SEM 5 CE Question Bank

1. In open loop control system

A. Output is independent of control input
B. Output is dependent of control input
C. Only system parameters have effect on the control output
D. None of the above

2. Which of the following is an open loop control system?
A. Field controlled D.C. motor
B. Ward leonard control
C. Metadyne
D. Stroboscope

3. In open loop control system

A. The control action depends on the size of the system
B. The control action depends on system variables
C.. The control action depends on the input signal
D. The control action is independent of the output

4. An automatic toaster is a .....loop control system

A. Open
B. Closed
C. Partially closed
D. Any of the above

5. For open loop control system which of the following statements is incorrect?

A. Less expensive
B. Recalibration is not required for maintaining the required quality of the output
C. Construction is simple and maintenance easy
D. Errors are caused by disturbances

6. The root locus of the plots of the variations of the poles of the closed loop system function with changes in
A. Open loop gain
B. Open loop poles
C. Closed loop zeros
D. None of the above

7. What is the number of root locus segments which do not terminate on zeros?

A. The number of poles
B. The number of zeros
C. The difference between the number of holes and the number of zeros
D. The sum of the number of poles and the number of zeros

8. For the equation, s3 - 4s2 + s + 6 = 0 the number of roots in the left half of s-plane will be

A. Zero
B. One
C. Two
D. Three

9. How many roots with positive real parts do the equation s3 + s2 + s + 1 = 0 have?

A. Zero
B. One
C. Two
D. Three

10. Which one of the following open-loop transfer functions has root locus parallel to imaginary axis?

A. k / (s + 1)
B. k / (s + 1) / (s + 1)2
C. k / (s + 1)2
D. k / (s + 12) / (s + 1)2

11. The bode plot is used to analyse which of the following?

A. Minimum phase network
B. Lag lead network
C. Maximum phase network
D. All phase network

12. The bode plot is applicable to.....network.

A. Maximum phase
B. Minimum phase
C. All phase
D. None of the above

13. The bode plot is a plot relating log w with magnitude in decible and.....

A. Phase angle
B. 900
C. 1800
D. None of the above

14. From bode plot .....coefficient cannot be determined.

A. Different error
B. Static error
C. Both A and B
D. None of the above

15. If the initial conditions for a system are inherently zero, what does it physically mean?

A. The system is at rest but stores energy
B. The system is working but does not store energy
C. The system is at rest or no energy is stored in any of its parts
D. The system is working with zero reference input

16. A system can be completely described by a transfer function if it is

A. Nonlinear and continuous
B. Linear and time-varying
C. Nonlinear and time-invariant
D. Linear and time-invariant

17. Linear system obeys

A. Principle of maximum power transfer
B. Reciprocity principle
C. Principle of superposition
D. All of these

18. the system described by the equation $y = a + bx$, $a > 0$, $b > 0$ is

A. Dynamic
B. Linear
C. Nonlinear
D. Time-varying

19. If the poles of a system lie on the imaginary axis, the system will be

A. Stable
B. Conditionally stable
C. Marginally stable
D. Unstable

20. Presence of nonlinearities in a control system tends to introduce

A. Transient error
B. Instability
C. Steady state error
D. All of these

21) State model representation is possible using _____
a. Physical variables
b. Phase variables
c. Canonical state variables
d. All of the above

22) Which among the following constitute the state model of a system in addition to state equations?
a. Input equations
b. Output equations
c. State trajectory
d. State vector

23) 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

24) Which among the following are the interconnected units of state diagram representation?
a. Scalars
b. Adders
c. Integrators
d. All of the above

25) State space analysis is applicable even if the initial conditions are _____
a. Zero
b. Non-zero
c. Equal
d. Not equal

26. The input to a controller is

A. Sensed signal
B. Error signal
C. Desired variable value
D. Signal of fixed amplitude not dependent on desired variable value

27. For a linear time invariant system, an optimal controller can be designed if
A. The system is controllable and observable

B. The system is uncontrollable but stable
C. The system is unstable but observable
D. The system is stable but unobservable

28. The on-off controller is a.....system

A. Digital
B. Linear
C. Non-linear
D. Discontinuous

29. A controller is basically a.....
A. Sensor
B. Comparator
C. Amplifier
D. Clipper

30. In root locus plot different roots have the same

A. Phase
B. Gain
C. Both A and B
D. Gain margin and phase margin

31. Which of the following is exhibited by Root locus diagrams?

A. The poles of the transfer function for a set of parameter values
B. The bandwidth of the system
C. The response of a system to a step input
D. The frequency response of a system

32. The breakaway points of a root locus occur at

A. Imaginary axis
B. Real axis
C. Multiple routes of characteristic equation
D. None of the above

33. Which of the following statements is incorrect for root locus technique?

A. It is most useful for single input single output systems
B. It provides the pattern of movement of closed loop holes when open loop gain varies
C. It is used to obtain closed-loop pole configuration from open-loop poles and zeros

D. None of the above

34. If the root locus branches cross the imaginary axis the system becomes

A. Over damped
B. Critically damped
C. Stable
D. Unstable

35. The root locus is the part of roots of the characteristic equation traced out in the S plane. Which one of the following is correct?

