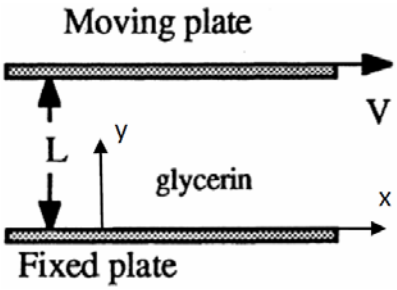
NAME

Fluids-ID

Quiz 1.

In the figure shown at the right, the fluid is glycerin at 20°C (μ = 1.5 N·s/m^2) and the width between plates is L = 6 mm. What shear stress (in Pa) is required to move the upper plate at V = 5.5 m/s? The fluid velocity profile between the plates is given as



$$u(y) = \frac{V}{L} \cdot y$$

Solution:

$$\tau = \mu \frac{du}{dy}$$

(+5 points)

$$\frac{du}{dy} = \frac{V}{L}$$

(+3 points)

$$\tau = \mu \frac{V}{L} = \left(1.5 \frac{Ns}{m^2}\right) \frac{(5.5\ m/s)}{(0.006\ m)} = 1375\ Pa$$

(+2 points)