

UNIT WISE QUESTIONS:

Unit I

Short questions:

1. What is control system?
2. Define open loop control system?
3. Define closed loop control system?
4. Define transfer function?
5. What are the basic elements used for modeling mechanical rotational system? system?
6. Write the force balance equation of ideal mass element?
7. Write the force balance equation of ideal dashpot element?
8. Write the force balance equation of ideal spring element?
9. What are the basic elements used for modeling mechanical translational system?
10. Write the torque balance equation of ideal rotational mass element?
11. Write the torque balance equation of ideal dash-pot element?
12. What is block diagram?
13. What is a signal flow graph?
14. What is transmittance?
15. What is sink and source?
16. Write Mason's Gain formula?
17. Define non-touching loop?
18. What is servomechanism?
19. What is Synchro transmitter?
20. What is Synchro receiver?
21. Define forward path?
22. What is the basis for framing the rules of block diagram reduction technique?
23. What are the components of block diagram?
24. Write the mason's gain formula?
25. Write the rule for moving summing point ahead of a block?
26. Define loop?

Long questions:

1. Explain open loop & closed loop control systems by giving suitable Examples & also highlights their merits & demerits?
2. Explain the difference between open loop and closed loop systems?
3. Illustrate at least three applications of feedback control systems?
4. Explain the classification of control systems?
5. Explain the advantages of systems with feedback? What are the effects of feedback on the performance of a system? Briefly explain?
6. Explain the traffic control systems using open loop and closed loop system
7. Explain the effects of disturbance signals by use of feedback? (b) Why negative feedback invariably preferred in closed loop systems?
8. What is mathematical model of a physical system? Explain briefly?
9. A. Write short notes on impulse response of a system?
B. Explain and derive the relation between impulse response and transfer function?
10. What is transfer function and what are the advantages and limitations?
11. Explain the temperature control system using open loop and closed loop systems?
12. Human being is an example of closed loop system. Justify your answer?
13. What is sensitivity function and explain it with respect to open loop and closed loop systems?
14. Derive the transfer function of a field controlled DC servomotor and develop its block diagram. State the assumptions made if any.
15. Derive the transfer function of an armature controlled DC servomotor and develop its block diagram
16. With the help of neat sketches, explain the construction and working principle of synchro transmitter and receiver.
17. (a) Explain the differences between AC servomotor and DC servomotor?
(b) Explain the practical applications of servomotors?
18. Describe Synchro as an error detector
19. (a) What is the basis for framing the rules of block diagram reduction technique? What are drawbacks of the block diagram reduction technique?
(b) Find the overall gain of the system shown below?

20. Explain properties of signal flow graphs? Explain the need of signal flow graph representation for any system
 21. How do you construct a signal flow graph from the equations? Explain briefly about mason's gain formula?
 22. What are advantages of signal flow graph over block diagram?
 23. (a) What is the basis for framing the rules of block diagram reduction technique? What are drawbacks of the block diagram reduction technique?
(b) Find the overall gain of the system shown below?
 24. Explain properties of signal flow graphs? Explain the need of signal flow graph representation for any system
 25. How do you construct a signal flow graph from the equations? Explain briefly about mason's gain formula?
 26. What are advantages of signal flow graph over block diagram?
 27. Define transfer function and determine the transfer function of RLC series circuit if the voltage across the capacitor is a output variable and input is voltage source $v(s)$.
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Unit 2

Short questions:

1. What is Proportional controller and what are its advantages?
2. What is the drawback in P-controller?
3. What is integral control action? What is the advantage and disadvantage in integral controller?
4. What is PI, PD, PID controller?
5. Define Damping ratio.?
6. Distinguish between type and order of a system?
7. Define rise, Delay time Analyze 3 8 Define Peak time? Write formula?
8. Give the relation between generalized and static error coefficients?
9. What are generalized error coefficients?

10. Define settling time and write formula?
11. Define Peak overshoot and write formula?
12. How the system is classified depending on the value of damping?
13. Find the type and order of the system $G(S)=40/S(s+4)(s+5)(s+2)$ Evaluate 3 15 Find the type and order of the system $G(S)=40/S(s+4)(s+5)(s+2)$

Long questions:

