Answer on Question#37150 – Physics - Mechanics

if the excess pressure inside a soup bubble is balanced by an oil column of height 2mm ,then surface tension of soap will be r=1cm .density of oil =0.8 g/cm cube)

Solution

The excess pressure inside a soup bubble of radius *r* is

$$P = \frac{4T}{r},$$

where T - surface tension of soap.

The pressure of an oil column of height h is

$$P_{\text{oil}} = \rho g h,$$

where ρ - density of oil.

The excess pressure inside a soup bubble is balanced by an oil column:

$$P = P_{\text{oil}} \rightarrow \frac{4T}{r} = \rho g h.$$

The surface tension of soap is

$$T = \frac{1}{4} r \rho g h = \frac{1}{4} * 10^{-2} m * 0.8 * 10^3 \frac{kg}{m^3} * 10 \frac{N}{kg} * 2 * 10^{-3} m = 0.04 \frac{N}{m}.$$

Answer: $0.04 \frac{N}{m}$.