitz criterion cannot be applied when the characteristic equation of the system containing coefficient's which is/are
a) Exponential function of s
b) Sinusoidal function of s

c) Complex
d) Exponential and sinusoidal function of s and complex

Root Locus

Sessional-2

1) For G(s)H(s) = {s(s+1)(s+2)}/{(s+3)(s+5)}
a) Poles are 3, 5
b) zeros are 0, 1, 2
c) Zeros 1, 2
d) Both (a) & (b)

2) In root locus branch terminates at
a) Pole
b) zero
c) None of the above
d) Both (a) & (b)

3) In root locus branch start from
a) Zero
b) Pole
c) None of the above
d) Both (a) & (b)

4) For drawing root locus, _____branches approach to infinity.
a) P-Z
b) P+Z
c) P/Z
d) P*Z

5) The root locus is always
a) Different in right & left half of s-plane
b) Unsymmetrical about the real axis
c) Symmetrical about the real axis
d) Symmetrical about the imaginary axis

Date:

Date: 31-5-21

1 Which one of the following is not the property of root loci?
a) The root locus is symmetrical about imaginary axis
b) They start from the open loop poles and terminate at the open loop zeroes
c) The root locus is symmetrical about real axis

d) Segments of the real axis are the part of the root locus if, the total number of real poles and zeroes to their right is odd.

2) Segments of the real axis are the part of the root locus if, the total number of real poles and zeroes to their right is
a) Even
b) Odd
c) Number of pole equal to number of zero
d) None of the above

3) What is the number of the root locus segments which do not terminate on zeroes?
a) The number of poles
b) The number of zeroes
c) The difference between the number of poles and zeroes
d) The sum of the number of poles and the number of the zeroes

4) Which one of the following is correct?
The root locus is the path of the roots of the characteristic equation traced out in the s-plane?
a) As the input of the system is changed
b) As the output of the system is changed
c) As a system parameter (resultant gain) is changed
d) As the sensitivity is changed

5) When the number of poles is equal to the number of zeroes, how many branches of root locus tends towards infinity?
a) 0
b) 1
c) 2
d) Equal to number of zeroes

Date: 5-6-21

1) If there are adjacent poles on the real axis, and the root locus exist between these adjacent poles, then
a) the breakaway point exist between these adjacent poles
b) the breakaway point does not exist between these adjacent poles
c) the breakaway point exist at the poles
d) None of the above

2) If there are adjacent zeros on the real axis, and the root locus exist between these adjacent zeros, then
a) the breakaway point exist between these adjacent zeros
b) the breakaway point does not exist between these adjacent zeros
c) the breakaway point exist at the zeros
d) None of the above

3) At complex conjugate poles, there is
a) angle of arrival
b) angle of departure
c) Both (a) & (b)
d) None of the above

4) At complex conjugate zeros, there is
a) angle of arrival
b) angle of departure
c) Both (a) & (b)
d) None of the above

5) Centroid of asymptotes lies at
a) c = (sum of real part of poles – sum of real part of zeros)/(P-Z)
b) c = (sum of real part of poles – sum of real part of zeros)/P
c) c = (sum of real part of poles + sum of real part of zeros)/(P-Z)
d) c = (sum of real part of poles – sum of real part of zeros)/(Z)

Unit: 5
Date: 07/6/21

Date: 10/6/21

1) The system stability can be checked by using
a) Routh Array
b) Root Locus
c) Bode Plot
d) All of the above

2) Unit of magnitude in Bode plot is
a) m
b) dB
c) Kg
d) gm

3) If gain cross over frequency is less than phase cross over frequency then
a) System is stable
b) System is unstable
c) System is marginally stable
d) None of the above

4) If gain cross over frequency is greater than phase cross over frequency then
a) System is stable
b) System is unstable
c) System is marginally stable
d) None of the above

5) If gain cross over frequency is equal to phase cross over frequency then
a) System is stable
b) System is unstable
c) System is marginally stable
d) None of the above

29) If the constant 'k' is positive, then what would be its contribution on the phase plot?
a) 0 degree
b) 45 degree
c) 90 degree
d) 180 degree

30) A system is marginally stable when
a) Gain Margin positive
b) Gain Margin & Phase Margin both negative
c) Phase Margin negative
d) Gain cross over frequency is equal to Phase cross over frequency

31) Phase cross over frequency is the frequency at which phase angle of $G(j\omega)H(j\omega)$ is
a) 90 degree
b) -180 degree
c) 45 degree
d) 0 degree

32) At which frequency does the magnitude of the system becomes zero dB?
a) Resonant frequency
b) Cut-off frequency
c) Gain crossover frequency
d) Phase crossover frequency

33) The corner frequency (in rad/sec) of the transfer function [1/(4s+1)] is
a) 1
b) 0.25
c) 4
d) None of the above

34) If gain cross over frequency is less than phase cross over frequency then
a) System is stable
b) System is unstable
c) System is marginally stable
d) None of the above

32) At which frequency does the magnitude of the system becomes zero dB?
a) Resonant frequency
b) Cut-off frequency
c) Gain crossover frequency
d) Phase crossover frequency

34) The polar plot of a transfer function passes through the critical point (-1,0). Gain margin is
a) Zero
b) -1dB
c) 1dB
d) Infinity

12. OLTF contains one zero in right half of s-plane then
a) Open loop system is unstable
b) Close loop system is unstable
c) Close loop system is unstable for higher gain
d) Close loop system is stable

15. The roots of the characteristic equation of the second order system in which real and imaginary part represents the :
a) Damped frequency and damping
b) Damping and damped frequency
c) Natural frequency and damping ratio
d) Damping ratio and natural frequency

Unit-VI

36) A system is said to be_____ if it is possible to transfer the system state from any initial state to any desired state in finite interval of time.
a) Controllable
b) Observable
c) Cannot be determined
d) Controllable and observable

37) A system is said to be_____ if every state can be completely identified by measurements of the outputs at the finite time interval.
a) Controllable
b) Observable
c) Cannot be determined
d) Controllable and observable

38) Which among the following plays a crucial role in determining the state of dynamic system?
a) State variables
b) State vector

c) State space
d) State scalar

39) To increase damping of pair of complex roots compensator used is
a) Phase lag
b) Phase lead
c) Phase lag lead
d) One with 60° lead circuit

40) If a pole is added to a system it causes
a) Lag compensation
b) Lead compensation
c) Lead-lag compensation
d) None of these