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Aim :-

To determine surface tension of given liquids by drop count method.

Reference :

Requirement :→

(a) Apparatus :- Pycnometer, Stalagmometer, Pipette, Thermometer, Analytical balance, Weight box, beaker, etc.

(b) Chemicals :→ Distilled water.

Theory :

Surface tension : This property of liquids arises from the intermolecular forces of attraction. A molecule in the interior of a liquid is attracted equally in all directions by the molecules around it.
Its SI unit is newton per metre (Nm^{-1}).

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Surface Tension Determination methods :

The methods commonly employed for the determination of surface tension are :-

1. Capillary - rise method
   - (a) Single capillary - rise method
   - (b) Double capillary - rise method
2. Drop formation method
   - (a) Drop no number method
   - (b) Drop weight method
3. Ring - detachment method
4. Maximum bubble pressure method
5. Wilhelmy plate method.
6. Pendant drop method.

Procedure:

1. Thoroughly clean pycnometer and stalagmometer with chromic acid and wash two times with fresh distilled water.
2. Stalagmometer must be fixed in a vertical position using stand.

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Observations:

1 Room temperature = ... °C

2. Weight of Empty pycnometer = W_1.

3 Weight of Pycnometer + Distilled water = W_2

4. Weight of Pycnometer + Liquid = W_3.

Liquids	Number of drops				Specific gravity	Surface tension.
	I	II	III	Mean		

Calculations:

1. Weight of liquid = $W_3 - W_1$.

2. Weight of distilled water = $W_2 - W_1$

3. Specific gravity of liquid = $\frac{(W_3 - W_1)}{(W_2 - W_1)}$

$$\gamma_2 = \frac{P_2 n_1}{P_1 n_2}$$

Calculate surface tension of other liquids by substituting data in place of distilled water using same equation.

3. Fill water in stalagmometer up to mark A and count total number of drops formed from mark A to B.

4. Repeat step 3 at least 3 times for accuracy.

5. Wash stalagmometer using same liquid of which surface tension is to be determined.

6 Repeat step 3, 4, 5 for other chemicals.

7. Determine density of liquids by using pycometer.

Result:

Surface tension of the given liquid has been determined in the laboratory successfully.