

Name \_\_\_\_\_

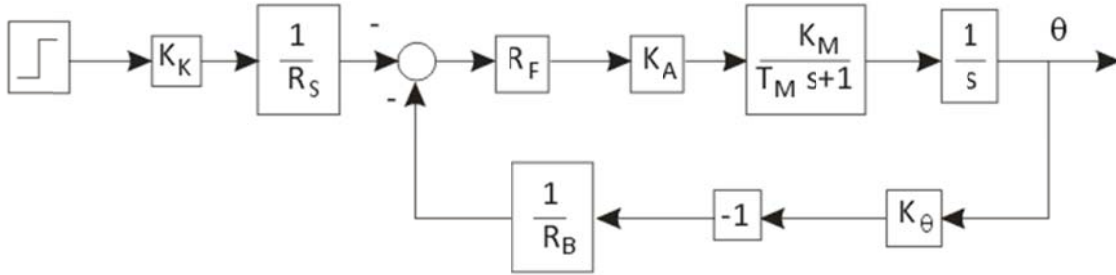
Circle one: Section 0810 0910

## ME 422 – Quiz 2

Fall 2011

In giving your answer, the answer alone is not enough. Make sure you clearly give your rationale for arriving at the answer. It must be clear to me how you arrive at your answer.

1.



Above is shown a block diagram of the Motomatic position controller. The voltage amplifier amplifies the input signal and at the same time changes its sign.

a. Find the open-loop transfer function of the system.

b. Find the closed-loop transfer function of the system

Continued on back...

c. What is the natural frequency of the closed-loop system in terms of the system parameters given in the block diagram?

d. What is the damping ratio ( $\zeta$ ) of the closed-loop system?

e. For what range of values of  $R_f$  is the system stable? Show work, not just answer.