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[NPTEL \(https://swayam.gov.in/explorer?ncCode=NPTEL\)](https://swayam.gov.in/explorer?ncCode=NPTEL) » **Control systems (course)**
[Announcements \(announcements\)](#)
[About the Course \(preview\)](#)
[Ask a Question \(forum\)](#)
[Progress \(student/home\)](#)
[Mentor \(student/mentor\)](#)

Unit 5 - Week 3

Course outline

How to access the portal

Pre-requisite Assignment

Week 1

Week 2

Week 3

 Effect of Zeros - Part 1 (unit?unit=25&lesson=26)

 Effect of Zeros- Part 2 (unit?unit=25&lesson=27)

 Closed Loop System - Part 1 (unit?unit=25&lesson=28)

 Closed Loop System- Part 2 (unit?unit=25&lesson=29)

 First Order Systems - Part 1 (unit?unit=25&lesson=30)

 First Order Systems- Part 2 (unit?unit=25&lesson=31)

 Quiz : Assignment 3 (assessment?name=126)
 Week 3 - Feedback: Control systems (unit?unit=25&lesson=32)

 WEEK 3 - Assignment Solution (unit?unit=25&lesson=33)

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

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Assignment 3

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-08-21, 23:59 IST.

1) A LTI system is governed by $\ddot{y}(t) + 12\dot{y}(t) + 20y(t) = \dot{u} + 4u(t)$, The dominant pole is **1 point**

- 12
 -10
 -2
 -4

No, the answer is incorrect.
Score: 0

Accepted Answers:
-2

2) The steady state value of the unit step response of the system given in problem 1 is **1 point**

- 0.2
 1
 3
 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.2

3) In the unit step response of the system given in problem 1, the coefficient that multiplies the exponential term whose exponent is the dominant pole is **1 point**

- 0.2
 0.5
 0.75
 -0.125

No, the answer is incorrect.
Score: 0

Accepted Answers:
-0.125

4) A zero of a transfer function in the right half complex plane is called **1 point**

- a stable zero
 an unstable zero
 a minimum phase zero
 a non-minimum phase zero

No, the answer is incorrect.
Score: 0

Accepted Answers:
a non-minimum phase zero

5) The governing equation of a first order LTI system with time delay is $\dot{y}(t) + 2y(t) = u(t - 0.2)$. The approximate transfer function of this system using the 1st order Pade approximation is **1 point**

- $\frac{(20 - 2s)}{(2s + 1)(20 + s)}$
 $\frac{(10 - 2s)}{(2s + 1)(20 + s)}$

$$\frac{(10 - s)}{(s + 2)(10 + s)}$$

$$\frac{(10 - s)}{(s + 1)(10 + s)}$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\frac{(10 - s)}{(s + 2)(10 + s)}$$

6) Consider a negative unity feedback system whose plant transfer function is $\frac{5}{(s^2 - 2s)}$ and controller transfer function is $s+1$. Then, the closed loop transfer function is **1 point**

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

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

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

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

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

7) If one considered unity positive feedback in problem 6, with everything else remaining the same, the corresponding closed loop transfer function is **1 point**

$$\frac{5(s + 1)}{(s^2 - 7s - 5)}$$

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

$$\frac{(5s + 1)}{(s^2 - 7s)}$$

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\frac{5(s + 1)}{(s^2 - 7s - 5)}$$

8) Which ONE of the following statements is TRUE about problems 6 and 7? **1 point**

- The closed loop system is stable with negative feedback but not with positive feedback
- The closed loop system is stable with positive feedback but not with negative feedback
- The closed loop system is stable with both positive and negative feedback
- The closed loop system is unstable with both positive and negative feedback

No, the answer is incorrect.

Score: 0

Accepted Answers:

The closed loop system is stable with negative feedback but not with positive feedback

9) The open loop transfer function corresponding to problem 6 is **1 point**

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

$$\frac{(s + 5)}{(s^2 - 2s)}$$

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

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
$$\frac{5(s+1)}{(s^2-2s)}$$

10) The open loop transfer function corresponding to problem 7 is

1 point

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

$$\frac{(s+5)}{(s^2-2s)}$$

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

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
$$\frac{5(s+1)}{(s^2-2s)}$$

11) Which ONE of the following statements is TRUE about a stable first order LTI system?

1 point

- The unit step response always converges to zero as time increases to infinity
- The unit impulse response converges asymptotically to a non-zero value as time increases to infinity
- The magnitude of the unit ramp response tends asymptotically to a finite value as time increases to infinity
- It has one pole in the left half complex plane

No, the answer is incorrect.
Score: 0

Accepted Answers:
It has one pole in the left half complex plane

12) At a time instant equal to thrice the time constant of a stable first order LTI system, the ratio of its unit step response value to the final asymptotic value of its unit step response is

1 point

- 0.632
- 0.865
- 0.95
- 0.982

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.95

13) When the system whose transfer function is $\frac{1}{s+2}$ is subjected to a unit step input, the difference between the output and the input asymptotically tends to

1 point

- 0.25
- 0.5
- 1
- 1

No, the answer is incorrect.
Score: 0

Accepted Answers:
-0.5

14) The governing equation of a first order LTI system is $\dot{y}(t) + 2y(t) = 4u(t)$. The steady state value of its unit step response is

1 point

- 1
- 2
- 4
- 0.5

No, the answer is incorrect.
Score: 0

Accepted Answers:
2

15) The governing equation of a first order LTI system is $\dot{y}(t) + 4y(t) = u(t)$. Which ONE of the following statements about this system is TRUE?

1 point

- Its response has an oscillatory component

- It is unstable
- Its settling time is 1 s
- The steady state value of its unit step response is 1

No, the answer is incorrect.
Score: 0

Accepted Answers:
Its settling time is 1 s