1 15sec +2.0 -0.66

For the system, $\dot{x} = \begin{bmatrix} 0 & 2 \\ 3 & 2 \end{bmatrix} x + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u$

and y = [1 0]x

check controllability and observability

1. Controllable but not observable

2. Not controllable but observable

3. Neither controllable not observable

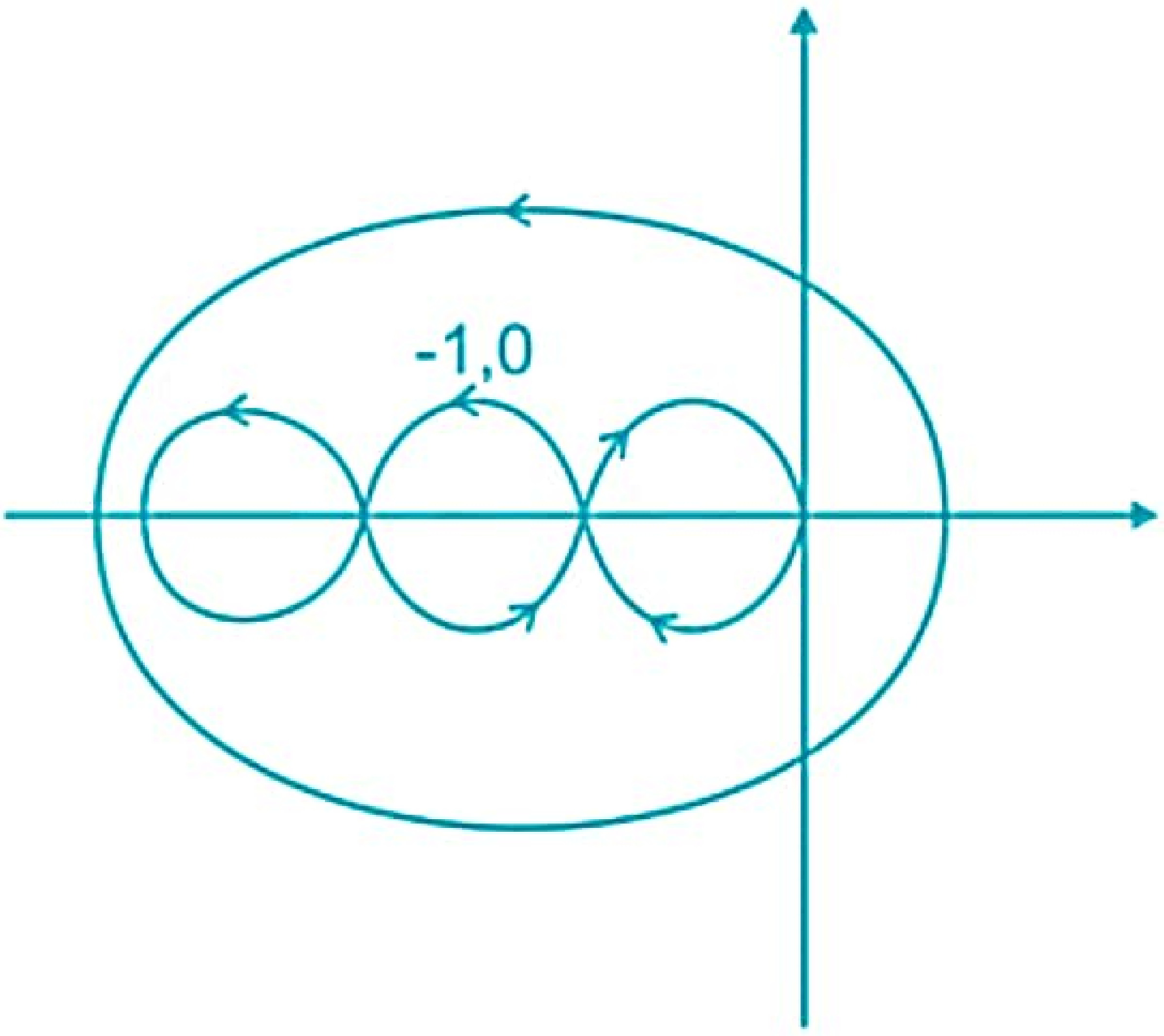
4. Controllable and observable

View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions.

2 19sec +1.0 -0.0

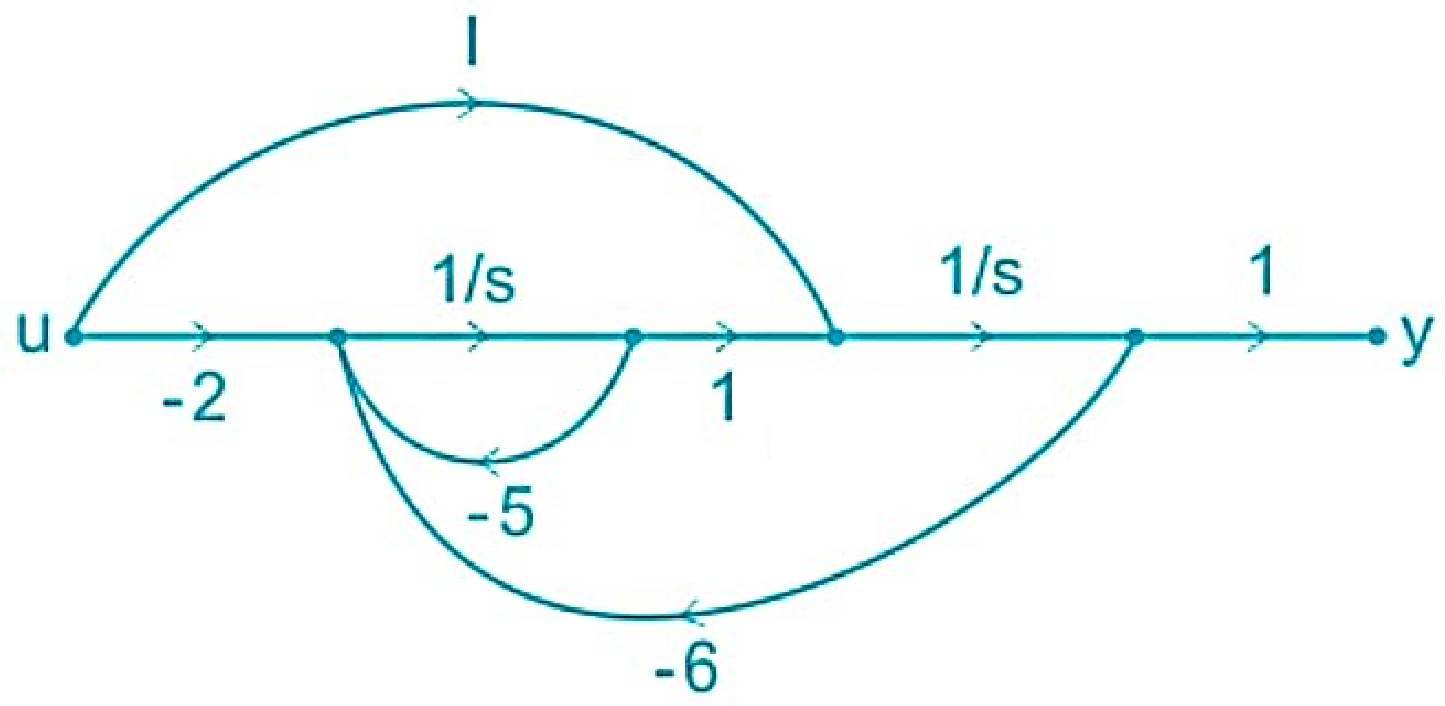
For the Nyquist plot shown below, the closed loop system is stable, then the number of open poles of GH lies on right half of the s-plane is______



