

B.Sc I Sem Pre-paratory Exam - UNIT-IV

I. Answer the following:

1 (a) Derive an expression for the rise of liquid in a capillary tube. (8m)

(b) Give the molecular theory of surface tension. (4m)

2. (a) Describe an experiment to determine the surface tension & angle of contact for mercury by Quinke's method. (8m)

(b) Calculate the excess of pressure inside a soap bubble of radius 2×10^{-2} m. Surface tension of soap solution is $20 \times 10^{-3} \text{ Nm}^{-1}$. Calculate also the surface energy of the soap bubble.

3. (a) Derive poiseuille's formula for the flow of viscous fluid through a narrow tube. (8m)

(b) Give differences b/w streamline & Turbulent flow (4m)

4. (a) Derive stoke formula & terminal velocity of a lead ball falling down through viscous liquid. (8m)

(b) A plate of a 0.01 sq.m in area rests on a layer of oil 2 mm thick whose coefficient of viscosity is 1.55 pas . calculate the horizontal force necessary to move the plate with a velocity 0.03 ms^{-1} . (4m)