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 moving 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 tune 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

(6) 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

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

(e) 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) ne 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

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

(6) 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 bond 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 not the ideal input to a controller ?

(a) Servo signal

(b) Desired variable value

(c) Error signal

(d) Sensed signal

Ans: a

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

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

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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-in variant 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

1. The system with the open loop transfer function 1/s(1+s) is:

a) Type 2 and order 1
b) Type 1 and order 1
c) Type 0 and order 0
d) Type 1 and order 2

View Answer

Answer: d

Explanation: Type is defined as the number of poles at origin and order is defined as the total number of poles and this is calculated with the help of the transfer function from the above transfer function the type is 1 and order is 2.

2. The identical first order system have been cascaded non-interactively. The unit step response of the systems will be:

a) Overdamped

b) Underdamped

c) Undamped

d) Critically damped

Answer: d

Explanation: Since both the systems that is the first order systems are cascaded non-interactively, the overall unit step response will be critically damped.

3. A third order system is approximated to an equivalent second order system. The rise time of this approximated lower order system will be:
a) Same as the original system for any input
b) Smaller than the original system for any input
c) Larger than the original system for any input
d) Larger or smaller depending on the input

View Answer

4. A system has a single pole at origin. Its impulse response will be:
a) Constant
b) Ramp
c) Decaying exponential
d) Oscillatory

View Answer

Answer: a
Explanation: For a single pole at origin the system is of type 1 and impulse response of the system with single pole at the origin will be constant.

5. When the period of the observation is large, the type of the error will be:

a) Transient error

b) Steady state error

c) Half-power error

d) Position error constant

View Answer

Answer: b

Explanation: The error will be the steady state error if the period of observation is large as the time if large then the final value theorem can be directly applied.

10. How can the steady state error can be reduced?

a) By decreasing the type of the system
b) By increasing system gain
c) By decreasing the static error constant
d) By increasing the input

^ View Answer

Answer: d

Explanation: Steady state error is the error as it is the difference between the final output and the desired output and by increasing the input the steady state error reduces as it depends upon both the states and input.

1. 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

Answer: c

Explanation: Centroid =Sum of real part of open loop pole-sum of real part of open loop zeros/P-Z.

2. 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

View Answer

Answer: b

Explanation: MATLAB stands for mathematics laboratory in which the input is in the form of the matrix and is the best software for drawing root locus.

3. 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 breakaway points are determined from dK/ds = 0

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

Answer: a

Explanation: The root locus is the locus traced due to the gain of the system with changing frequency and need not be symmetrical about origin.

4. The breakaway point calculated mathematically must always lie on the root locus.

a) True

b) False

Answer: a

Explanation: The breakaway point of the two branches of the root locus is the point where the two branches either meet or they break and may or may not always lie on the root locus.

5. 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

Answer: c

Explanation: The number of the root locus segments which do not lie on the root locus is the difference between the number of the poles and zeroes.

6. Which one of the following are 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 is changed
d) As the sensitivity is changed

Answer: c

Explanation: The root locus is the locus of the change of the system parameters of the characteristic equation traced out in the s-plane.

7. If the gain of the system is reduced to a zero value, the roots of the system in the s-plane,

a) Coincide with zero

b) Move away from zero

c) Move away from poles

d) Coincide with the poles

Answer: d

Explanation: The roots of the system in s plane coincides with the poles if the gain of the system is reduced to a value zero.

8. The addition of open loop zero pulls the root loci towards:

a) The left and therefore system becomes more stable

b) The right and therefore system becomes unstable

c) Imaginary axis and therefore system becomes marginally stable

d) The left and therefore system becomes unstable

View Answer

Answer: a

Explanation: The system can become stable by reducing the damping and also by adding zeroes in the s plane and moving left of the s plane system becomes more stable.

10. When the number of poles is equal to the number of zeroes, how many branches of root locus tends towards infinity?

a) 1

b) 2

c) 0

d) Equal to number of zeroes

Answer: c

Explanation: Branches of the root locus is equal to the number of poles or zeroes which ever is greater and tends toward infinity when poles or zeroes are unequal.

1. Routh Hurwitz criterion gives:

a) Number of roots in the right half of the s-plane

b) Value of the roots

c) Number of roots in the left half of the s-plane

d) Number of roots in the top half of the s-plane

View Answer

Answer: a

Explanation: Routh Hurwitz criterion gives number of roots in the right half of the s-plane.