A. As the input of the system is changed
B. As the output of the system is changed
C. As a system parameter is changed
D. As the sensitivity is changed

36. A control system has G (s) H (s) = K / [s (s + 4) (s2 + 4s + 20) (0 < K)< ∞) What is the number of breakaway points in the root locus diagram ?

A. One
B. Two
C. Three
D. Zero

37. for root loci which of the following are the starting points?

A. Open loop zeros
B. Closed loop zeros
C. Closed loop poles
D. Open loop poles

38. At which of the following root loci will end?

A. Open loop zeros
B. Closed loop zeros
C. Closed loop poles
D. Open loop poles

39. The root loci of a system have three asymptotes. The system can have

A. Five poles and two zeros
B. For pole and one zero
C. Three poles
D. All of the above

40. The most commonly used input signal in control system is/are

A. Step function
B. Ramp or velocity function
C.Accelerating function
D. All of the above

41. What is the characteristic of a good control system?

A. Sensitive to parameter variation
B. Insensitive to input commands
C. Neither sensitive to parameter variation nor sensitive to input commands
D. Insensitive to parameter variation nor sensitive to input commands

42. Feedback control systems are

A. Insensitive to both forward and feedback path parameter changes
B. Less sensitive to feedback path parameter changes than to forward path parameter changes
C. Less sensitive to forward path parameter changes than to feedback path parameter changes
D. Equally sensitive to forward and feedback path parameter changes

43. In a control system the use of negative feedback

A.. Eliminates the chances of instability
B. Increases the reliability
C. Reduces the effects of disturbance and noise signals in the forward path
D. Increases the influence of variations of component parametres on the system performance

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

a. 1/ s - 5
b. 1/ s + 5
c. (s+1) / (s+5)
d. (s2 - 5s)/ (s-5)

45) Which among the following are the elements of rotational motion?

a. Mass, Spring, Friction
b. Inertia, Damper, Spring

c. Work, Energy, Power
d. Force, Pressure, Viscocity

46) Match the following notations with their meanings:

A. G(s) ---------- 1) Laplace of error signal
B. H(s) ---------- 2) Laplace of output signal
C. C(s) ---------- 3) Forward transfer function
D. E(s) ---------- 4) Feedback transfer function

a. A- 2, B- 3, C- 1, D- 4
b. A- 3, B- 4, C- 2, D- 1
c. A- 2, B- 3, C- 4, D- 1
d. A- 1, B- 2, C- 3, D- 4

47) Consider the equation S3 + 3s2 + 5s + 2 = 0. How many roots are located in left half of s-plane?
a. Zero
b. Two
c. Three
d. Four

48) If the system is represented by characteristic equation s6 + s4 + s3 + s2 + s + 3 = 0, then the system is_____
a. Stable
b. Unstable
c. Marginally stable
d. Unpredictable

49) If poles are added to the system, where will the system tend to shift the root locus?
a. To the left of an imaginary axis
b. To the right of an imaginary axis
c. At the center
d. No shifting takes place

50) For a unity feedback system with G(s) = 10 / s2, what would be the value of centroid?
a. 0
b. 2
c. 5
d. 10

51) The frequency at which the phase of the system acquires ____ is known as 'Phase crossover frequency'.

a. 90°
b. -90°
c. 180°
d. -180°

52) 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

53) If the phase angle at gain crossover frequency is estimated to be -105°, what will be the value of phase margin of the system?

a. 23°
b. 45°
c. 60°
d. 75°

54) The system is said to be marginally stable, if gain margin is _____

a. 0
b. 1
c. +∞
d. None of the above

55) If the constant 'k' is positive, then what would be its contribution on the phase plot?

a. 0°
b. 45°
c. 90°
d. 180°

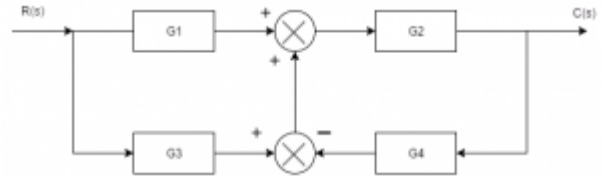
56) If the unity feedback system is given by the open loop transfer function G(s) = ks2 / [(1 + 0.3s) (1+ 0.05s)], what would be the initial slope of magnitude plot?

a. 20 dB/decade
b. 40 dB/decade
c. 60 dB/decade
d. Unpredictable

57) If the system is represented by G(s) H(s) = k (s+7) / s (s +3) (s + 2), what would be its magnitude at ω = ∞?

a. 0
b. ∞
c. 7/10
d. 21

58)



If the transfer function of the system is given by T(s)=G1G2+G2G3/1+X. Then X is:
a) G2G3G4
b) G2G4
c) G1G2G4
d) G3G4

59. The advantage of block diagram representation is that it is possible to evaluate the contribution of each component to the overall performance of the system.
a) True
b) False

60. The overall transfer function from block diagram reduction for cascaded blocks is :
a) Sum of individual gain
b) Product of individual gain
c) Difference of individual gain
d) Division of individual gain