Answer SUBMIT

3 14sec +1.0 -0.33

The observability matrix for the given signal flow graph is



1. $\begin{bmatrix} 1 & -2 \\ -2 & 4 \end{bmatrix}$

2. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

3. $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

4 4sec +2.0 -0.0

For a given open – loop transfer function

$$G(s) = \frac{k(s-2)\left(s-\frac{3}{2}\right)}{s(s+2)(s+4)}$$

The point of intersection of the asymptote of the root locus with the real axis is______

Answer SUBMIT

View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions.

5 2min 58sec | +2.0 -0.66

A unity feedback has an open-loop transfer function $G(s) = \frac{10(s+2)(s+3)}{s(s+3.5)(s+2.5)}$

What will be the steady-state error if it is excited with input x(t) = 15tu(t) unit ramp input?

1. 2.1875
2. 0
3. 4
4. 102.8

View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions

6 0sec | +2.0 -0.0

Step response of a second order system is

$$s(t) = 1 - \frac{e^{-1.5t}}{\sqrt{0.91}} \sin\left[\omega_n \sqrt{0.91}t + 72.5^\circ\right]$$

Damping frequency of the system is ________ rad/sec

Answer SUBMIT

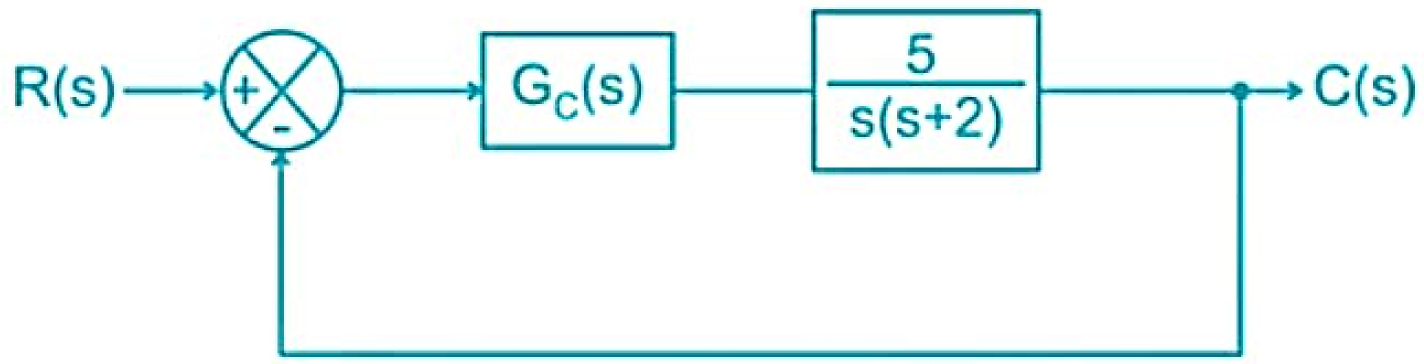
View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions.

7 1min 44sec +1.0 -0.0

Consider the feedback control system shown in figure below, where closed loop transfer function is

$$\frac{5s+20}{s^2+7s+20}$$



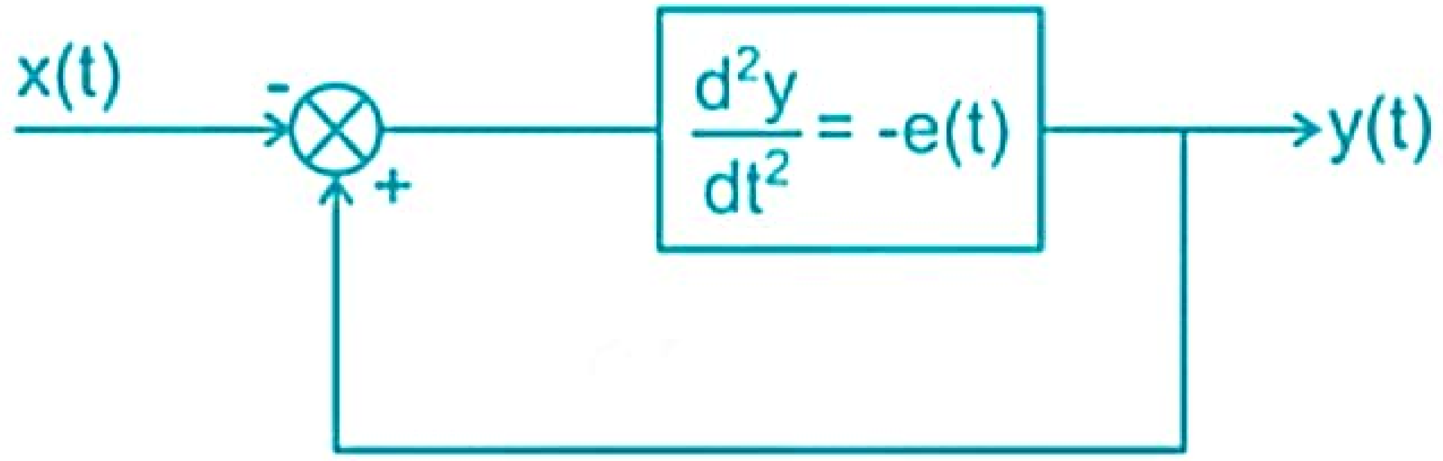
The phase of the controller $G_c(s)$ at $\omega = 4\sqrt{3}$ rad/sec is ________ (in degrees).

