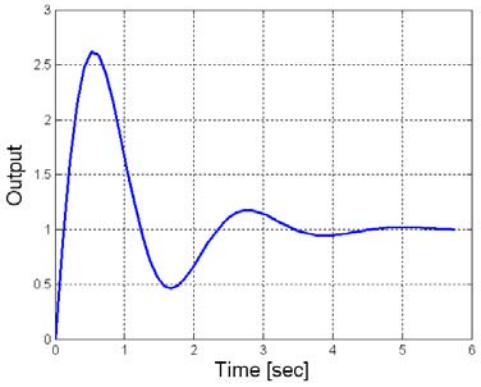
ESE 406/505 & MEAM 513 – 2011-Feb-21 – Quiz – Name:_____

- Choose only one answer for each question by circling the letter.
- A correct answer is worth 2 points.
- No answer is worth 0 points.
- An incorrect answer is worth -1 point. Random guessing will lower your score, on average.

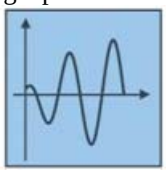
1. Which of the following is the BEST ESTIMATE of the transfer function whose step response is shown at right?

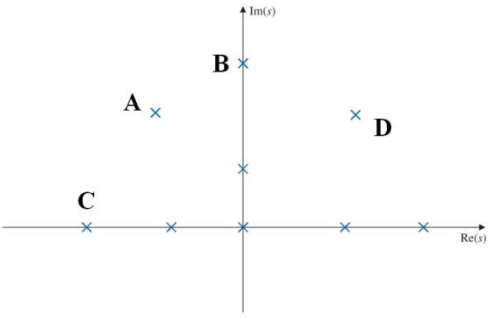


   A. $\frac{9}{s^2+9}$.
   B. $\frac{9}{s^2+6s+9}$
   C. $\frac{9s}{s^2+2s+9}$
   D. $\frac{9s+9}{s^2+2s+9}$

2. Which of the following is MOST CORRECT concerning the unit step response of the transfer function $\frac{4s+8}{(s^2+s+4)(s+1)}$?
   A. The steady-state value of the output will be 4.
   B. The first-order zero in the numerator will dramatically reduce the peak overshoot.
   C. The value of the second derivative of the output at t=0+ will be 4.
   D. None of the above is correct.

3. Match the transient response shown below to the corresponding letter identifying a pole in the complex plane at right.





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4. If $Y(s)=\frac{6}{s+1}U(s)$, what is the steady-state response to $u(t)=\sin(t)$?
   A. $y(t)\approx 3.6\sin(6t)$.
   B. $y(t)\approx 2.4\cos(t+45°)$.
   C. $y(t)\approx 4.2\sin(t-45°)$
   D. $y(t)\approx 1/\cos(6t-45°)$

5. If $Y(s)=\frac{4}{s^2+0.4s+4}U(s)$, what is the steady-state response to $u(t)=\cos(2t)$?
   A. $y(t)\to\infty$.
   B. $y(t)\approx 5\sin(2t)$.
   C. $y(t)\approx\cos(2t)$
   D. $y(t)\approx 4\cos(4t)$