

QUESTION BANK (LCS)

1. 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

Ans: a

2. For open 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

Ans: b

3. 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

Ans: a

4. In closed loop control system, with positive value of feedback gain the overall gain of the system will

- (a) decrease
- (b) increase
- (c) be unaffected
- (d) any of the above

Ans: a

5. Which of the following is an open loop control system ?

- (a) Field controlled D.C. motor
- (b) Ward leonard control
- (c) Metadyne
- (d) Stroboscope

Ans: a

6. Which of the following statements is not necessarily correct for open control system ?

- (a) Input command is the sole factor responsible for providing the control action
- (b) Presence of non-linearities causes malfunctioning
- (c) Less expensive
- (d) Generally free from problems of non-linearities

Ans: b

7. In open loop 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

Ans: d

8 has tendency to oscillate.

- (a) Open loop system
- (b) Closed loop system
- (c) Both (a) and (b)
- (d) Neither (a) nor (b)

Ans: b

9. A good control system has all the following features except

- (a) good stability
- (b) slow response
- (c) good accuracy
- (d) sufficient power handling capacity

Ans: b

10. A car is running at a constant speed of 50 km/h, which of the following is the feedback element for the driver ?

- (a) Clutch
- (b) Eyes
- (c) Needle of the speedometer
- (d) Steering wheel
- (e) None of the above

Ans: c

11. The initial response when the output is not equal to input is called

- (a) Transient response
- (b) Error response
- (c) Dynamic response
- (d) Either of the above

Ans: a

12. A control system working under unknown random actions is called

- (a) computer control system
- (b) digital data system
- (c) stochastic control system
- (d) adaptive control system

Ans: c

13. An automatic toaster is a _____ loop control system.

- (a) open
- (b) closed
- (c) partially closed
- (d) any of the above

Ans: a

14. Any externally introduced signal affecting the controlled output is called a

- (a) feedback
- (b) stimulus

- (c) signal
 - (d) gain control
- Ans: b

15. A closed loop system is distinguished from open loop system by which of the following?

- (a) Servomechanism
- (b) Feedback
- (c) Output pattern
- (d) Input pattern

Ans: b

16 is a part of the human temperature control system.

- (a) Digestive system
- (b) Perspiration system
- (c) Ear
- (d) Leg movement

Ans: b

17. By which of the following the control action is determined when a man walks along a path ?

- (a) Brain
- (b) Hands
- (c) Legs
- (d) Eyes

Ans: d

18 is a closed loop system.

- (a) Auto-pilot for an aircraft
- (b) Direct current generator
- (c) Car starter
- (d) Electric switch

Ans: a

19. Which of the following devices are commonly used as error detectors in instruments ?

- (a) Vernistats
- (b) Microsyns
- (c) Resolvers
- (d) Any of the above

Ans: d

20. Which of the following should be done to make an unstable system stable ?

- (a) The gain of the system should be decreased
- (b) The gain of the system should be increased
- (c) The number of poles to the loop transfer function should be increased
- (d) The number of zeros to the loop transfer function should be increased

Ans: b

21 increases the steady state accuracy.

- (a) Integrator
- (b) Differentiator
- (c) Phase lead compensator

(d) Phase lag compensator

Ans: a

22. A.C. servomotor resembles

- (a) two phase induction motor
- (b) Three phase induction motor
- (c) direct current series motor
- (d) universal motor

Ans: a

23. As a result of introduction of negative feedback which of the following will not decrease ?

- (a) Band width
- (b) Overall gain
- (c) Distortion
- (d) Instability

Ans: a

24. Regenerative feedback implies feedback with

- (a) oscillations
- (b) step input
- (c) negative sign
- (d) positive sign

Ans: d

25. The output of a feedback control system must be a function of

- (a) reference and output
- (b) reference and input
- (c) input and feedback signal
- (d) output and feedback signal

Ans: a

26 is an open loop control system.

- (a) Ward Leonard control
- (b) Field controlled D.C. motor
- (c) Stroboscope
- (d) Metadyne

Ans: b

27. A control system with excessive noise, is likely to suffer from

- (a) saturation in amplifying stages
- (b) loss of gain
- (c) vibrations
- (d) oscillations

Ans: a

28. Zero initial condition for a system means

- (a) input reference signal is zero
- (b) zero stored energy
- (c) no initial movement of moving parts

(d) system is at rest and no energy is stored in any of its components

Ans: d

29. Transfer function of a system is used to calculate which of the following ?

- (a) The order of the system
- (b) The time constant
- (c) The output for any given input
- (d) The steady state gain

Ans: c

30. The band width, in a feedback amplifier.

- (a) remains unaffected
- (b) decreases by the same amount as the gain increase
- (c) increases by the same amount as the gain decrease
- (d) decreases by the same amount as the gain decrease

Ans: c

31. On which of the following factors does the sensitivity of a closed loop system to gain changes and load disturbances depend ?

