

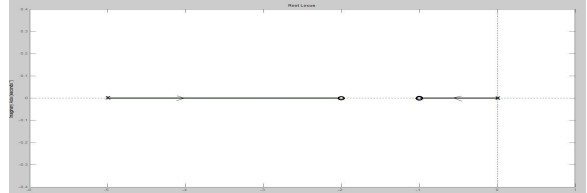
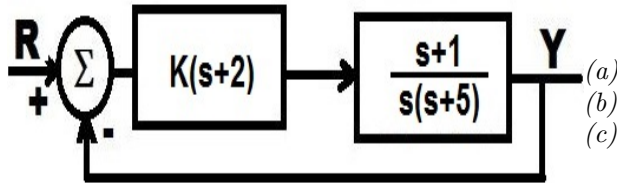
Name:
ID. No.

Eskişehir Osmangazi University - Electrical Engineering Department
Fundamentals of Control Systems
2nd Midterm Examination - Spring 2014

All answers must be written in the appropriate neighborhoods of the questions. Anything written elsewhere will not be graded. Use the back side of the exam sheet if you need scratch paper.

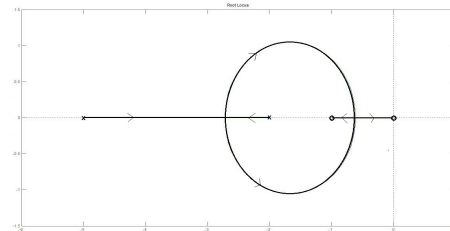
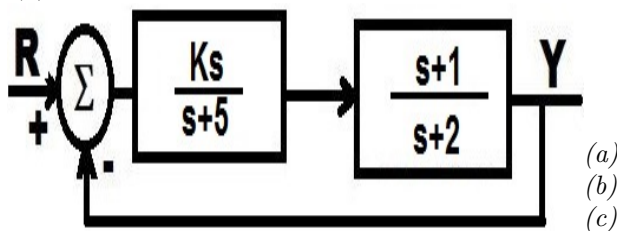
Question 1.

30 pts. (a) Sketch the root loci for the configuration below. Show trajectory directions by arrows.
(b) Is this system stable for $K = 5$?
(c) Find K value corresponding to the closed loop pole $s = -0.1$.



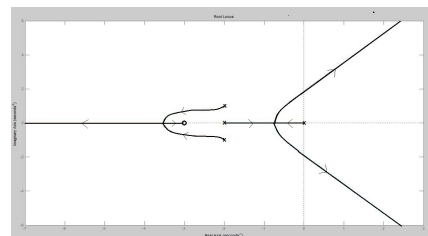
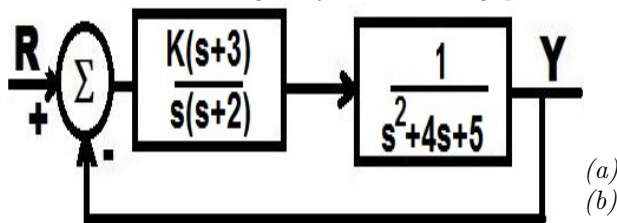
Question 2.

30 pts. (a) Sketch the root loci for the configuration below. Show trajectory directions by arrows.
(b) Is this system stable for $K = 5$?
(c) Is $s = i$ on the root loci?



Question 3.

30 pts. (a) Sketch the root loci for the configuration below.
(b) Which one of $\{s = 1.9i, s = 2.3i, s = 2.7i\}$ is closer to the imaginary axis crossing point?



Question 4.

10 pts. Find the steady state output signal in time domain if $2 \sin(2t)$ is applied to a LTI system with transfer function $\frac{3}{5+s}$.

$$y_{ss} = 1.114 \sin(2t - 0.38)$$

Good Luck
A. Karamancioğlu