

ECE-205 Practice Quiz 7

(no Tables, Calculators, or Computers)

Problems 1-3 assume we have a system modeled with the transfer function

$$H(s) = \frac{s+2}{(s+1)(s+3)(s+4)}$$

- 1) This system model has how many **zeros**? a) 0 b) 1 c) 2 d) 3
- 2) This system model has how many **poles**? a) 0 b) 1 c) 2 d) 3
- 3) How many terms will there be in the partial fraction expansion?
a) 0 b) 1 c) 2 d) 3
- 4) How many terms will there be in the partial fraction expansion of $H(s) = \frac{1}{s(s+1)^2}$?
a) 0 b) 1 c) 2 d) 3

For problems 5-7 assume we have a system modeled by the transfer function $H(s)$.

5) To determine the **impulse response** we should compute the inverse Laplace transform of

- a) $Y(s) = H(s)$ b) $Y(s) = H(s)\frac{1}{s}$ c) $Y(s) = H(s)\frac{1}{s^2}$ d) $Y(s) = H(s)\frac{1}{s^3}$

6) To determine the **(unit) step response** we should compute the inverse Laplace transform of

- a) $Y(s) = H(s)$ b) $Y(s) = H(s)\frac{1}{s}$ c) $Y(s) = H(s)\frac{1}{s^2}$ d) $Y(s) = H(s)\frac{1}{s^3}$

7) To determine the **(unit) ramp response** we should compute the inverse Laplace transform of

- a) $Y(s) = H(s)$ b) $Y(s) = H(s)\frac{1}{s}$ c) $Y(s) = H(s)\frac{1}{s^2}$ d) $Y(s) = H(s)\frac{1}{s^3}$

8) For the transfer function

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

the corresponding impulse response $h(t)$ is composed of which terms?

- a) $t^2 e^{-2t}$ b) t and te^{-2t} c) 1 and te^{-2t}
d) te^{-2t} e) 1 , e^{-2t} , and te^{-2t}

9) An impulse response $h(t)$ is composed of the terms 1 , t , e^{-t}

A possible corresponding transfer function (for some constant value A) is

- a) $H(s) = \frac{A}{s(s+1)}$ b) $H(s) = \frac{A}{s^2(s+1)}$
c) $H(s) = \frac{As}{(s+1)}$ d) $H(s) = \frac{A}{s(s+1)^2}$

10) In using partial fractions to go from the Laplace domain to the time domain for a transfer function with no pole/zero cancellations, the number of terms used in the partial fraction expansion is determined by

- a) the zeros of the transfer function b) the poles of the transfer function

11) For the transfer function

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

The partial fraction expansion will be of the form

- a) $H(s) = \left(\frac{A}{s+1}\right)\left(\frac{B}{s+2}\right)\left(\frac{C}{(s+2)^2}\right)$ b) $H(s) = \frac{A}{s+1} + \frac{B}{s+2} + \frac{C}{(s+2)^2}$
c) $H(s) = \frac{A}{s+1} + \frac{C}{(s+2)^2}$ d) $H(s) = \left(\frac{A}{s+1}\right)\left(\frac{C}{(s+2)^2}\right)$

12) The Laplace transform of $x(t) = u(t) - u(t-2)$ is

a) $X(s) = 1 - e^{-2s}$ b) $X(s) = 1 - e^{+2s}$ c) $X(s) = \frac{1}{s} - \frac{e^{-2s}}{s}$ d) none of these

13) The Laplace transform of $x(t) = te^{-3t}u(t)$ is

a) $X(s) = \frac{1}{s} \frac{1}{s+3}$ b) $X(s) = \frac{1}{s+3}$ c) $X(s) = \frac{1}{(s+3)^2}$ d) $X(s) = \frac{2}{(s+3)^2}$

14) The Laplace transform of $x(t) = (t-2)u(t-2)$ is

a) $X(s) = \frac{1}{s-2}$ b) $X(s) = \frac{e^{-2s}}{s}$ c) $X(s) = \frac{e^{-2s}}{s-2}$ d) none of these

15) The Laplace transform equivalent impedance of an inductor (assuming the initial conditions are equal to zero) is

a) $Z(s) = \frac{1}{Ls}$ b) $Z(s) = \frac{L}{s}$ c) $Z(s) = Ls$ d) $Z(s) = \frac{s}{L}$

16) The Laplace transform equivalent impedance of a capacitor (assuming the initial conditions are equal to zero) is

a) $Z(s) = Cs$ b) $Z(s) = \frac{C}{s}$ c) $Z(s) = \frac{s}{C}$ d) $Z(s) = \frac{1}{sC}$

Answers: 1-b, 2-d, 3-d, 4-d, 5-a, 6-b, 7-c, 8-e, 9-b, 10-b, 11-b, 12-c, 13-c, 14-d, 15-c, 16-d