

LAXMINARAYAN INSTITUTE OF TECHNOLOGY

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SUBJECT: PROCESS DYNAMICS AND CONTROL

QUESTION BANK

- Proportional controller's property is
 - Introduce offset
 - Decreases offset
 - increases margin of stability
 - Decrease velocity constant
- The input given to controller is always
 - sense signal
 - Error signal
 - desired variable value signal
 - signal of fixed amplitude independent on desired variable value
- The demerit of integral controller is
 - it decreases the stability of the system
 - it produces offset
 - it makes response faster
 - it has very simple implementation
- P – I Controller transfer function is given by
 - $kp + ki /s$
 - $kp + (ki/s)$
 - $(kp /s) + ki. s$
 - $(kp /s) + s$
- The on-off controller is which type of system
 - Digital
 - linear
 - nonlinear
 - Discontinuous
- PID controller is also popularity known as
 - three term controllers
 - fix controller
 - two terms
 - four term controllers
- Integral control is having the properties.....?
 - Decreases the damping coefficient
 - increases the steady state error
 - increases the noise and stability
 - Decreases the steady state error
- Response of a system to a sinusoidal input is called Response

- A. impulse
- B. unit step
- C. frequency
- D. none of these

9. The open loop transfer function of a control system is $1/(Ts+1)$. this represents.....

- A. A first order system
- B. Dead time system
- C. A first-time lag
- D. A second order system

10. When the damping co-efficient (ζ) is unity, the system is.....?

- A. overdamped
- B. critically damped
- C. underdamped
- D. highly fluctuating

11. The unit of time constant of system is same as that of.....?

- A. Velocity
- B. time
- C. time inverse
- D. none of these

12. Response of linear control system for a change in set point is called.....

- A. Frequency response
- B. Transient response
- C. servo problem
- D. Regulator problem

13. What is the Laplace transform of impulse input having magnitude problem

- A. X
- B. X²
- C. 1/X
- D. 1

14. Physical parameters change due to

- A. voltage
- B. current
- C. internal and external disturbance
- D. power

15. A nonlinear system will have steady state values

- A. one
- B. more than one
- C. two
- D. three

16. For proper feedback in a process control element, it is required to
- measure P
 - measure set point
 - measure comparator
 - PLEASE ADD
17. A transducer convert
- mechanical quantity to electrical form
 - electrical to physical form
 - physical to electrical form
 - chemical quantity to physical form
18. What are components that makes the programming logic controller work?
- input and output module
 - CPU
 - power supply
 - all of above
19. controller has maximum stabilizing time
- P
 - PD
 - PI
 - PID
20. Bode diagram is a plot of.....
- $\log (AR)$ vs. $\log (f)$ and (ϕ) vs. $\log (f)$
 - $\log (AR)$ vs. f and $\log \phi$ vs. f
 - AR vs. $\log (f)$ and ϕ vs. $\log (f)$
 - None of these
21. Phase margin is equal to.....
- 180° - phase lag
 - Phase lag - 180°
 - Phase lag + 180°
 - Phase lag + 90°
22. In a feed-back control system G and H denote open loop and close loop transfer functions respectively. The output-input relationship is
- $G/(1 + H)$
 - $H/(1 + G)$
 - G/H
 - H/G
23. The transfer function for a P-D controller is
- $K_c(1 + \tau D s)$

- B. $K_c(1 + 1/\tau D s)$
- C. $K_c \tau D s$
- D. $K_c/\tau D s$

24. Mercury thermometer can be used to measure the temperature upto _____ °C.

- A. 100
- B. 250
- C. 350
- D. 750

25. In a closed loop system, the process to be controlled is an integrating process with transfer function $1/2s$. The controller proposed to be used is an integral controller with transfer function $1/T_1s$. When a step change in set point is applied to such a closed loop system, the controlled variable will exhibit

- A. Overdamped response
- B. Underdamped response
- C. Undamped response
- D. Unstable response

26. A control system is unstable, if the open loop frequency response exhibits an amplitude ratio exceeding unity at the crossover frequency." This is _____ criterion.

