Homework 5
CM4650
Spring 2016

Due:  Part A: Wednesday 16March 2016, in class
Part B: Wednesday 23March 2016, in HW box A

Please do not write on the back side of the pages. Please write legibly and large. Thank you.

Part A
1. (20 points) Derive $G'(\omega)$ and $G''(\omega)$ for a Newtonian fluid beginning with the recipe card.
2. (20 points) Choose two of the following materials. Choose one of the following material functions. Find in the literature (give full citation) a graph of the material function for each of the materials. Compare the two.
   Materials:
   a. Polyethylene
   b. Polystyrene
   c. Filled elastomer (meaning polybutadiene or polyisoprene or natural rubber with carbon black or chalk or some other powder)
   d. Polypropylene
   e. Branched polymer
   f. Motor oil
   Material functions:
   a. Steady shear viscosity
   b. Steady shear first normal stress coefficient
   c. Steady elongational viscosity
   d. Step strain
   e. Small amplitude oscillatory shear
   f. Small amplitude oscillatory elongation

Part B
3. (10 points) Text problem 6.6
4. (10 points) Text problem 7.5
5. (20 points) Text problem 7.28
6. (20 points) Text problem 7.29