2. 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

^ View Answer

Answer: d

Explanation: Routh Hurwitz criterion cannot be applied when the characteristic equation of the system containing coefficient/s which is/are exponential, sinusoidal and complex function of s.

3. Consider the following statement regarding Routh Hurwitz criterion:

a) It gives absolute stability

b) It gives gain and phase margin

c) It gives the number of roots lying in RHS of the s-plane

d) It gives gain, phase margin and number of roots lying in RHS of the s-plane

View Answer

Answer: d

Explanation: Routh Hurwitz gives the absolute stability and roots on the right of the s plane.

9. If root loci plots of a particular control system do not intersect the imaginary axis at any point, then the gain margin of the system will be:

a) 0

b) 0.707

c) 1

d) Infinite

View Answer

Answer: d

Explanation: The gain margin is the inverse of the intersection of the root loci plot to the imaginary axis and if it does not intersect then the gain margin will be infinite.

10. When the number of poles is equal to the number of zeroes, how many branches of root locus tends towards infinity?

a) 1

b) 2

c) 0

d) Equal to number of zeroes

4. The order of the auxiliary polynomial is always:

a) Even

b) Odd

c) May be even or odd

d) None of the mentioned

^ View Answer

Answer: a

Explanation: Auxiliary polynomial denotes the derivative of the odd equation which is always even.

5. Which of the test signals are best utilized by the stability analysis.

a) Impulse

b) Step

c) Ramp

d) Parabolic

Answer: a

Explanation: Computational task is reduced to much extent.

6. The characteristic equation of a system is given as $3s^4+10s^3+5s^2+2=0$. This system is :

a) Stable

b) Marginally stable

c) Unstable

d) Linear

Answer: c

Explanation: There is a missing coefficient so the system is unstable.

7. The characteristic equation of a system is given ass3+25s2+10s+50=0. What is the number of the roots in the right half s-plane and the imaginary axis respectively?

a) 1,1

b) 0,0

c) 2,1

d) 1,2

Answer: b

Explanation: The characteristic equation has no sign changes so number of roots on the right half of s plane is zero.

2. A node having only outgoing branches.

a) Input node

b) Output node

c) Incoming node

d) Outgoing node

Answer: a

Explanation: Nodes are the point by which the branches are outgoing or ingoing and this can be input or output node and input node is the node having only outgoing branches.

5. 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

View Answer

Answer: c

Explanation: Loop is the part of the network in which the branch starts from the node and comes back to the same node and non touching loop must not have any node in common.

6. Signal flow graphs:

a) They apply to linear systems

b) The equation obtained may or may not be in the form of cause or effect

c) Arrows are not important in the graph

d) They cannot be converted back to block diagram

View Answer

Answer: a

Explanation: Signal flow graphs are used to find the transfer function of control system by converting the block diagrams into signal flow graphs or directly but cannot be used for nonlinear systems.

8. The relationship between an input and output variable of a signal flow graph is given by the net gain between the input and output node is known as the overall_____

a) Overall gain of the system

b) Stability

c) Bandwidth

d) Speed

Answer: a

Explanation: The relationship between input and output variable of a signal flow graph is the overall gain of the system.

1. A signal flow graph is the graphical representation of the relationships between the variables of set linear algebraic equations.
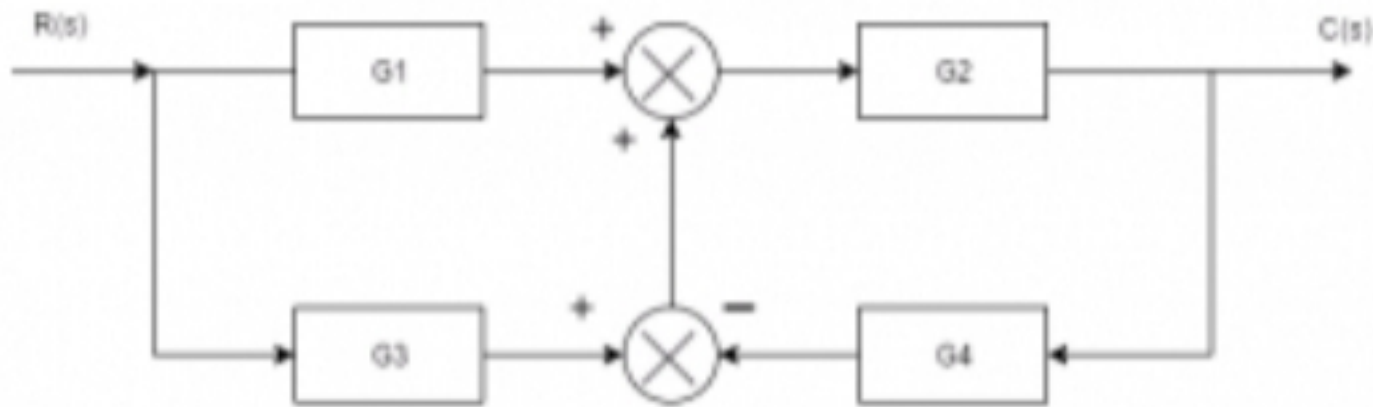
a) True