Answer SUBMIT

View Solution

8 3min 30sec +1.0 -0.33

For the system shown in figure, e(t) is the error between input x(t) and output y(t)



If x(t) = t u(t) and all initial conditions are zero, then e(t) will be

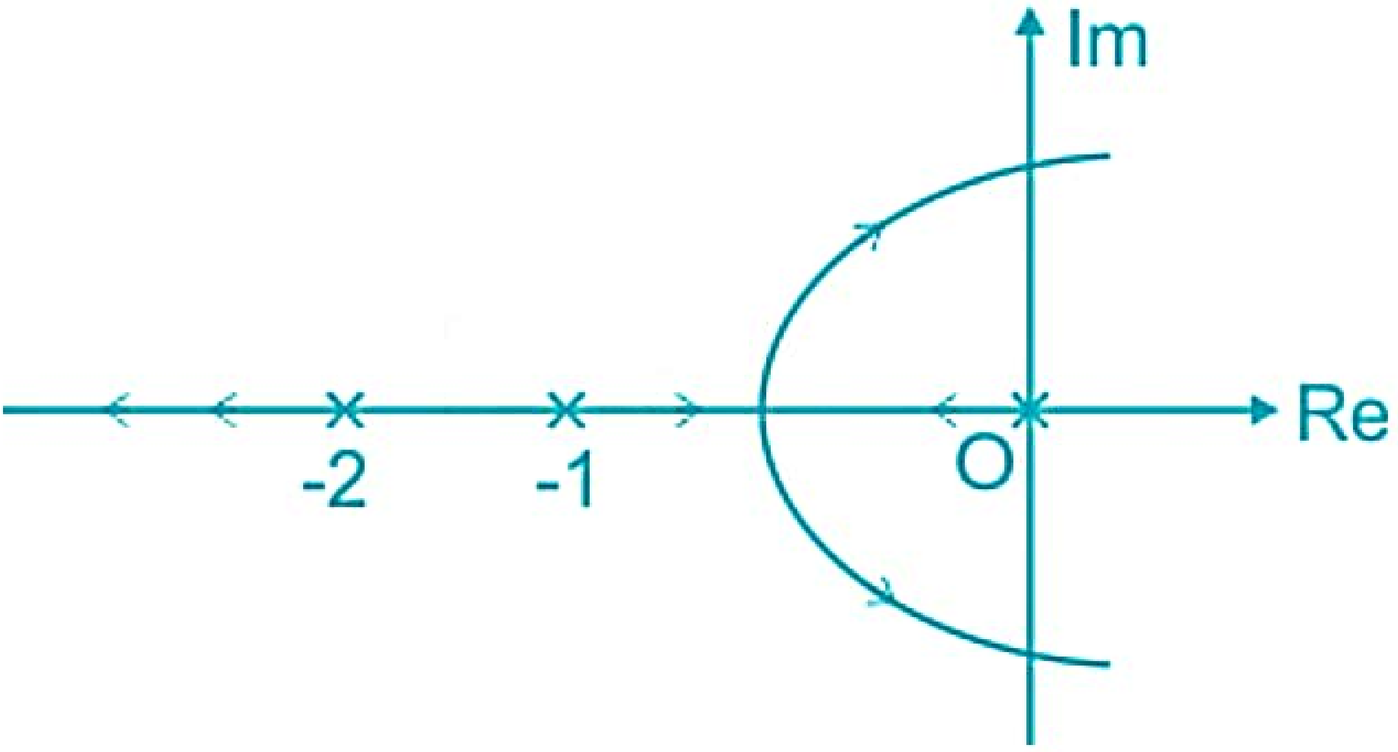
1. sin t
2. cos t
3. -cos t
4. -sin t

View Solution

9 6sec +2.0 -0.0

The root locus plot for a system, with open loop transfer function $\frac{k}{s(s+1)(s+2)}$ is shown in figure

The minimum value of k for which the system is underdamped is ______



Answer SUBMIT

10 0sec +0.0 -0.0

Consider the polynomial
$P(s) = s^5 + 5s^4 + 11s^3 + 23s^2 + 28s + 12$
Using the Routh Hurwitz criteria, which of the following is/are true?

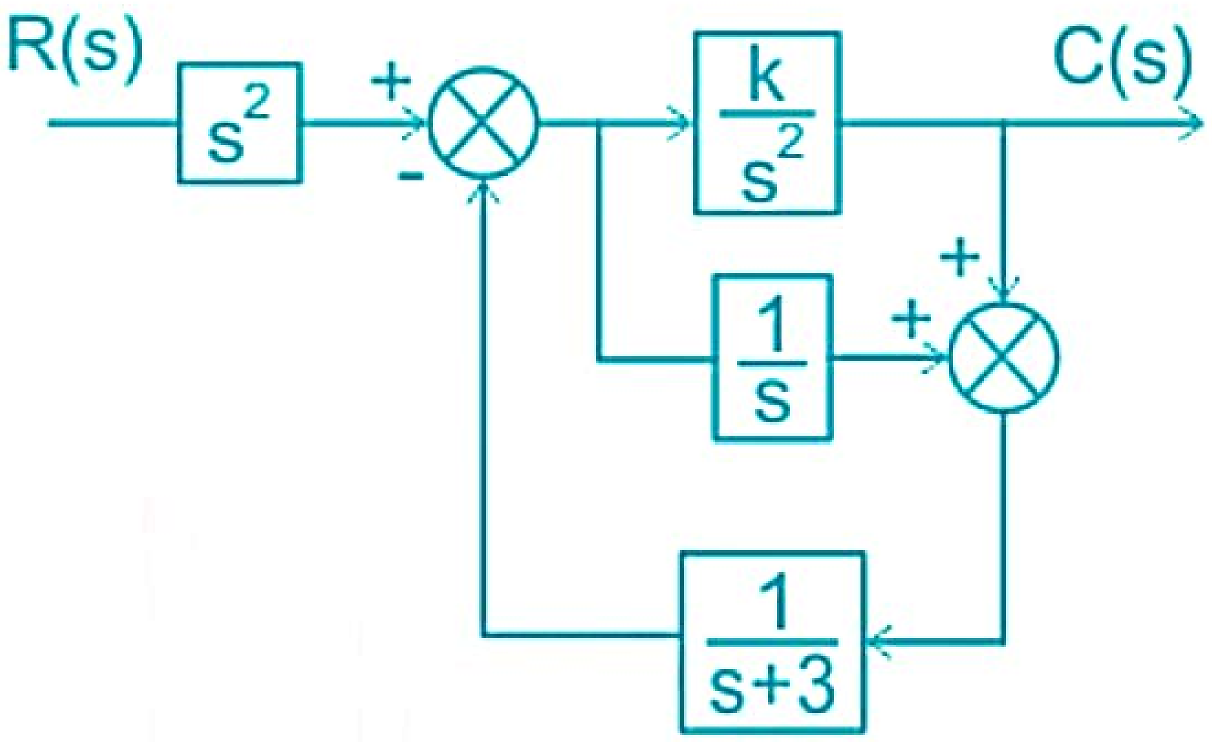
**This question may have multiple correct answers*