- a) Bode stability
- b) Nyquist
- c) Routh stability
- d) None of these

27. According to Bode stability criterion, a system is unstable, if the open loop frequency response exhibits an amplitude ratio exceeding unity at frequency for which phase lag is

- a) 0°
- b) 45°
- c) 90°
- d) 180°

28. The transfer function of a first order system is

- a) $1/(Ts + 1)$
- b) $1/Ts$
- c) $s/(Ts + 1)$
- d) None of these

29. In a single tank system, the transfer function of _____ to inlet flow rate is $1/(TS+1)$.

- a) Outlet flow rate
- b) Level
- c) Both (a) & (b)
- d) Neither (a) nor (b)

30. The main objective of drawing root locus plot is :

- a) To obtain a clear picture about the open loop poles and zeroes of the system
- b) To obtain a clear picture about the transient response of feedback system for various values of open loop gain K
- c) To determine sufficient condition for the value of 'K' that will make the feedback system unstable
- d) Both b and c

31. Root locus is used to calculate:
- a) Marginal stability
 - b) Absolute stability
 - c) Conditional stability
 - d) Relative stability
32. The Feedforward control system
- a) cannot make correction until a measurable error exists
 - b) make change in output that is the integrated error
 - c) requires little knowledge of the process before installation
 - d) is theoretically capable of perfect control
33. The most dramatic application of feedforward techniques has occurred in their application to.....
- a) Heat exchanger
 - b) level process
 - c) flow processes
 - d) Distillation columns
34. which of the following is an open loop control system.....?
- a) Ward leonard control
 - b) metadyne
 - c) stroboscope
 - d) field-controlled D.C motor
35. The output feedback control system must be a function of.....?
- a) output and feedback signal
 - b) input and feedback signal
 - c) Reference input
 - d) Reference output
36. In a control system the output of the controller is given to.....?
- a) Amplifier
 - b) sensor
 - c) final control element
 - d) comparator
37. Feedback control system is basically.....?
- a) band pass filter
 - b) band stop filter
 - c) high pass filter
 - d) low pass filter
38. When negative feedback in a closed loop control system, the system sensitivity to parameter variation.....
- a) Becomes infinite
 - b) becomes zero
 - c) Decreases
 - d) Increases
39. What is the relation between output response and input signal in closed loop system.....?

- a) Nonlinear
- b) Linear
- c) Exponential
- d) parabolic

40. In the root locus method, a zero of transfer function $G(s)$ is the value of s for which $G(s)$ approaches
- A. Two
 - B. Zero
 - C. one
 - D. Infinity
41. The open loop transfer function of the system is $G(s) = K/(s+1)^4$, Centre of gravity will be
- A. 1
 - B. -4
 - C. -2
 - D. -1
42. Gain and Proportional bands are:
- A. Adjusted independently of one another
 - B. Reciprocally related
 - C. Same
 - D. Two different control modes
43. The Nyquist diagram relates amplitude ratio with _____ and phase angle
- A. natural frequency
 - B. radian frequency
 - C. both A and B
 - D. neither A nor B
44. As per Zeigler-Nichols controller tuning method the value of gain of proportional controller is (Where K_u is ultimate gain)
- A. $1/K_u$
 - B. $0.5K_u$
 - C. $0.25K_u$
 - D. none of these
45. The corner frequency for the Bode diagram of Proportional Derivative controller is (If t_D is derivative time)
- A. t_D
 - B. $2/t_D$
 - C. $1/t_D$
 - D. $4*t_D$
46. For first order system the sampling period T must be _____ one time constant
- A. greater than
 - B. equal to
 - C. two
 - D. smaller than
47. For slowly varying signals the _____ hold will be preferred
- A. Zero order
 - B. First order
 - C. No hold
 - D. Not sure
48. The Characteristic equation in Z domain is $(z-1)(z-0.136) + 0.432Kz = 0$. The value of K when the system is just unstable is
- A. 6.26

- B. 4.26
- C. 5.26
- D. 1.26

49. For converting digital signal to analogue signal following combination is required

- A. D/A converter & Sampler
- B. A/D Converter & Sampler
- C. D/A Converter & Hold element
- D. A/D Converter & Hold element

50. For the root locus diagram in Z domain the asymptote will be

- A. Imaginary axis
- B. Real axis
- C. Both A & B
- D. neither A nor B