1. The PID controller is the sum of how many terms?
   - a. 1
   - b. 2
   - c. 3

2. The proportional term?
   - a. sets the loop gain
   - b. integrates the error
   - c. differentiates the error

3. The integral term?
   - a. sets the loop gain
   - b. integrates the error
   - c. differentiates the error

4. The derivative term?
   - a. sets the loop gain
   - b. integrates the error
   - c. differentiates the error

5. The basic elements of a control loop are?
   - a. Plant and Controller
   - b. Controller and Feedback Sensor
   - c. Plant, Controller, and Feedback Sensor

6. In the basic feedback control loop block diagram the symbols for the plant and controller are?
   - a. P plant and H controller
   - b. C plant and H controller
   - c. P plant and C controller

7. The PID is a specific type of?
   - a. plant
   - b. controller
   - c. feedback sensor

8. Each block of the control loop can be represented in the?
   - a. time domain
   - b. frequency domain
   - c. both
9. The transform often used to convert between the continuous time and frequency domains is?
   - a. Bode
   - b. Nyquist
   - c. Laplace

10. The control loop frequency response can be analyzed using?
    - a. Bode Plots and Analysis
    - b. Nyquist Plots and Analysis
    - c. both

11. Bode frequency plots are used to analyze the?
    - a. Plant frequency response
    - b. Controller frequency response
    - c. The OLT and CTF frequency response

12. Key stability criteria derived from Bode and Nyquist plots are?
    - a. gain margin
    - b. phase margin
    - c. both

13. The control loop gain is primarily set by the?
    - a. plant
    - b. controller
    - c. feedback sensor

14. The control loop response from the command input to the output is termed?
    - a. The open loop transfer function
    - b. The sensitivity function
    - c. The closed loop transfer function

15. The open loop transfer function gain is primarily a function of the ________ gain?
    - a. Plant
    - b. Controller
    - c. Feedback

16. Increasing a PID proportional gain KP will?
    - a. decrease rise time
    - b. increase rise time
    - c. have no effect

17. Increasing a PID integral gain KI will?
    - a. decrease overshoot
    - b. increase overshoot
    - c. have no effect

18. Increasing a PID derivative gain KD will?
    - a. decrease overshoot
    - b. increase overshoot
    - c. have no effect

19. The PID controller works best with?
a. plants with very long delays
b. complex plants with high order dynamics
c. simple plants with step response similar to that of a first order system

20. There are two standard PID forms, one parameterized in terms of absolute gain and the other a proportional gain and time related to integration and differentiation. Parameter equivalence between structures is related as?
   a. \{K_p, K_i, K_D\} <-> \{K_p, K_p/T_i, K_p*T_D\}
   b. \{K_p, K_i, K_D\} <-> \{K_p, K_p*T_i, K_p/T_D\}
   c. \{K_p, K_i, K_D\} <-> \{K_p, T_i, T_D\}

21. The PI*PD configuration uses a?
   a. PI controller in cascade with PD controller operating in forward path on the error
   b. PI controller in forward path operating on error between output PD controller in feedback path and command input
   c. forward path sum of PI and PD controllers in tandem

22. The PIPD configuration uses?
   a. PI controller in cascade with PD controller operating in forward path on the error
   b. PI controller in forward path operating on error between PD controller in output feedback path and command input
   c. forward path sum of PI and PD controllers in tandem

23. The most well-known PID tuning methods are?
   a. Fourier transform
   b. Laplace transform
   c. Ziegler and Nichols tuning methods

24. An issue with the PID derivative term is?
   a. windup
   b. noise amplification
   c. there are not any issues

25. An issue with the PID integral term is?
   a. windup
   b. noise amplification
   c. there are not any issues

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