

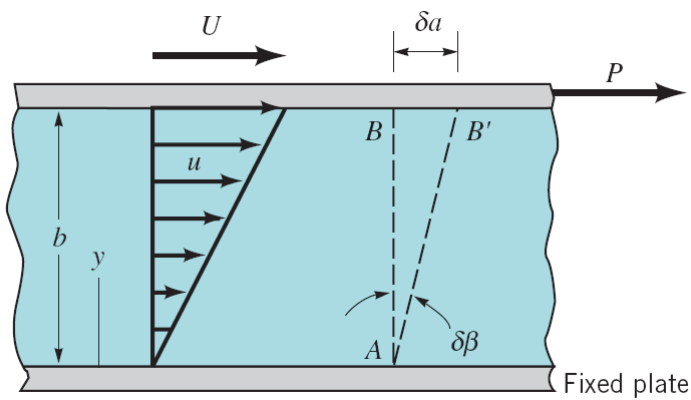
NAME _____

Fluids-ID _____

Quiz 1.

For a parallel plate arrangement of the type shown below it is found that when the distance between plates is 2mm, a shearing stress of 150 Pa develops at the upper plate when it is pulled at a velocity of 1 m/s. Determine the viscosity of the fluid between the plates.

(Hint: $u(y) = \frac{U}{b}y$; 1 Pa = 1 N/m²)



Solution:

$$\tau = \mu \frac{du}{dy} = \mu \frac{d}{dy} \left(\frac{U}{b} y \right) = \mu \frac{U}{b}$$

$$\therefore \mu = \frac{\tau}{U/b} = \frac{150 \text{ N/m}^2}{(1 \text{ m/s})/0.002 \text{ m}} = 0.3 \text{ N} \cdot \text{s/m}^2$$