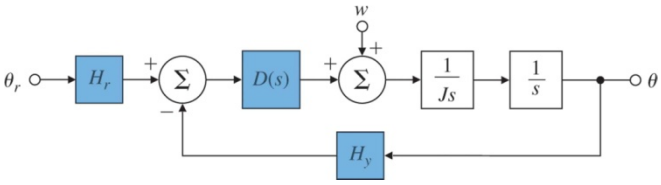
ESE 406/505 & MEAM 513 – 2011-Apr-04 – Quiz – Name:_____

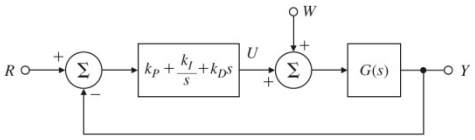
- Choose the one best answer for each question by circling the letter.
- A correct answer is worth 2 points.
- No answer is worth 0 points.
- An incorrect answer is worth -1 point. Random guessing will lower your score, on average.

1. In the block diagram shown at the right, if $H_r=H_y=1$ and D(s)=K, which of the following is MOST ACCURATE?



   A. There will be zero steady error for step command inputs.
   B. There will be zero steady error for step disturbance inputs.
   C. Both A & B are correct.
   D. Neither A nor B is correct.

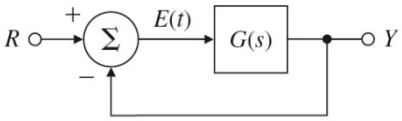
2. In the figure shown at right, with $G(s)=\dfrac{16}{s^2+s+16}$, the primary effect of derivative feedback is that it…?



   A. …ensures zero steady-state errors for step disturbance inputs, W(s).
   B. …ensures zero steady-state errors for step command inputs, R(s).
   C. …increases the natural frequency of the closed-loop poles.
   D. …increases the damping ratio of the closed-loop poles.

3. For the system shown in previous problem, the primary effect proportional feedback is that it…
   A. …ensures zero steady-state errors for step disturbance inputs, W(s).
   B. …ensures zero steady-state errors for step command inputs, R(s).
   C. …increases the natural frequency of the closed-loop poles.
   D. …increases the damping ratio of the closed-loop poles.

4. Suppose that the system shown in the figure at right exhibits a constant steady-state error, $e_{ss}=\Delta$, in response to a *unit ramp* command input, r(t)=t. From this, we can infer that



   A. $\lim_{s\to 0} sG(s)=\dfrac{1}{\Delta}$
   B. $\lim_{s\to \infty} G(s)=\Delta$
   C. $G(j\omega)=-1$
   D. None of the above is a reasonable inference.

5. Which of the following is MOST ACCURATE concerning integral feedback?
   A. Because of the beneficial effects of integral feedback for reducing errors, it is always a "no-brainer" to use integral feedback in designing a control system.
   B. Integral feedback has no effect on stability, so the only limit on how high the integral gain can go is actuator bandwidth.
   C. Integral feedback is very useful for many applications, but has to be designed judiciously, with such issues as anti-windup protection and initialization given careful consideration.
   D. All of the above are accurate.