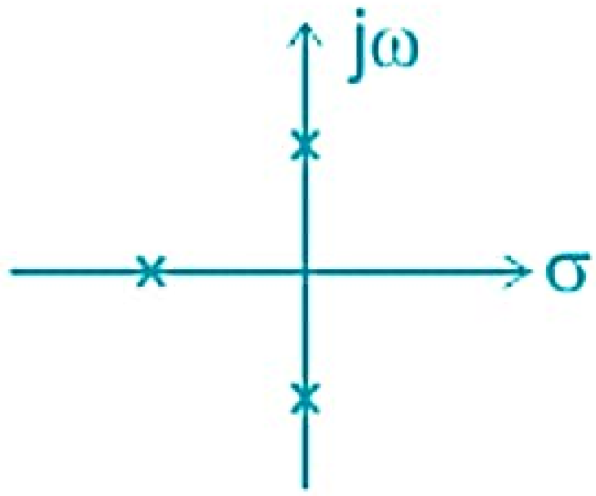
1. The system has no roots on the imaginary axis
2. The system has multiple roots at the origin
3. The system is stable
4. The system has three poles on the left half of s-plane

Submit

11 4sec +2.0 -0.0

The value of K in the system of figure that will place the closed loop poles as shown is



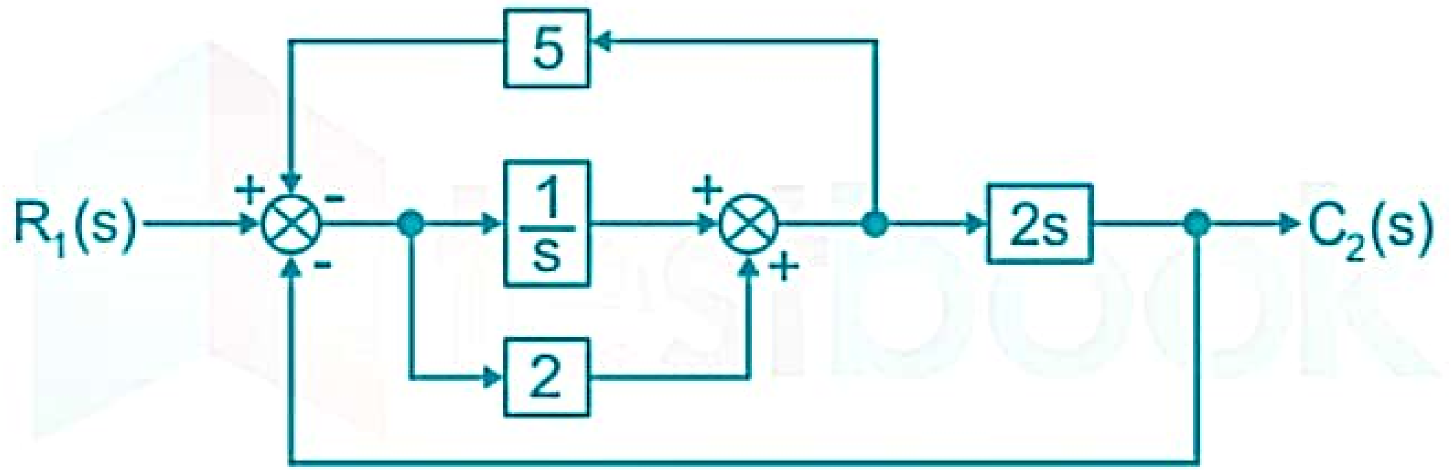


Answer

SUBMIT

12 15sec +1.0 -0.33

A block diagram is shown below.



The transfer function for this system is

1. $\frac{2s(2s+1)}{2s^2+3s+5}$

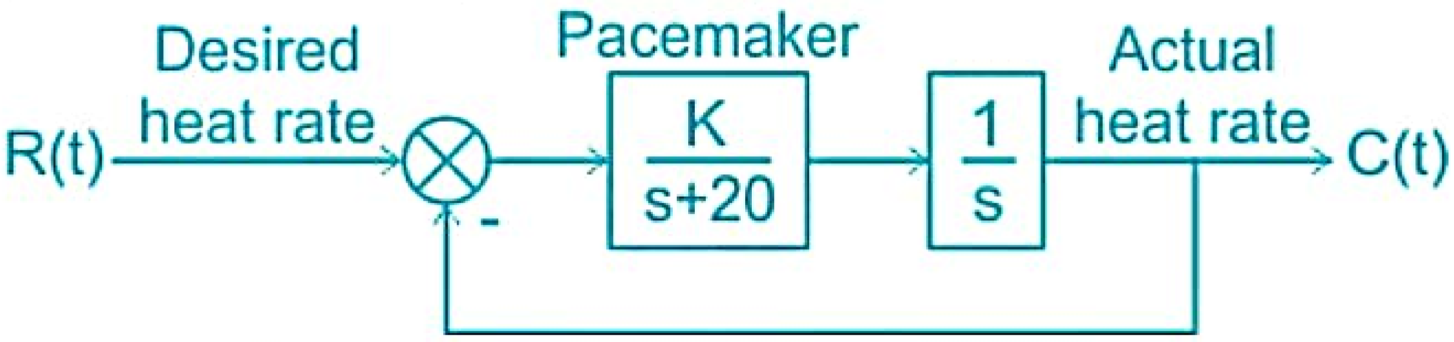
2. $\frac{2s(2s+1)}{2s^2+13s+5}$

3. $\frac{2s(2s+1)}{4s^2+13s+5}$

4. $\frac{2s(2s+1)}{4s^2+3s+5}$

13 1sec +2.0 -0.0

The block diagram of an electronic pacemaker is given in figure.



The value of K for which the steady state error to a ramp input will be 0.02

Answer

SUBMIT

View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions.

14 0sec | +1.0 -0.0

In a control system with unity gain feedback, the transfer function of the loop-gain function is $L(s) = \frac{9e^{-0.1s}}{s}$. The phase margin of the loop-gain function L(s) is ______ degree.

