An air bubble of 1cm radius is rising at a steady rate of 2 $\frac{mm}{s}$ through a liquid of density 1.5 $\frac{g}{cm^3}$ neglect density of air, if g is 1000 $\frac{cm}{s^2}$, then the coefficient of viscosity of the liquid is ?

Force of viscosity equals (Stokes' law):

$$F_v = 6\pi\mu v r$$

where v – speed of the bubble, μ- coefficient of viscosity

Buoyant force that is exerted on bubble equals:

$$F_b = \rho g V = \rho g \frac{4}{3}\pi r^3$$

Newton's first law of motion:

$$F_b = F_v$$

$$6\pi\mu v r = \rho g \frac{4}{3}\pi r^3$$

$$\mu = \frac{\rho g \frac{4}{3}\pi r^3}{6\pi v r} = \frac{2\rho g r^2}{9v} \cong 167\frac{kg}{m * s}$$

Answer: $167\frac{kg}{m*s}$