Name: _____ ID: _____

1.) (40 pts) Please consider the system described by the open-loop transfer function:

$$G(s) = \frac{K}{s(s+1)(s+8)}$$

Obtain the gain margin, phase margin, and cross-over frequencies of this system for $K = 10$ and $K = 1000$.

Name: _____ ID: _____

2.) (10 pts) Please solve Problem B-7-26 from Ogata (page 565).

Name: _____ ID: _____

3.) (10 pts) Please solve Problem B-7-27 from Ogata (page 565).

Name: _____ ID: _____

4.) (Bonus) (20 pts) Please design a lead compensator for the system described by the open-loop transfer function:

$$G(s) = \frac{1}{s(s+1)}$$

with a desired gain crossover frequency ω_G = 10 rad/s and a desired phase margin PM = 60°.