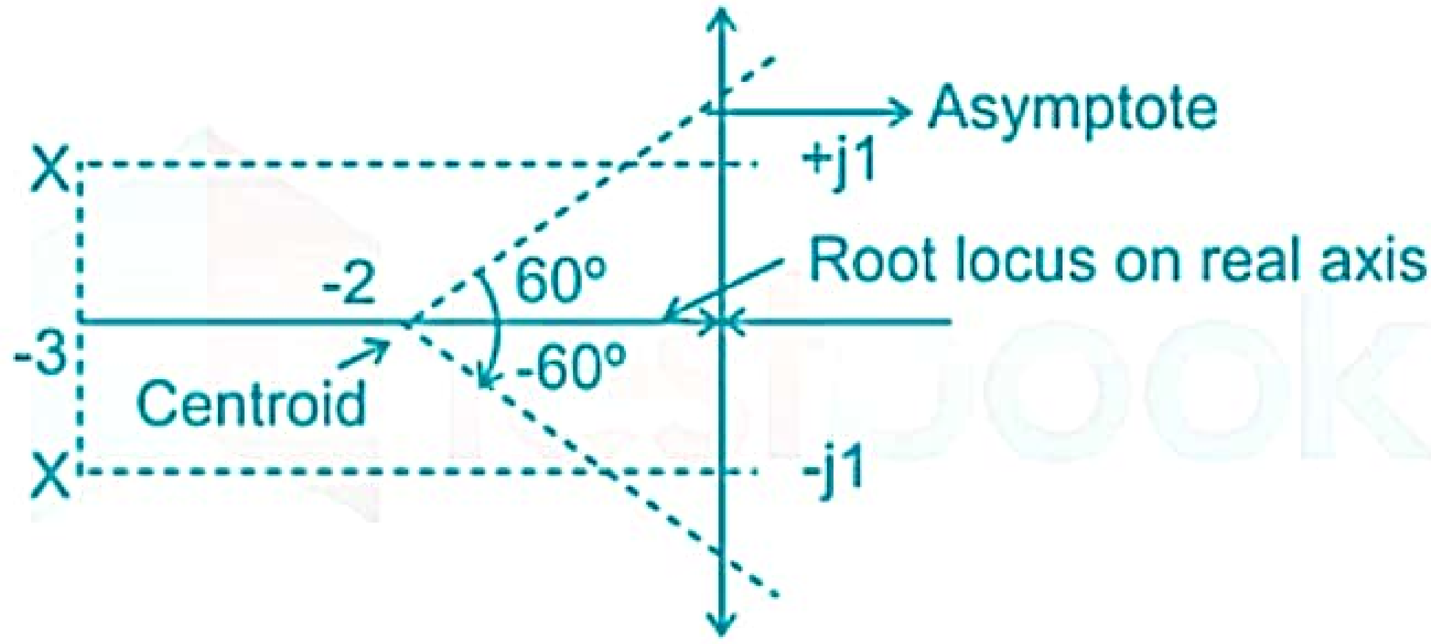
Answer SUBMIT

View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions.

15 1sec +1.0 -0.33

Figure shows the Asymptote row locus on real axis and location of poles and centroid



The Break in point of the root locus is

1. -3
2. -2
3. -1.18
4. -2.82

16 0sec +0.0 -0.0

Considering the frequency response of the standard second-order closed-loop system, with the transfer function

$$T(s) = \frac{\omega_n^2}{s^2+2\xi\omega_n s+\omega_n^2}$$

The closed-loop system has the following performance characteristics.

$\xi = 0.2$, t_s (2% criteria) = 0.5 s

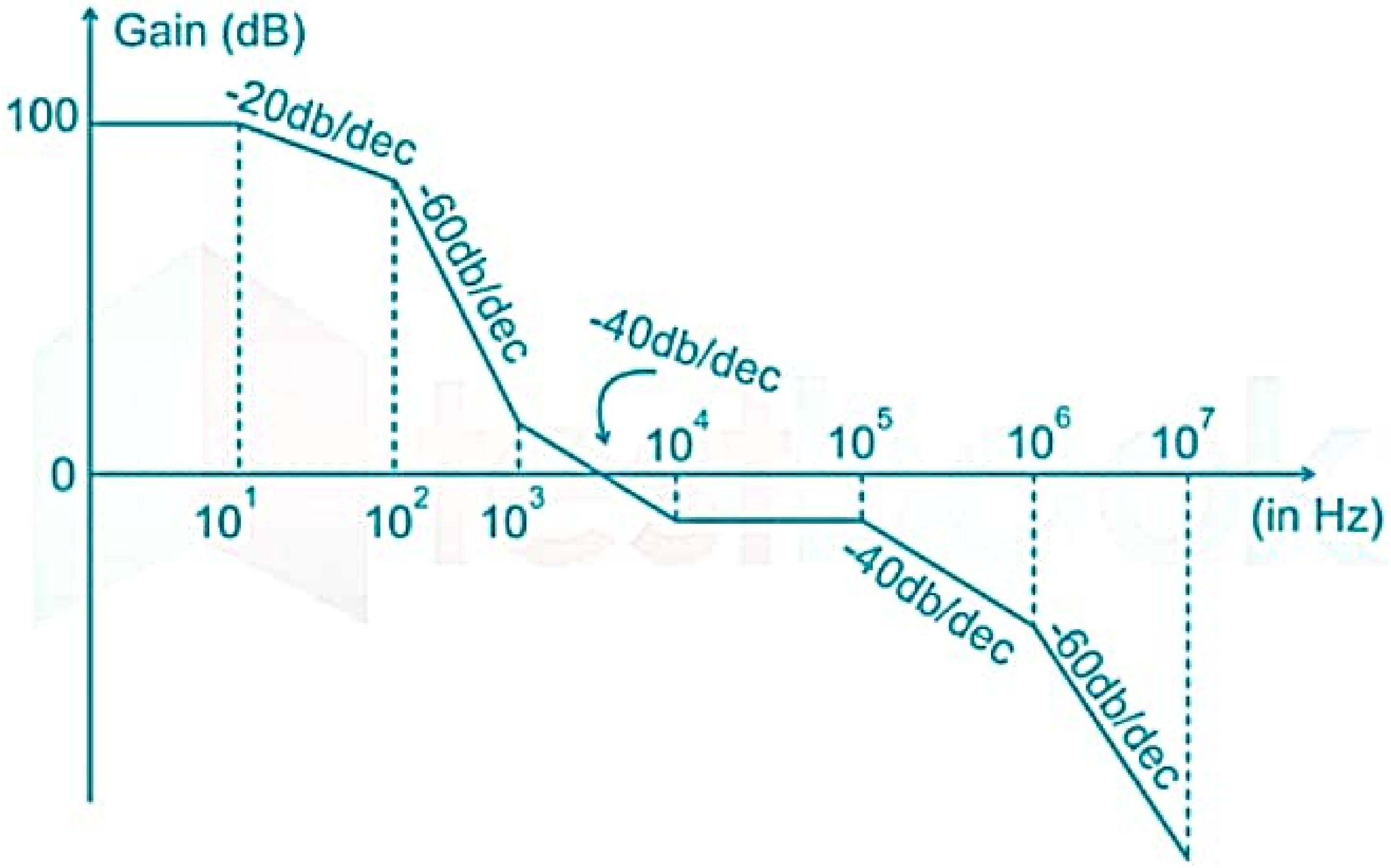
Which of the following is/are true?

