1. Kalpakjian & Schmid Prob. 8.116 (Fourth Ed: Prob. 8.96, except use a motor power of 5 HP and a mechanical efficiency of 80%), except use a speed of 180 RPM (all editions). (600 RPM would greatly exceed the class guidelines for cutting speed.)

2. A 300 mm long, 100 mm diameter mild steel rod is being reduced in diameter to 95 mm by turning on a lathe. The spindle rotates at 400 RPM. Determine the feed rate which would be appropriate for performing this cut as quickly as possible on a 10 HP lathe. How much time is required to perform the cut? If the rake angle is 10° and the coefficient of friction at the tool interface is 1.5, what is the magnitude of the total force applied to the tool?

3. Assume that you just started a summer internship at a job shop specializing in machining. Your supervisor assigns you to a job which requires turning down 500 bars of free-machining brass from 25.4 mm diameter to 22.5 mm diameter in one pass. You have good lathes with sturdy tool holders and carbide cutters available to you. The tool is set up with a rake angle of about 10°. The coefficient of friction at the tool-chip interface is estimated to be about 1.

   (a) Suggest a spindle speed and feed for setting up the lathes.
   (b) What is the horsepower of the smallest lathe capable of doing this job?
   (c) Estimate the thickness of the chips.

4. You need to make the turned part illustrated below in the student shop. You will start with a piece of solid 1020 CD steel bar having a stock diameter of 25.4 mm. (All dimensions are in mm.)

   (a) Suggest an appropriate spindle RPM and feed rate for the lathe to make a roughing cut, which reduces the diameter to 20.5 mm, with a carbide tool.
   (b) Estimate the minimum horsepower of the lathe required to make the roughing cut.
   (c) Suggest an appropriate spindle RPM for drilling the 6.4 mm diameter through hole with a HSS drill bit.
   (d) If a power feed is available for the drill bit spindle, suggest an appropriate feed rate.