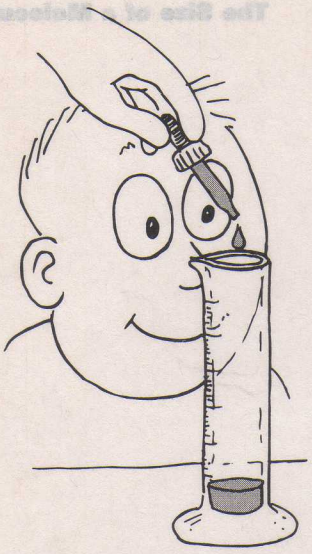

Compute length of molecule.

Step 3: Count the number of drops of solution needed to occupy 3 mL (or 3 cm^3) in the graduated cylinder. Do this three times, and find the average number of drops in 3 cm^3 of solution.

number of drops in 3 cm^3 = _____

Divide 3 cm^3 by the number of drops in 3 cm^3 to determine the volume of a single drop.

volume of drop = _____ cm^3

Step 4: The volume of the oleic acid alone in the circular film is much less than the volume of a single drop of the solution. The concentration of oleic acid in the solution is 5 cm^3 per 1000 cm^3 of solution. Every cubic centimeter of the solution thus contains only 5/1000 cm^3 of oleic acid. The ratio of oleic acid to total solution is 0.005 for any volume. Multiply the volume of a drop by 0.005 to find the volume of oleic acid in the drop. This is the volume of the layer of oleic acid in the tray.

volume of oleic acid = _____ cm^3

Step 5: Estimate the length of an oleic acid molecule by dividing the volume of oleic acid by the area of the circle.

length of molecule = _____

Analysis

1. What is meant by a monolayer?

_____

_____

2. Why is it necessary to dilute the oleic acid?

_____

_____

3. Which substance forms the monolayer film—the oleic acid or the alcohol?

_____

_____

4. The shape of oleic acid molecules is more like that of a rectangular hot dog than a cube or marble. Furthermore, one end is attracted to water so that the molecule actually "floats" vertically like a log with a heavy lead weight at one end. If each of these rectangular molecules is 10 times as long as it is wide, how would you compute the volume of one oleic acid molecule?

_____

_____