- (a) Frequency
- (b) Loop gain
- (c) Forward gain
- (d) All of the above

Ans: d

32. The transient response, with feedback system,

- (a) rises slowly
- (b) rises quickly
- (c) decays slowly
- (d) decays quickly

Ans: d

33. The second derivative input signals modify which of the following ?

- (a) The time constant of the system
- (b) Damping of the system
- (c) The gain of the system
- (d) The time constant and suppress the oscillations
- (e) None of the above

Ans: d

34. Which of the following statements is correct for any closed loop system ?

- (a) All the co-efficients can have zero value
- (b) All the co-efficients are always non-zero
- (c) Only one of the static error co-efficients has a finite non-zero value
- (d) None of the above

Ans: c

35. Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero ?

- (a) The system is relatively stable

- (b) The system is highly stable
- (c) The system is highly oscillatory
- (d) None of the above

Ans: c

36. Due to which of the following reasons excessive band width in control systems should be avoided ?

- (a) It leads to slow speed of response
- (b) It leads to low relative stability
- (c) Noise is proportional to band width
- (d) None of the above

Ans: c

37. In a stable control system backlash can cause which of the following ?

- (a) Underdamping
- (b) Overdamping
- (c) Poor stability at reduced values of open loop gain
- (d) Low-level oscillations

Ans: d

38. In an automatic control system which of the following elements is not used ?

- (a) Error detector
- (b) Final control element
- (c) Sensor
- (d) Oscillator

Ans: d

39. In a control system the output of the controller is given to

- (a) final control element
- (b) amplifier
- (c) comparator
- (d) sensor
- (e) none of the above

Ans: a

40. A controller, essentially, is a

- (a) sensor
- (b) clipper
- (c) comparator
- (d) amplifier

Ans: c

41. Which of the following is the input to a controller ?

- (a) Servo signal
- (b) Desired variable value
- (c) Error signal
- (d) Sensed signal

Ans:

42. The on-off controller is a _____ system.

- (a) digital
- (b) linear
- (c) non-linear
- (d) discontinuous

Ans:

43. The capacitance, in force-current analogy, is analogous to

- (a) momentum
- (b) velocity
- (c) displacement
- (d) mass

Ans: d

44. The temperature, under thermal and electrical system analogy, is considered analogous to

- (a) voltage
- (b) current
- (c) capacitance
- (d) charge
- (e) none of the above

Ans: a

45. In electrical-pneumatic system analogy the current is considered analogous to

- (a) velocity
- (b) pressure
- (c) air flow
- (d) air flow rate

Ans: d

46. In liquid level and electrical system analogy, voltage is considered analogous to

- (a) head
- (b) liquid flow
- (c) liquid flow rate
- (d) none of the above

Ans: a

47. The viscous friction co-efficient, in force-voltage analogy, is analogous to

- (a) charge
- (b) resistance
- (c) reciprocal of inductance
- (d) reciprocal of conductance
- (e) none of the above

Ans: b

48. In force-voltage analogy, velocity is analogous to

- (a) current
- (b) charge
- (c) inductance
- (d) capacitance

Ans: a

49. In thermal-electrical analogy charge is considered analogous to

- (a) heat flow
- (b) reciprocal of heat flow
- (c) reciprocal of temperature
- (d) temperature
- (e) none of the above

Ans: d

50. Mass, in force-voltage analogy, is analogous to

- (a) charge
- (b) current
- (c) inductance
- (d) resistance

Ans: c

51. The transient response of a system is mainly due to

- (a) inertia forces
- (b) internal forces
- (c) stored energy
- (d) friction

Ans: c

52. signal will become zero when the feedback signal and reference signs are equal.

- (a) Input
- (b) Actuating
- (c) Feedback
- (d) Reference

Ans: b

53. A signal other than the reference input that tends to affect the value of controlled variable is known as

- (a) disturbance
- (b) command
- (c) control element
- (d) reference input

Ans: a

54. The transfer function is applicable to which of the following ?

- (a) Linear and time-invariant systems
- (b) Linear and time-variant systems
- (c) Linear systems
- (d) Non-linear systems
- (e) None of the above

Ans: a

55. From which of the following transfer function can be obtained ?

- (a) Signal flow graph
- (b) Analogous table
- (c) Output-input ratio

- (d) Standard block system
- (e) None of the above

Ans: a

56 is the reference input minus the primary feedback.