b) False

Answer: a

Explanation: By definition signal flow graphs are the graphical representation of the relationships between the variables of set linear algebraic equations.

1. Consider the block diagram shown below:

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

<u>View Answer</u>

Answer: b

Explanation: Use the technique of making two different block diagram by dividing two summers and use the approaches of shifting take off point and blocks.

2. For the block diagram given in the following figure, the expression of C/R is:
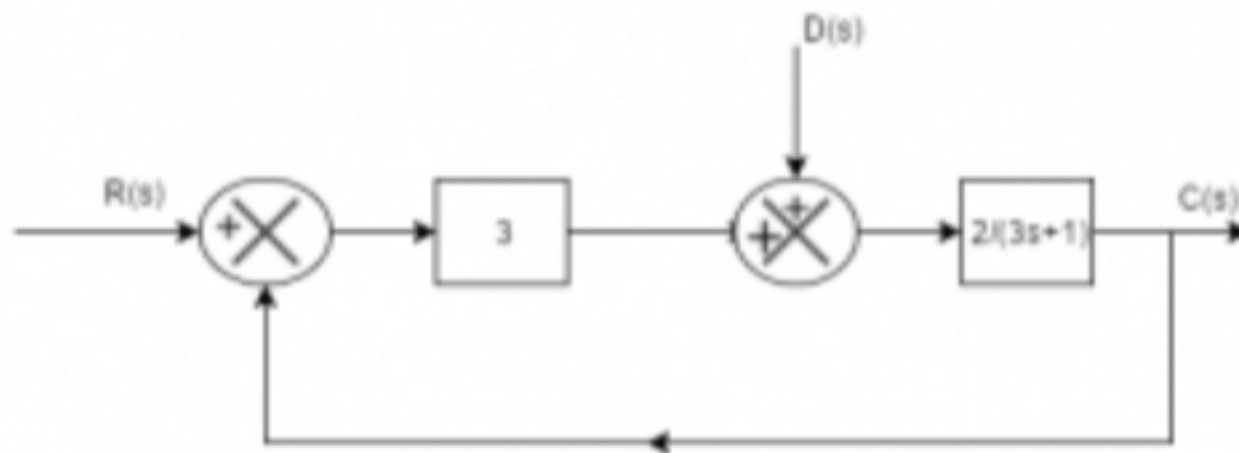

a) G1G2G3/1-G2G1

b) G1G2/1-G1G2G3

c) G1G2G3/1-G1G2G3

d) G1G2/G3(1-G1G2)

<u>View Answer</u>

Answer: a

Explanation: Block diagram is being converted into signal flow graphs by considering each take off point as a node and each forward transfer function as forward gain.

3. The transfer function from D(s) to Y(s) is :

a) 2/3s+7

b) 2/3s+1

c) 6/3s+7

d) 2/3s+6

^ View Answer

Answer: a

Explanation: Y(s)/D(s)=2/3s+1/1+3*
(2/3s+1)=2/3s+7.

4. 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

Answer: b

Explanation: C(s)/R(s)=-3/1+3/2=-6/5.

5. 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

Answer: a

Explanation: The advantage of the block diagram is that it is possible to get the contribution of each block to the overall performance of the system.

6. 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

View Answer

Answer: b

Explanation: Gain of block get multiplied when they are cascaded where cascaded means that the blocks are in series combination with no summer in between.