



### Homework-3

Student Name: \_\_\_\_\_

Grade:  $\frac{\quad}{5}$

- 1- A solid cylindrical workpiece made of *1100-O Aluminum* (strength coefficient ( $K$ ) =  $180 \text{ MPa}$  and strain hardening ( $n$ ) =  $0.20$ ) is  $0.5 \text{ ft}$  in diameter and  $4 \text{ in}$  high. It is reduced in height by  $60\%$  at room temperature by open-die forging. Assuming that the coefficient of friction is  $0.1$ , *calculate the forging force.*



- 2- A solid cylindrical workpiece made of *4135 annealed steel* [ strength coefficient ( $K$ ) =  $1,015 \text{ MPa}$  and strain hardening ( $n$ ) =  $0.17$  ] that is  $89 \text{ mm}$  high and  $127 \text{ mm}$  in diameter is reduced in height by 30% by closed-die forging. Let the coefficient of friction be 0.15 and assuming that it is a complex forging and that the projected area of flash is 20% greater than the projected area of the forged workpiece. *Calculate the forging force.*

TABLE 14.2

**Range of  $k'$  Values for Eq. (14.2)**

Simple shapes, without flash	3–5
Simple shapes, with flash	5–8
Complex shapes, with flash	8–12