**This question may have multiple correct answers*

1. Natural frequency is 40 rad/sec
2. Resonant peak frequency is 40 rad/sec
3. Magnitude of resonant peak is 2.55
4. settling time for 5% criteria is 0.375 s

17 1sec +2.0 -0.66

For an LTI system, the Bode plot for its gain is as illustrated in the figure shown. The transfer function of the system is:



1. $$H(s) = \frac{10^5\left(1+\frac{s}{1000}\right)\left(1+\frac{s}{10^4}\right)}{\left(1+\frac{s}{10}\right)\left(1+\frac{s}{100}\right)^2\left(1+\frac{s}{10^5}\right)^2\left(1+\frac{s}{10^6}\right)}$$

2. $$H(s)$$

$$10^5\left(1+\frac{s}{1000}\right)\left(1+\frac{s}{10^4}\right)^2$$

18 0sec | +0.0 -0.0

The state-space representation for a system is given by:

$$\dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -36 & -15 \end{bmatrix} x + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$

y = [1000 100 0] x

Which of the following statements is/are true?

This question may have multiple correct answers

1. The system is stable

2. The closed-loop poles lie on the right half of the s-plane are 2.

3. The closed-loop poles lie on the left half of s-plane are 2 and one pole is at the origin

4. The system is marginally stable

19 2sec +1.0 -0.33

An open loop transfer function with negative unity feedback is given as $G(s) = \frac{K(s+1)}{s(s+2)(s+5)}$. The number of asymptotes will be

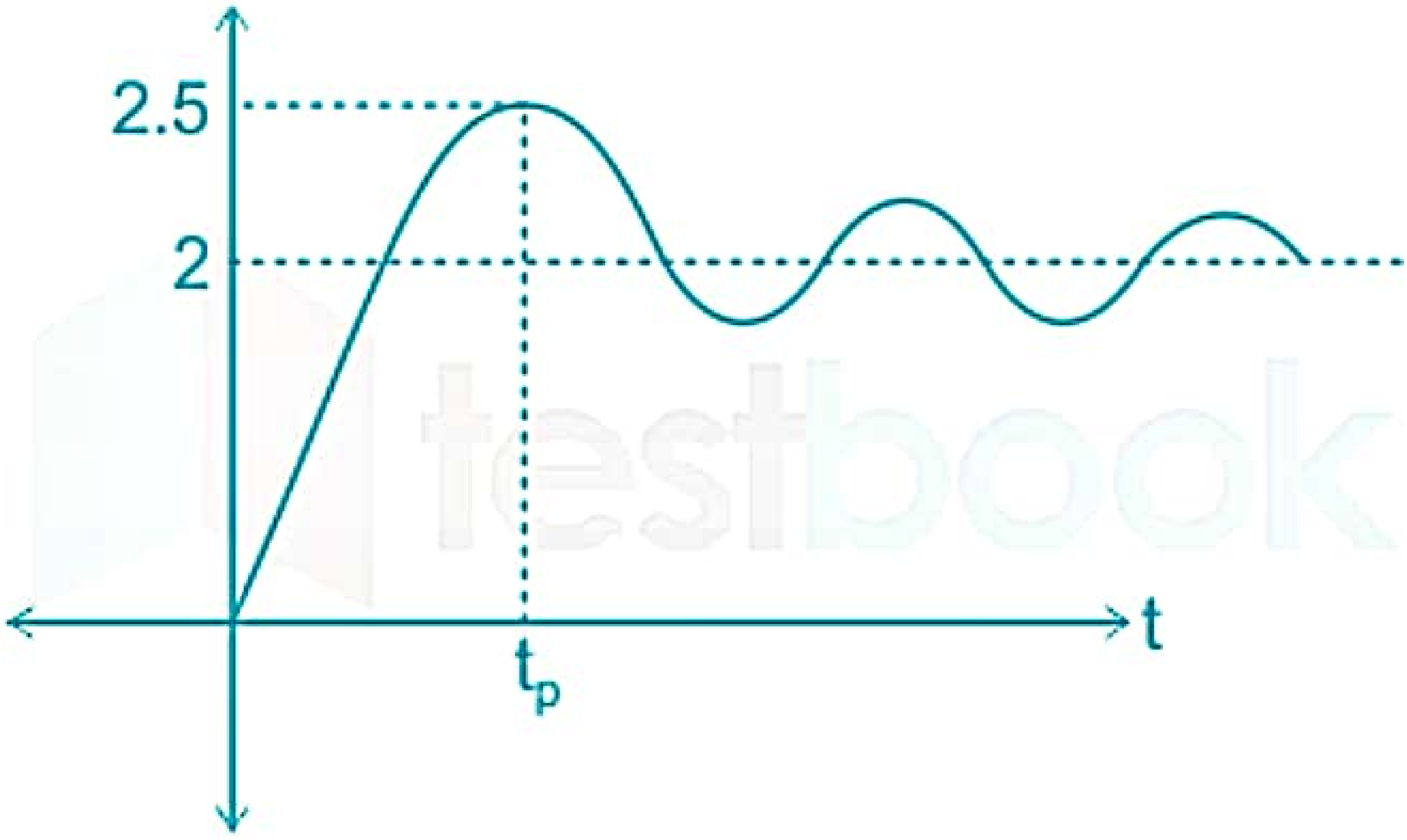
1. Three
2. Four
3. Two
4. One

View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions.

20 4sec +2.0 -0.0

The output response of the second-order system is shown for the step input.



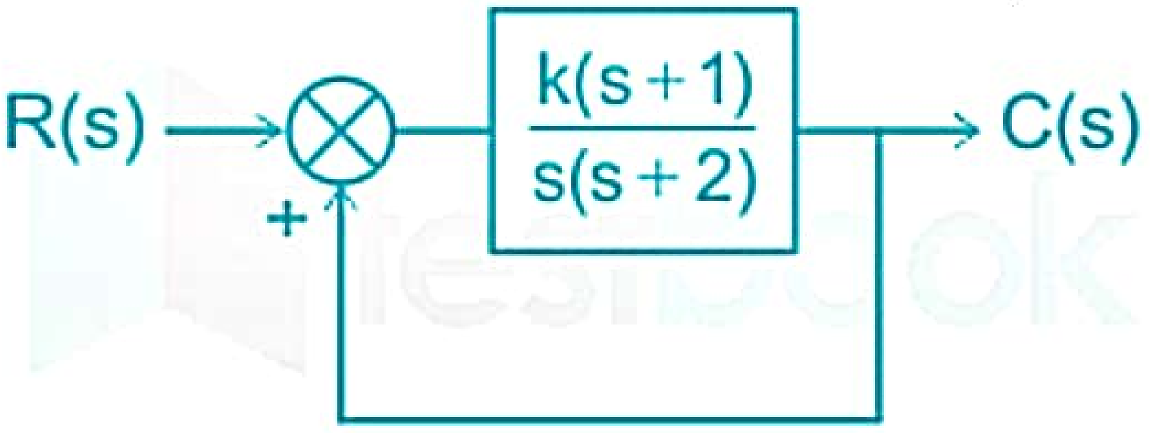
Find the Maximum peak overshoot for this system in percentage.

