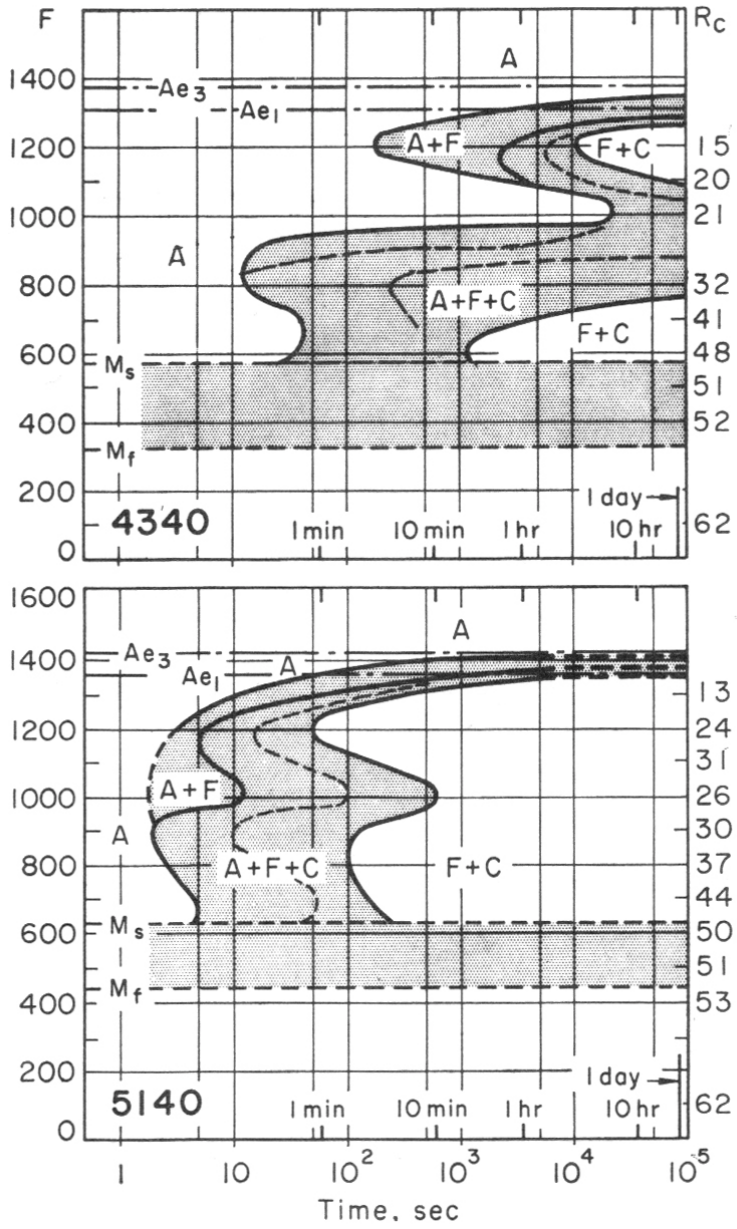
ENGR 240 Materials Engineering
Homework 15 – 10 points

Due Wednesday, April 18, 2001

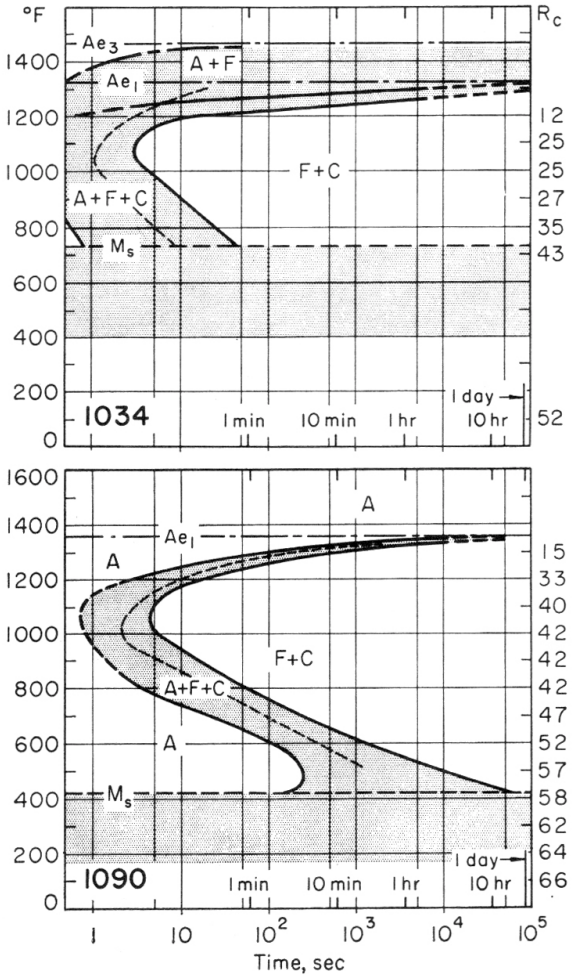
1. What is the purpose of tempering?

2. The TTT diagrams for two steels are shown below. If the two steels were tested for hardenability using the Jominy end quench method, which steel would you expect to show higher hardenability? Explain your answer.

   NOTE: These TTT diagrams are labeled with letters for the *phases* (F=ferrite, C=cementite, etc.) instead of letters for the microconstituent names (P=pearlite, B=bainite). This is just another way of drawing TTT diagrams, and it should not affect your answer to the problem.



3. TTT diagrams for AISI 1034 and AISI 1090 steels are shown below. Based on the appearance of the two diagrams, what effect does carbon have on the ease of martensite formation upon quenching of the steels?



4. Two complete Jominy hardenability curves for steels A and B are given below.

   a. Which steel has more alloying elements?
   b. Which steel will have more pearlite present at the center of a bar 2 inches in diameter?
   c. Which steel has higher hardenability?
   d. Which steel contains harder martensite?