## 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)

b) 
$$Y(s) = H(s) \frac{1}{s}$$

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) 
$$Y(s) = H(s) \frac{1}{s}$$

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

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

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

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### 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)  $t^2e^{-2t}$  b) t and  $te^{-2t}$  c) l and  $te^{-2t}$

- d)  $te^{-2t}$  e) 1.  $e^{-2t}$ , and  $te^{-2t}$

### 9) An impulse response h(t) is composed of the terms

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

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

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

c) 
$$H(s) = \frac{As}{(s+1)}$$

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

b) 
$$H(s) = \frac{A}{s+1} + \frac{B}{s+2} + \frac{C}{(s+2)^2}$$

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

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)  $Z(s) = \frac{1}{sC}$