1. Explain about various test signals used in control systems?
(b) Define time constant and explain its importance?
2. Derive the expression for time domain specification of a under damped second order system to a step input?
3. Derive the transient response of under damped second order system when excited by unit step input?
4. Derive the transient response of over damped second order system when excited by unit step input?
5. How steady state error of a control system is determined? How it can be reduced? (b) Derive the static error constants and list the disadvantages?
6. For a system Find the value of K to limit steady state error to 10 when input to system is
7. Explain error constants K_p , K_v and K_a for type I system?
8. Explain the effect of PI control on the performance of control system?
9. What are P, D, and I controllers? Why D controller is not used in control systems?
10. Discuss the advantages and disadvantages of proportional, proportional derivative, proportional integral control system?
11. Derive the transient response of un damped second order system when excited by unit step input?
12. Derive the transient response of critically damped second order system when excited by unit step input?
13. Explain the effect of PD control on the performance of control system

14. Explain error constants K_p , K_v and K_a for type II system. Evaluate 3 15 What are generalized error constants? State the advantages and significance of generalized error constants?
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Unit-3

Short questions:

1. Define BIBO stability. What is the necessary condition for stability?
2. What is characteristic equation? How the roots of characteristic equation are related to stability?
3. What is the relation between stability and coefficient of characteristic polynomial?
4. What will be the nature of impulse response when the roots of characteristic equation are lying on imaginary axis?
5. What will be the nature of impulse response if the roots of characteristic equation are lying on right half s-plane?
6. What is root locus? How will you find root locus on real axis?
7. What are asymptotes?
8. What is centroid, how it is calculated?
9. What is breakaway point?
10. What is dominant pole?
11. What is break in point?
12. Determine poles for $G(S)=40/S(s+4)(s+5)$ Evaluate 4 13 Determine poles for $G(S)=40/S(s+6)(s+2)$
13. Determine the zeros for $G(S)=40(s+2)(s+6)/(s+4)(s+5)$ Evaluate 4 15 Determine the zeros for $G(S)=10(s+6)(s+8)/(s+3)(s+2)$

Long questions:

1. Define the terms (i) absolute stability (ii) marginal stability (iii) conditional stability (iv) stable system (v) Critically stable system (vi) conditionally stable system?
2. State Routh's stability criterion. State their advantages What are the limitations of Routh Hurwitz criteria?

3. what are the necessary conditions to have all the roots of characteristics equation in the left half of s-plane?
 4. By means of Routh criterion ,determine the stability represented by characteristic equation $s^4 + 2s^3 + 8s^2 + 4s + 3 = 0$
 5. The open loop transfer function of a unity feedback system is given by .find the restriction on k so that the closed loop system is absolutely stable.
 6. Explain the steps for the construction of root locus?
 7. The open loop t.f of a control system is given by $G(s) H(s) =$ sketch complete root locus.
 8. Check whether the points lie $(-1+j)$ and $(-3+j)$ lie on the root locus of a system given by $G(s) H(s)$.use the angle condition.
 9. Sketch the root locus $G(S)=K/s(s^2 + 6s+10)$, $H(S)=1$ Understand 4 10 What is PID controller? Explain effect of PID controller on the control system?
 10. Check the stability of the given characteristic equation using Routh's method Evaluate 4 12 Locate the poles and zeros on the S-plane of a system $G(s)=13(s+7)(s+9)/(s^2 + 5s+8)$
 11. Using the routh's criterion determine the stability of the system represented by characteristic equation $s^4 + 8s^3 + 18s^2 + 16s + 5 = 0$
 12. Using the routh's criterion determine the stability of the system represented by characteristic equation $s^7 + 9s^6 + 24s^5 + 24s^3 + 24s^2 + 23s + 15$
 13. Construct the routh array for the unity feedback system $g(s)=10/s(s+2)(s+4)(s+6)$
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Unit – 4

Short questions:

1. What is frequency response?
2. What are frequency domain specifications?
3. Define Resonant Peak? Analyze 5 4 What is Bode plot? What are the advantages of Bode Plot?
4. Define gain margin?

5. Define phase margin?
6. Define corner frequency?
7. What is Gain cross-over frequency?
8. What is phase cross-over frequency?
9. Define Bandwidth?
10. What are advantages of frequency response analysis?
11. Write the expression for resonant peak?
12. What is cut-off rate?
13. Write the expression for resonant frequency?
14. Define corner frequency?

