Homework Set 6 – Due February 28

Problem 1
Using the block diagram shown below, determine the transfer function $\frac{X(s)}{R(s)}$.

Problem 2
Find the transfer function of the given state-space model.

\[
\dot{X} = \begin{bmatrix} -3 & 2 \\ 5 & -1 \end{bmatrix} X + \begin{bmatrix} 1 \\ 4 \end{bmatrix} U
\]

\[
Y = \begin{bmatrix} 1 & 0 \end{bmatrix} X
\]
Problem 3

Given the mechanical system shown below, find the transfer functions $\frac{Y_1(s)}{F(s)}$ and $\frac{Y_2(s)}{F(s)}$. All coordinates are defined from SEP.