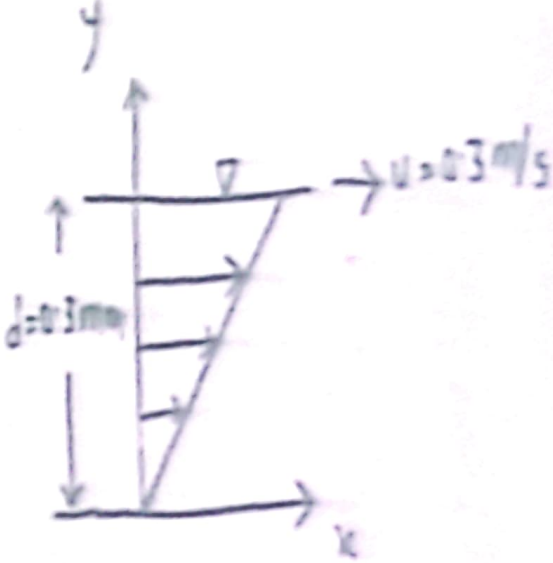
liquid as shown in figure. For small gap width d, we assume a linear velocity distribution in liquid. The liquid viscosity is 0.65 centipoise and it's specific gravity is 0.88. Determine

a. kinematic viscosity of liquid

b. shear stress on lower plate

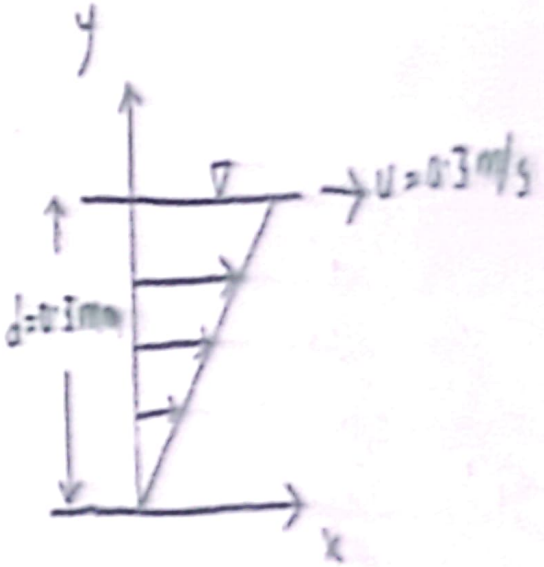
c. shear stress on upper plate



$$\therefore \nu = \frac{\mu}{\rho} = \frac{0.65 \times 0.01 \times 0.1}{0.88 \times 1000} = 0.74 \times 10^{-6}\ m^2/s$$

(b)

$$0.3 - u_1 = m(0.0003 - y) \qquad [0.3 - u_1 = m(d - y_1)]$$



$$\text{At } y = 0, u_1 = 0, \text{ so, } m = 1000\ s^{-1} = \frac{du}{dy}$$

$$We\ know, \tau = \mu \frac{du}{dy}$$

$$\tau = 0.65 \times 0.01 \times 0.1 \times 1000 \frac{N.s}{m^2 s} = 0.65 \frac{N}{m^2}$$

(c)

$$\text{At } y = 0.3\ mm, u_1 = 0.3\ m/s, \qquad \text{so, } m = \frac{du}{dy} = \frac{0.3}{0.0001} = 1000\ s^{-1}$$

$$\tau = 0.65 \times 0.01 \times 0.1 \times 1000 \frac{N.s}{m^2 s} = 0.65 \frac{N}{m^2}$$

Shear stress does not depend on distance in the equation that is developed in this question