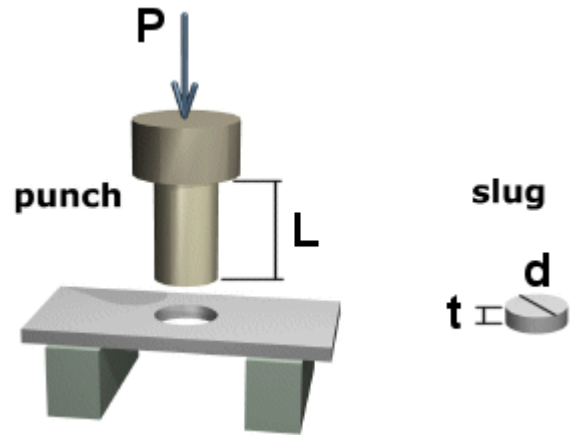


A punch of length  $L$  and diameter  $d$  is pressed into a plate of thickness  $t$  with force  $P$  to create a slug, which also has diameter  $d$  and thickness  $t$ .

Possible answers to the questions on this page include:

- a.  $\pi d^2 / 4$
- b.  $d t$
- c.  $\pi d t$
- d.  $d L$
- e.  $\pi d L$
- f.  $t L$

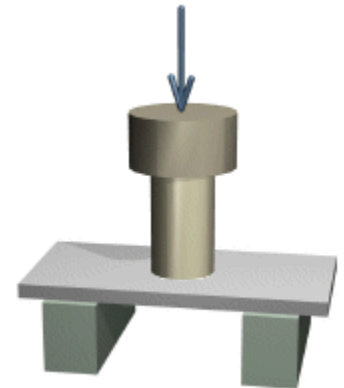
Some answers may be used more than once.



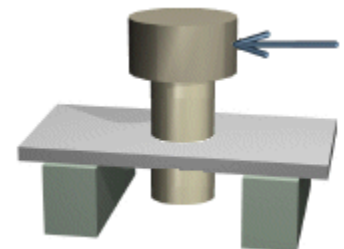
1. As the punch first comes into contact with the plate, the area used to calculate the bearing stress would be   a  ?

2. As the punch cuts through the plate, the area used to calculate the cutting shear stress would be   c  ?

3. The area used to calculate the normal stress in the punch as it does these operations would be   a  ?



4. If the punch were then inserted through the hole and pushed sideways, the area used to calculate the bearing stress between the punch and the plate would be   b  ? (*assume the plate remains stationary and does not slide across the supports*)



5. If the punch were then to shear off and leave the lower half stuck in the plate, the area used to calculate the cutting shear stress would be   a  ?