قائمة الاسئلة

التحكم التماثلي - كلية الهندسة - قسم الميكاترونكس- المستوى الثالث - 3 ساعات - درجة هذا الاختبار (50)

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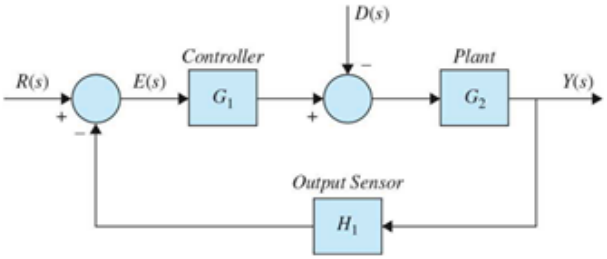
1) What is Control System?
   1) + Control system is a system in which the output is controlled by varying the input.
   2) - Control system is a device that will not manage or regulate the behaviour of other devices using control loops
   3) - Control system is a feedback system that can be both positive and negative
   4) - Control System is a system in which the input is controlled by varying the output
2) Which of the following element is not used in an automatic control system?
   1) - Final control element
   2) - Sensor
   3) + Oscillator
   4) - Error detector
3) The output of the feedback control system must be a function of _____
   1) - Output and feedback signal.
   2) + Input and feedback signal.
   3) - Reference input.
   4) - Reference output
4) The initial response when tune output is not equal to input is called:
   1) + Transient response.
   2) - Error response.
   3) - Dynamic response.
   4) - Either of the above
5) A car is moving at a constant speed of 50 km/h, which of the following is the feedback element for the driver?
   1) - Clutch.
   2) + Needle of the speedometer.
   3) - Eyes.
   4) - Steering wheel.
6) In a control system the output of the controller is given to
   1) - Amplifier.
   2) - Sensor.
   3) + Final control element.
   4) - Comparator
7) Zero initial condition for a system means:
   1) - input reference signal is zero.
   2) - zero stored energy.
   3) - no initial movement of moving parts.
   4) + system is at rest and no energy is stored in any of its components.
8) The on-off controller is a _____ system.
   1) - Digital.
   2) - Linear.
   3) - non-linear.
   4) + discontinuous.
9) 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:
   1) + not necessarily stable.
   2) - Stable.

3) - Unstable.
4) - always unstable.

10) The characteristic equation of a control system is given by s(s+4)(s2+2s+s) + k(s+1) = 0. What are the angles of the asymptotes for the root loci?
1) - 0°, 180°, 300°.
2) - 0°, 120°, 240°.
3) + 60°, 180°, 300°.
4) - 120°, 180°, 240°.

11) A control system is generally met with the time response specifications:
1) - Damping factor.
2) - Setting time.
3) - Steady state accuracy.
4) + All of the mentioned

12) **As shown in next system When $R(s) = 0$, the block diagram is simplified to give the transfer function $\frac{Y(s)}{D(s)}$ as:**



1) + $\frac{Y(s)}{D(s)} = \frac{-G_2}{1+G_1G_2H_1}$.
2) - $\frac{Y(s)}{D(s)} = \frac{G_2}{1+G_1G_2H_1}$.
3) - $\frac{Y(s)}{D(s)} = \frac{1}{1+G_1G_2H_1}$.
4) - $\frac{Y(s)}{D(s)} = \frac{-G_1}{1+G_1G_2H_1}$

13) **Considering the following T.F. of a certain first order system, the response of the system for r(t) = 5u(t) is:**

$$\frac{C(s)}{R(s)} = G(s) = \frac{10}{(s+10)}$$

1) - $c(t) = 5[1-e^{-i10t}]$
2) + $c(t) = 5[1-e^{-10t}]$
3) - $c(t) = 5[1+e^{-i10t}]$

