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^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) $H(s) = \frac{A}{s^2(s+1)}$
- 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) $Z(s) = \frac{1}{sC}$