Answer SUBMIT

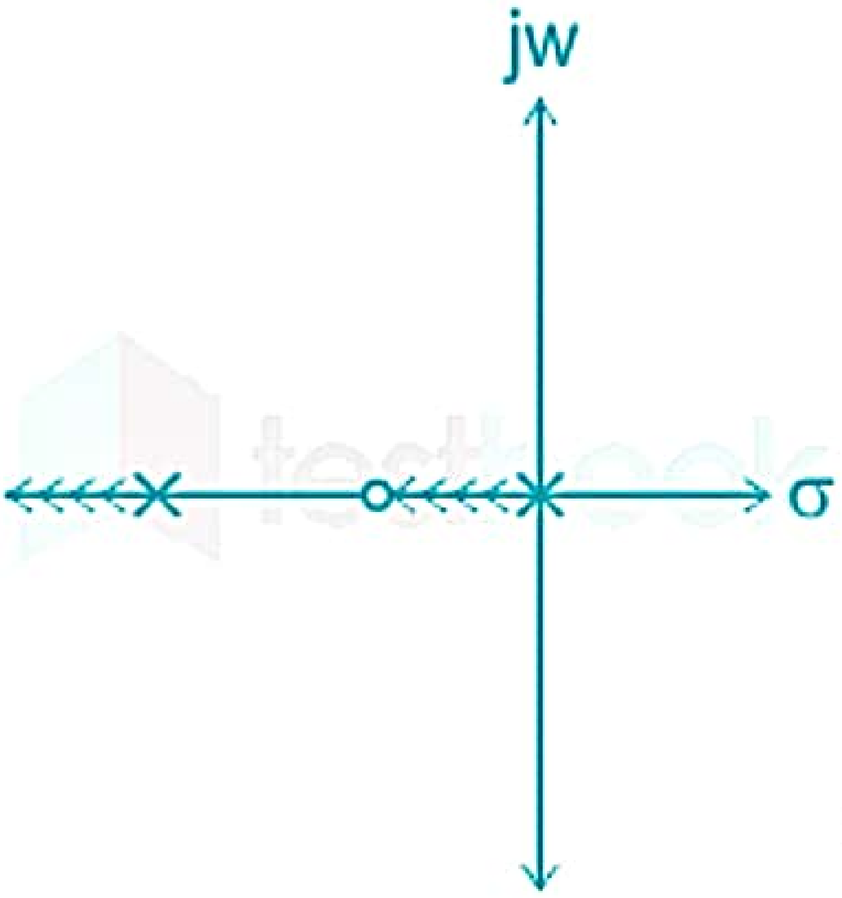
View Solution

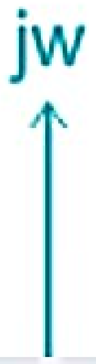
21 1sec +2.0 -0.66

If the value of gain K varies from -∞ to 0 then draw the root locus of the positive feedback system shown below. ($-\infty < K < 0$)



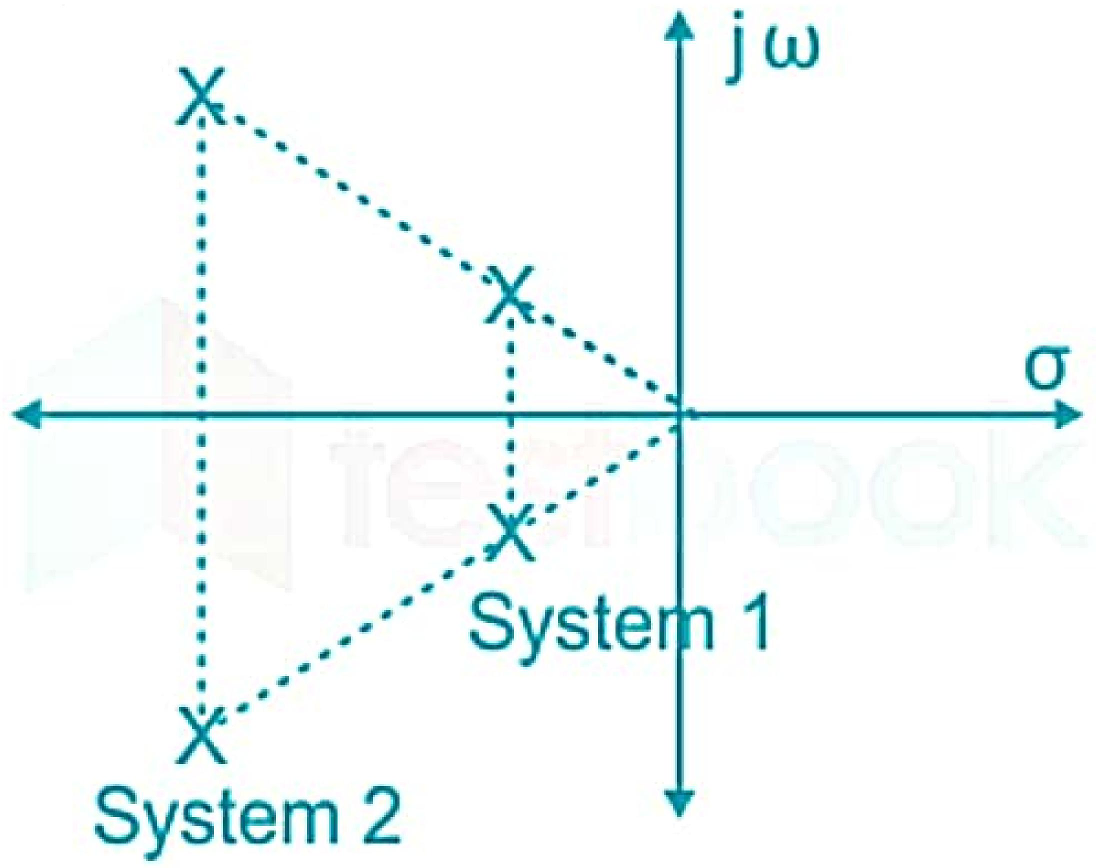
1.