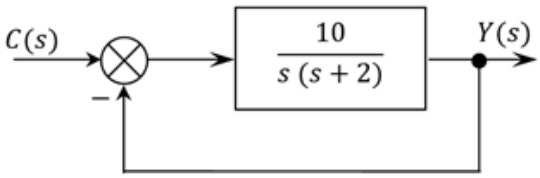
4) - $c(t) = 5[1 + e^{10t}]$

14) **Considering the following T.F. of a certain first order system, the Time delay equal:**

$$\frac{C(s)}{R(s)} = G(s) = \frac{10}{(s+10)}$$

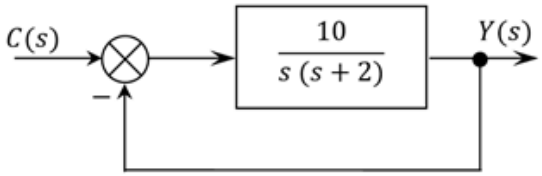
1) - 0.693 s
2) - 0.0963 s
3) + 0.0693 s
4) - 0.0363 s

15) **As following certain unity negative feedback control system for the transfer function $G(s) = \frac{Y(s)}{C(s)}$ the ω_n and ζ respectively are:**



1) - - 3.1623 and 0.3162.
2) - 3.1623 and - 0.3162.
3) - 3.21623 and 0.32162.
4) + 3.1623 and 0.3162.

16) **As following certain unity negative feedback control system the for input $C(s) = u(t)$ and transfer function $G(s) = \frac{Y(s)}{C(s)}$ the M_P and $\%M_P$ respectively are:**



1) + 0.3507 units and 35%.
2) - 0.33 units and 33%.
3) - 0.421 units and 42%.
4) - 3.507 units and 85%.

17) **By using the Routh stability criterion, and discussing the stability of the closed loop system as a function of K if the characteristic equation F(s) as follow: the range of K values are:**

$$F(s) = s^4 + 12s^3 + 69s^2 + 198s + (200 + K)$$

1) - -200 < K ;

2) + -200 < K < 666.25
3) - 0 < K < 666.25
4) - 200 < K < 666.25

18) **in systems type 0 and type 1 with input $c(t) = u(t)$ with steady state error formula $\frac{1}{1+K_P}$ the Static error constant K_P for both systems respectively are:**

1) - K_P = constant and K_P =0;
2) - $K_P = \infty$ and K_P =0;
3) - $K_P = 0$ and K_P =∞;
4) + K_P = constant and $K_P = \infty$

19) **the MATLAB statement to draw the Bode plot of the next given system is:**

$$\frac{4s+6}{s^3+3s^2+8s+6}$$

1) + num = [4 6]; den = [1 3 8 6]; sys = tf (num,den); bode(sys).
2) - num = [4 6]; den = [1 3 8 0 6]; sys = tf (num,den); bode(sys).
3) - num = [4 6]; den = [1 3 8 6]; sys = tf (den, num); bode(sys).
4) - None of the above.

20) **For the certain control system has the following transfer function, the frequency response at $\omega = 5$ rad/sec is:**

$$G(s) = \frac{5(s+2)}{(s+1)(s+4)}$$

1) + $G(j5) = 0.8247\angle -61.83°$.
2) - $G(j5) = 0.2847\angle -16.83°$
3) - $G(j5) = 0.8247\angle 61.83°$
4) - $G(j5) = 0.8247\angle -23.83°$

21) **In the control system has $H(s)\,G(s) = \frac{300\,s\,(s+5)}{(s+1)\,(s+30)}$ the starting frequency is:**

1) - $\omega_{st} = 1$ rad/sec.

2) + $\omega_{st} = 0.1$ rad/sec.

3) - $\omega_{st} = 0.5$ rad/sec.

4) - $\omega_{st} = 0.25$ rad/sec.

22) **In the control system has $H(s)\,G(s) = \frac{300\,s\,(s+5)}{(s+1)\,(s+30)}$ the starting magnitude is:**

1) - 14
2) - 13.5
3) + 13.98
4) - 12.97

23) **In the closed loop transfer function $G(s) = \frac{C(s)}{R(s)}$ and the characteristic equation is $1 + H(s)\,G(s) = 0$, and $H(s)\,G(s) = \frac{K}{(s+2)\,(s+4)}$ the breakaway point is:**

1) - -2.5
2) + -3
3) - 3
4) - -3.5