UNIT-IV

1. The primary objective of controller design is to:

A) Increase system complexity
B) Improve system performance
C) Increase power consumption
D) Reduce hardware size only
Answer: B

2. Stability of a control system means:

A) Output becomes infinite
B) Output oscillates continuously
C) Output remains bounded for bounded input
D) Gain becomes zero
Answer: C

3. Steady-state accuracy refers to:

A) System performance during transient state
B) Accuracy after transients have died out
C) Frequency response accuracy
D) Controller gain accuracy
Answer: B

4. Transient accuracy is related to:

A) Steady-state error only
B) Rise time, overshoot, and settling time
C) Frequency crossover
D) Gain margin only
Answer: B

5. Disturbance rejection refers to the ability of a system to:

A) Amplify disturbances
B) Ignore disturbances and maintain output
C) Increase noise
D) Reduce gain
Answer: B

6. Robustness of a control system means:

A) Ability to operate under parameter variations
B) High power consumption
C) Low gain margin
D) Unstable operation
Answer: A

7. Sensitivity of a control system should generally be:

A) High
B) Infinite
C) Low
D) Equal to one
Answer: C

8. Root-locus technique shows the movement of:

A) Zeros only
B) Poles only
C) Gain only
D) Frequency response
Answer: B

9. Root-locus design is mainly a:

A) Time-domain method
B) Frequency-domain method
C) State-space method
D) Numerical method
Answer: A

10. Which specification is commonly used in frequency-domain design?

A) Settling time
B) Peak time
C) Gain margin
D) Initial value
Answer: C

11. The proportional controller output is proportional to:

A) Integral of error
B) Derivative of error
C) Error signal

D) Output signal
Answer: C

12. A proportional controller is represented by:

A) Kp
B) Ki
C) Kd
D) Ks
Answer: A

13. The integral controller helps in reducing:

A) Rise time
B) Overshoot
C) Steady-state error
D) Gain margin
Answer: C

14. The derivative controller improves:

A) Stability and transient response
B) Steady-state error only
C) Gain only
D) Power factor
Answer: A

15. Which controller combines proportional, integral, and derivative actions?

A) PI Controller
B) PD Controller
C) PID Controller
D) Lead Controller
Answer: C

16. Lead compensation primarily improves:

A) Steady-state error
B) Phase margin and transient response
C) Integral action
D) Disturbance magnitude
Answer: B

17. Lag compensation is mainly used to improve:

A) Steady-state accuracy
B) Overshoot
C) Rise time
D) Resonance
Answer: A

18. Which compensator increases low-frequency gain?

A) Lead compensator
B) Lag compensator
C) PD controller
D) Differentiator
Answer: B

19. Analog controllers are implemented using:

A) Logic gates only
B) Operational amplifiers and passive components
C) Microprocessors only
D) Memory units only
Answer: B

20. Digital controllers are generally implemented using:

A) Resistors only
B) Capacitors only
C) Microprocessors or microcontrollers
D) Transformers only
Answer: C

Fill in the Blanks

1. The ability of a system to remain bounded for bounded inputs is called **stability**.
2. Accuracy after transients disappear is called **steady-state accuracy**.
3. Rise time, settling time, and overshoot are measures of **transient accuracy**.
4. The ability of a system to withstand disturbances is called **disturbance rejection**.
5. A robust control system can tolerate **parameter variations**.
6. The sensitivity of a good control system should be **low**.
7. Root-locus plots show the movement of system **poles** as gain varies.

8. Root-locus is mainly a **time-domain** design technique.
9. Gain margin and phase margin are **frequency-domain** specifications.
10. A proportional controller output is proportional to the **error** signal.
11. The gain of a proportional controller is denoted by **Kp**.
12. The integral controller gain is denoted by **Ki**.
13. Integral control action reduces **steady-state error**.
14. The derivative controller gain is denoted by **Kd**.
15. Derivative control improves the **transient response** of the system.
16. A controller that combines P, I, and D actions is called a **PID controller**.
17. Lead compensation improves **phase margin** and system speed.
18. Lag compensation improves **steady-state accuracy**.
19. Analog controllers are implemented using operational amplifiers and passive components.
20. Digital controllers are implemented using **microprocessors** or **microcontrollers**.