- (a) Manipulated variable
- (b) Zero sequence
- (c) Actuating signal
- (d) Primary feedback

Ans: c

57. The term backlash is associated with

- (a) servomotors
- (b) induction relays
- (c) gear trains
- (d) any of the above

Ans:

58. With feedback _____ increases.

- (a) system stability
- (b) sensitivity
- (c) gain
- (d) effects of disturbing signals

Ans: a

59. By which of the following the system response can be tested better ?

- (a) Ramp input signal
- (b) Sinusoidal input signal
- (c) Unit impulse input signal
- (d) Exponentially decaying signal

Ans: c

60. In a system zero initial condition means that

- (a) The system is at rest and no energy is stored in any of its components
- (b) The system is working with zero stored energy
- (c) The system is working with zero reference signal

Ans: a

61. In a system low friction co-efficient facilitates

- (a) reduced velocity lag error
- (b) increased velocity lag error
- (c) increased speed of response
- (d) reduced time constant of the system

Ans: a

62. Hydraulic torque transmission system is analog of

- (a) amplidyne set
- (b) resistance-capacitance parallel circuit
- (c) motor-generator set
- (d) any of the above

Ans:

63. Spring constant in force-voltage analogy is analogous to

- (a) capacitance
- (b) reciprocal of capacitance
- (c) current
- (d) resistance

Ans: b

64. The frequency and time domain are related through which of the following?

- (a) Laplace Transform and Fourier Integral
- (b) Laplace Transform
- (c) Fourier Integral
- (d) Either (b) or (c)

Ans: a

65. An increase in gain, in most systems, leads to

- (a) smaller damping ratio
- (b) larger damping ratio
- (c) constant damping ratio
- (d) none of the above

Ans: a

66. Static error co-efficients are used as a measure of the effectiveness of closed loop systems for specified _____ input signal.

- (a) acceleration
- (b) velocity
- (c) position
- (d) all of the above

Ans: d

67. A conditionally stable system exhibits poor stability at

- (a) low frequencies
- (b) reduced values of open loop gain
- (c) increased values of open loop gain
- (d) none of the above

Ans: b

68. The type 0 system has _____ at the origin.

- (a) no pole
- (b) net pole
- (c) simple pole
- (d) two poles
- (e) none of the above

Ans: a

69. The type 1 system has _____ at the origin.

- (a) no pole
- (b) net pole
- (c) simple pole

(d) two poles

Ans: c

70. The type 2 system has at the origin.

(a) no net pole

(b) net pole

(c) simple pole

(d) two poles

Ans: d

71. The position and velocity errors of a type-2 system are

(a) constant, constant

(b) constant, infinity

(c) zero, constant

(d) zero, zero

Ans: c

72. Velocity error constant of a system is measured when the input to the system is unit _____ function.

(a) parabolic

(b) ramp

(c) impulse

(d) step

Ans: b

73. In case of type-1 system steady state acceleration is

(a) unity

(b) infinity

(c) zero

(d) 10

Ans: b

74. If a step function is applied to the input of a system and the output remains below a certain level for all the time, the system is

(a) not necessarily stable

(b) stable

(c) unstable

(d) always unstable

(e) any of the above

Ans: a

75. Which of the following is the best method for determining the stability and transient response ?

(a) Root locus

(b) Bode plot

(c) Nyquist plot

(d) None of the above

Ans: a

76. Phase margin of a system is used to specify which of the following ?

- (a) Frequency response
- (b) Absolute stability
- (c) Relative stability
- (d) Time response

Ans: c

77. Addition of zeros in transfer function causes which of the following ?

- (a) Lead-compensation
- (b) Lag-compensation
- (c) Lead-lag compensation
- (d) None of the above

Ans: b

78. technique is not applicable to nonlinear system ?

- (a) Nyquist Criterion
- (b) Quasi linearization
- (c) Functional analysis
- (d) Phase-plane representation

Ans: a

79. In order to increase the damping of a badly underdamped system which of following compensators may be used ?

- (a) Phase-lead
- (b) Phase-lag
- (c) Both (a) and (b)
- (d) Either (a) and (b)
- (e) None of the above

Ans: a

80. The phase lag produced by transportation relays

- (a) is independent of frequency
- (b) is inverse proportional to frequency
- (c) increases linearly with frequency
- (d) decreases linearly with frequency

Ans: c

81. In a stable control system saturation can cause which of the following ?

- (a) Low-level oscillations
- (b) High-level oscillations
- (c) Conditional stability
- (d) Overdamping

Ans: a

82. Which of the following can be measured by the use of a tacho-generator ?

- (a) Acceleration
- (b) Speed
- (c) Speed and acceleration
- (d) Displacement
- (e) None of the above

Ans: b

83 is not a final control element.

