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Unit 5 - Week 3

Assignment 3

The due date for submitting this assignment has passed. **Due on 2019-08-21, 23:59 IST.**
As per our records you have not submitted this assignment.

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