ESE 406/505 & MEAM 513 – 2011-Feb-14 – 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.

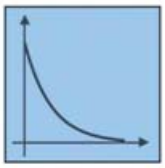
1. Which of the following is MOST CORRECT concerning the constant, K, we used in our description of the DC motor?

   A. K expresses the relationship between the power required to run the motor and the speed of the motor, $P = K\Omega$.
   B. K expresses the relationship between the torque generated by the motor and the current flowing in the motor coils, $Q = Ki$.
   C. Both of the above.
   D. Neither of the above.

2. Which of the following is NOT correct concerning time-domain specifications that we discussed in class?
   A. Settling time is defined as the time required for the step response to get permanently within 1% of the final value and results in a minimum necessary level of damping.
   B. The rise time is the time required for the response to go between 25% and 75% of the final value and results in a minimum necessary DC gain.
   C. The peak overshoot is defined as the maximum percentage by which the response exceeds the final value and results in a minimum necessary damping ratio.

3. Which of the following is NOT correct concerning the in-class demonstration of DC motor control of a pendulum, constructed using legos?
   A. The angular position was measured using a digital encoder.
   B. The inverted pendulum (trim at an angle of 180 degrees) was stable even without feedback.
   C. The proportional gain acted like a spring in a spring-mass-damper system.
   D. The derivative gain acted like a damper in a spring-mass-damper system.

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



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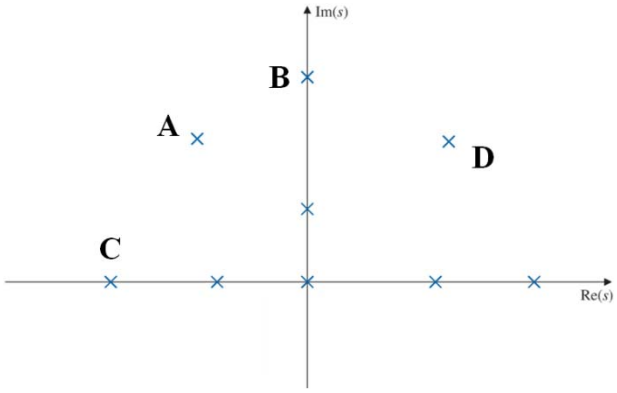
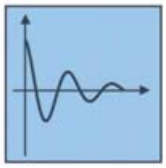


5. Match the transient response shown below to the corresponding letter identifying a pole in the complex plane at right.



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