61. 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

62. Transfer function of the system is defined as the ratio of Laplace output to Laplace input considering initial conditions_____
a) 1
b) 2
c) 0
d) infinite

63) The root locus of the plots of the variations of the poles of the closed loop system function with changes in

a) Open loop gain
b) Open loop poles
c). Closed loop zeros
d) None of the above

64) What is the number of root locus segments which do not terminate on zeros?

a) The number of poles
b) The number of zeros
c) The difference between the number of holes and the number of zeros
d) The sum of the number of poles and the number of zeros

65) For the equation, s3 - 4s2 + s + 6 = 0 the number of roots in the left half of s-plane will be

a) Zero
b) One
c) Two
d) Three

66) How many roots with positive real parts do the equation s3 + s2 + s + 1 = 0 have?

a) Zero
b) One
c) Two
d) Three

67) Which one of the following open-loop transfer functions has root locus parallel to imaginary axis?

a) k / (s + 1)
b) k / (s + 1) / (s + 1)2
c) k / (s + 1)2
d) k / (s + 12) / (s + 1)2

68) Consider the loop transfer function K(s+6)/(s+3)(s+5) In the root locus diagram the centroid will be located at:
a) -4
b) -1
c) -2
d) -3

69) Which one of the following applications software's is used to obtain an accurate root locus for?
a) LISP
b) MATLAB
c) dBase

d) Oracle

70) The breakaway points of a root locus occur at

a) Imaginary axis
b) Real axis
c) Multiple routes of characteristic equation
d) None of the above

71) Which of the following statements is incorrect for root locus technique?

a)It is most useful for single input single output systems
b) It provides the pattern of movement of closed loop holes when open loop gain varies
c) It is used to obtain closed-loop pole configuration from open-loop poles and zeros
d) None of the above

72) If the root locus branches cross the imaginary axis the system becomes

a) Over damped
b) Critically damped
c) Stable
d) Unstable

73) The root locus is the part of roots of the characteristic equation traced out in the S plane. Which one of the following is correct?

a) As the input of the system is changed
b) As the output of the system is changed
c) As a system parameter is changed
d) As the sensitivity is changed

74) A control system has G (s) H (s) = K / [s (s + 4) (s2 + 4s + 20) (0 < K)< ∞) What is the number of breakaway points in the root locus diagram ?

a) One
b) Two
c) Three
d) Zero

75) For system having characteristic equation (s^2+8s+25)+Ks(s+4)=0 the number of poles And zeros are…..

a) Poles 2 and zeros 1
b) Poles 2 and Zeros 2
c) Poles 1 and zeros 2
d) Poles 1 and zeros 1

76) For system having characteristic equation (s^2+8s+25)+Ks(s+4)=0 angle of departure for complex pole is…

a) -323.13 degree
b) -324 degree
c) -180.23 degree
d) – 275.3 degree

77) The breakaway point for system mentioned in above question….
a) -2.3
b) -2.5
c) -2.8
d) -2.7

78) The bode plot is a plot relating log w with magnitude in decible and.....

A. Phase angle
B. 90 degree
C. 180 degree
D. 30 degree

79) For relative stability of the system which of the following is sufficient?

a) Gain margin
b) Phase margin
c) Both (a) and (b)
d) None of these

80) In a Bode plot the frequency where two asymptotic lines meet is called……..
a) Linear Frequency
b) Corner Frequency
c) Non Linear Frequency
d) Ideal Frequency

81) 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

82) The system is said to be marginally stable, if gain margin is _____

a. 0
b. 1
c. Infinite
d. None of the above

83) If a pole is located at origin, how does it get represented on the magnitude plot?

a. -10 log (ω) dB
b. -20 log (ω) dB
c. -40 log (ω) dB
d. -60 log (ω) dB

84) Which unit is adopted for magnitude measurement in Bode plots?

a. Degree
b. Decimal
c. Decibel
d. Deviation

85) The bode plot is used to analyse which of the following?

A. Minimum phase network
B. Lag lead network
C. Maximum phase network
D. All phase network

86) The bode plot is applicable to.....network.

A. Maximum phase
B. Minimum phase
C. All phase
D. None of the above

87) In bode plot given transfer function is converted into……

a) Frequency domain
b) time domain
c) Derivative domain
d) None of above

88) For poles in bode plot the slope is…….

a) Positive
b) Negative
c) Zero
d) All of above

89) For zeros in bode plot the slope is…….

a) Positive
b) Negative
c) Zero
d) All of above

90) In a bode magnitude plot, which one of the following slopes would be exhibited at high frequencies by a 4th order all-pole system?

a) -80dB/decade
b) -40 dB/decade
c) 40 dB/decade
d) 80 dB/decade

91) For constant K of a transfer function the magnitude in decibel for bode plot will be…
a) 20
b) -20 log K
c) 0
d) 20 log K

92) The phase angle for pole, in bode plot, is calculated by negative tan inverse of…
a) Imaginary part only
b) Real part only
c) Ratio of imaginary part to real part
d) Ratio of real part to imaginary part