Long questions:

1. What is frequency response? What are advantages of frequency response analysis?
 2. write short notes on various frequency domain specifications
 3. Explain the steps for the construction of Bode plot? What are the advantages of Bode Plot?
 4. Explain with the examples (i) minimum phase function (ii) non-minimum phase function (iii) all pass function
 5. Sketch the Bode plot for the open loop transfer function $G(S)=10(S+3)/S(S+2)(S^2+4S+100)$
 6. The open loop transfer function of a system is $G(S)=K/S(1+s)(1+0.1S)$ Determine the value of K such that (i) Gain Margin = 10dB and (ii) Phase Margin = 50 degree
 7. For $H(s)=1$, $G(s)=Ke^{-0.2s}/s(s+2)(s+8)$. Determine K so that (i) phase margin is 450 (ii.) value of k for the gain margin to be 10db
 8. Sketch the bode plot for a system with unity feedback having the transfer function, and assess its closed-loop stability. $G(S)=75/S(S^2+16S+100)$
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Unit 5

Short questions:

1. What is a state variable?

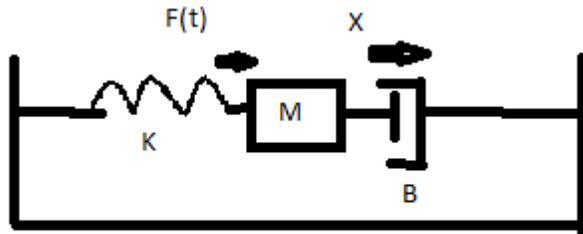
2. What is state model?
3. What is state of equation?
4. What is diagonalisation?
5. What is controllability?
6. What is observability?
7. What is state transition matrix?

Long questions:

1. Explain properties of state transition matrix?
2. Explain concept of controllability using kalman's test?
3. Explain observability using kalman's test?
4. Test and comment on controllability and observability using kalmans test.

$$\begin{pmatrix} \dot{X}_1 \\ \dot{X}_2 \end{pmatrix} = \begin{pmatrix} -1 & 0 \\ 0 & -2 \end{pmatrix} \begin{pmatrix} X_1 \\ X_2 \end{pmatrix} + \begin{pmatrix} 0 \\ 1 \end{pmatrix} U$$

5. Obtain state model for mechanical system



6. Obtain Sate Transition Matrix for state model whose matrix A is $A = \begin{pmatrix} 0 & 1 \\ -2 & -3 \end{pmatrix}$

7. Determine transfer function for

$$\dot{X} = \begin{pmatrix} 0 & 1 \\ -2 & -3 \end{pmatrix} \begin{pmatrix} X_1 \\ X_2 \end{pmatrix} + \begin{pmatrix} 0 \\ 1 \end{pmatrix} U$$

$$Y = \begin{pmatrix} 1 & 0 \end{pmatrix} \begin{pmatrix} X_1 \\ X_2 \end{pmatrix}$$

Unit wise Objective bits:

UNIT-1

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 rtyining 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 tne 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

UNIT-2

1. is an open loop control system.

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

Ans: b

2. 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

3. 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

4. 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

5. 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

6. 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

7. The transient response, with feedback system,

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

Ans: d

8. 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

9. 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

10. 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

11. 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

12. 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

13. 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

14. 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

15. A controller, essentially, is a

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

Ans: c

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

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

Ans: d

17. 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

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

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

Ans: d

19. 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

UNIT-3

1. 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

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

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

(d) capacitance

Ans: a

3. 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

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

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

Ans: c

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

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

Ans: c

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

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

Ans: b

7. 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

8. 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

9. 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

10. Is the reference input minus the primary feedback.

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

Ans: c

11. With feedback _____ increases.

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

Ans: a

12. 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

13. 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

14. 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

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

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

Ans: b

16. 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

17. 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

18. 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

19. 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

20. 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

UNIT-4

1. 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

2. With feed back _____ reduces.

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

Ans: b

3. 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

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

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

Ans: d

5. Directly converts temperature into voltage.

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

Ans: a

6. 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

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

(a) Alternating current

(b) Direct current

(c) A.C. voltage

(d) D.C. voltage

Ans: d

8. 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

9. 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

10. 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

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

(a) no pole

(b) net pole

- (c) simple pole
- (d) two poles

Ans: c

12. The type 2 system has _____ at the origin.

- (a) no net pole
- (b) net pole
- (c) simple pole
- (d) two poles

Ans: d

13. 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

14. 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

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

- (a) unity
- (b) infinity
- (c) zero
- (d) 10

Ans: b

16. 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

17. 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

18. 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

19. 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

20. technique is not applicable to nonlinear system ?

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

Ans: a

21. 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

UNIT-5

1. The phase lag produced by transportation relays

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

Ans: c

2. 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

3. 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

4 is not a final control element.

- (a) Control valve
- (b) Potentiometer

- (c) Electro-pneumatic converter
- (d) Servomotor

Ans: b

5. 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

6. 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

7. 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

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

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

Ans: c

9. 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

10. Technique gives quick transient and stability response

- (a) Root locus
- (b) Bode
- (c) Nyquist
- (d) Nichols

Ans: a

11. 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

12. 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

13. 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

14. 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

15. 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

16. 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

17. 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