22 0sec +0.0 -0.0

The location of poles for two different systems are shown, Which of the following is/are true?



This question may have multiple correct answers

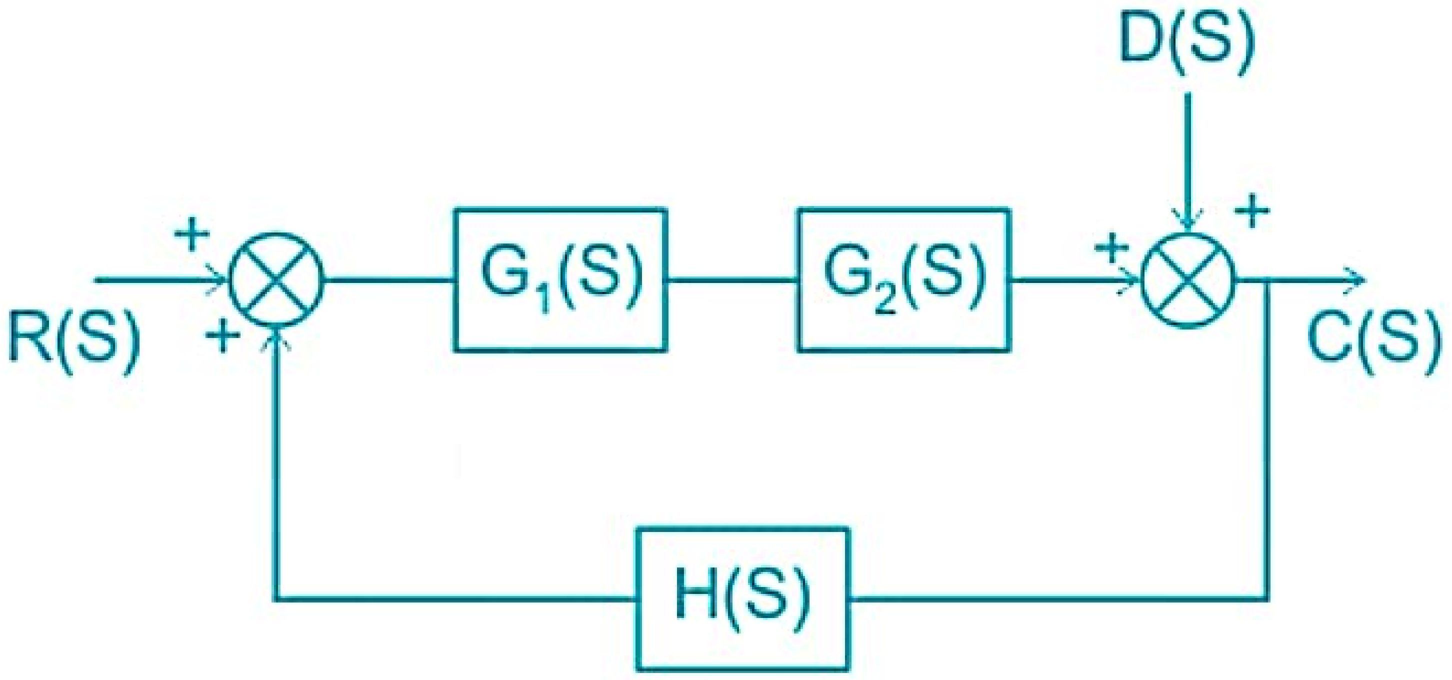
1. Damping ratio of system-2 is higher then the system-1

2. Resonance frequency of systen-2 is higher then the system-1

3. Peak time of the system-2 is lesser then the peak time of

23 2sec +1.0 -0.33

For the given block diagram find the transfer function of the system by considering only disturbance as input.



1. $\frac{1}{(1-G_1G_2H)}$

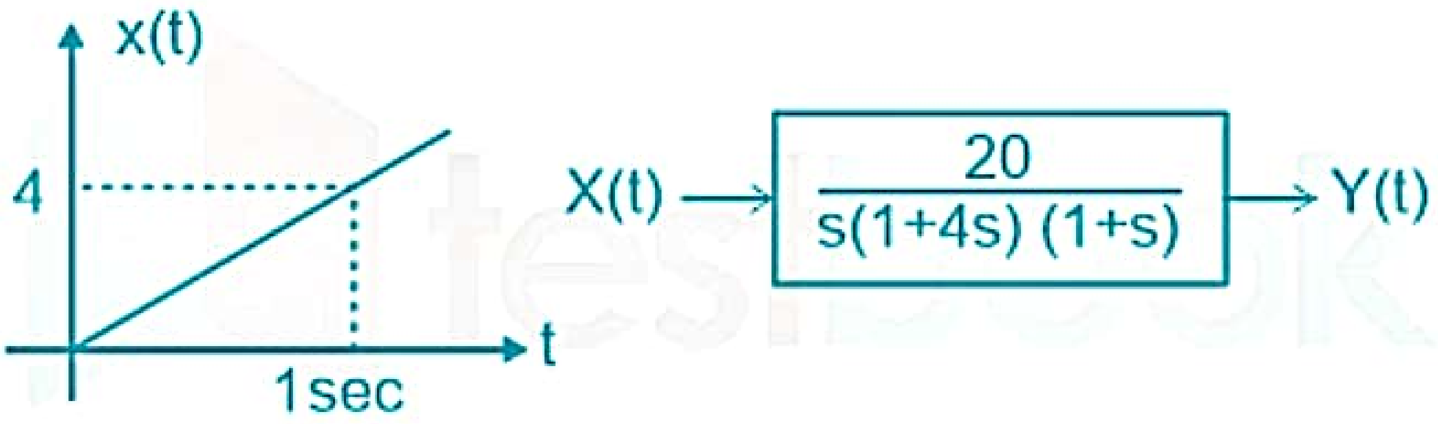
2. $\frac{1}{(1+G_1G_2H)}$

3. $\frac{G_1G_2}{(1-G_1G_2H)}$

4. $\frac{G_1G_2}{(1+G_1G_2H)}$

24 0sec | +2.0 -0.66

For the given system find the steady-state error in the output Y(t). A negative unity feedback is applied in the system.



1. 0.2

2. 5

3. 0

4. ∞

View Solution

25 3sec +1.0 -0.33

Compute the open loop DC gain if the closed loop transfer function is $\frac{2s+6}{2s^2+10s+14}$ with unity feedback factor.

1. 0.75

2. 3

3. 0.5

4. 1

View Solution

Re-attempt mode is ON. Turn OFF the Re-attempt mode or re-attempt the question to see the solutions.