- (a) Control valve
- (b) Potentiometer
- (c) Electro-pneumatic converter
- (d) Servomotor

Ans: b

84. Which of the following is the definition of proportional band of a controller ?

- (a) The range of air output as measured variable varies from maximum to minimum
- (b) The range of measured variables from set value
- (c) The range of measured variables through which the air output changes from maximum to minimum
- (d) Any of the above
- (e) None of the above

Ans: c

85. In pneumatic control systems the control valve used as final control element converts

- (a) pressure signal to electric signal
- (b) pressure signal to position change
- (c) electric signal to pressure signal
- (d) position change to pressure signal
- (e) none of the above

Ans: b

86. Pressure error can be measured by which of the following ?

- (a) Differential bellows and strain gauge
- (b) Selsyn
- (c) Strain gauge
- (d) Strain gauge and potentiometer

Ans: a

87. Which of the following devices is used for conversion of co-ordinates ?

- (a) Microsyn
- (b) Selsyn
- (c) Synchro-resolver
- (d) Synchro-transformer

Ans: c

88. The effect of error damping is to

- (a) provide larger settling time
- (b) delay the response
- (c) reduce steady state error
- (d) any of the above
- (e) none of the above

Ans: c

89 technique gives quick transient and stability response

- (a) Root locus

- (b) Bode
- (c) Nyquist
- (d) Nichols

Ans: a

90. A phase lag lead network introduces in the output

- (a) lag at all frequencies
- (b) lag at high frequencies and lead at low frequencies
- (c) lag at low frequencies and lead at high frequencies
- (d) none of the above

Ans: c

91. Which of the following is the non-linearity caused by servomotor ?

- (a) Static friction
- (b) Backlash
- (c) Saturation
- (d) None of the above

Ans: c

92. Which can be extended to systems which are time-varying ?

- (a) Bode-Nyquist stability methods
- (b) Transfer functions
- (c) Root locus design
- (d) State model representatives

Ans: d

93. When the initial conditions of a system are specified to be zero it implies that the system is

- (a) at rest without any energy stored in it
- (b) working normally with reference input
- (c) working normally with zero reference input
- (d) at rest but stores energy

Ans: d

94. Which of the following is an electromechanical device ?

- (a) Induction relay
- (b) Thermocouple
- (c) LVDT
- (d) Any of the above
- (e) None of the above

Ans: c

95. A differentiator is usually not a part of a control system because it

- (a) reduces damping
- (b) reduces the gain margin
- (c) increases input noise
- (d) increases error

Ans: c

96. If the gain of the critical damped system is increased it will behave as

- (a) oscillatory
- (b) critically damped
- (c) overdamped
- (d) underdamped
- (e) none of the above

Ans: d

97. In a control system integral error compensation _____ steady state error

- (a) increases
- (b) minimizes
- (c) does not have any effect on
- (d) any of the above

Ans: b

98. With feed back _____ reduces.

- (a) system stability
- (b) system gain
- (c) system stability and gain
- (d) none of the above

Ans: b

99. An amplidyne can give which of the following characteristics ?

- (a) Constant current
- (b) Constant voltage
- (c) Constant current as well as constant voltage
- (d) Constant current, constant voltage and constant power
- (e) None of the above

Ans: d

100. Which of the following can be measured by LVDT?

- (a) Displacement
- (b) Velocity
- (c) Acceleration
- (d) Any of the above

Ans: d

101 directly converts temperature into voltage.

- (a) Thermocouple
- (b) Potentiometer
- (c) Gear train
- (d) LVDT
- (e) None of the above

Ans: a

102. The transfer function technique is considered as inadequate under which of the following conditions ? (a) Systems having complexities and non-linearities

- (b) Systems having stability problems
- (c) Systems having multiple input disturbances
- (d) All of the above

Ans: d

103. Which of the following is the output of a thermocouple ?

- (a) Alternating current
- (b) Direct current
- (c) A.C. voltage
- (d) D.C. voltage
- (e) None of the above

Ans: d

104. A.C. servomotor is basically a

- (a) universal motor
- (b) single phase induction motor
- (c) two phase induction motor
- (d) three phase induction motor

Ans: c

105. The first order control system, which is well designed, has a

- (a) small bandwidth
- (b) negative time constant
- (c) large negative transfer function pole
- (d) none of the above

Ans: c

106. 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
- (e) None of the above

Ans: a