

List of Experiments

Sr. No	Date of Expt.	Name of Experiment	Signature with date
1.		Determination of hardness of water sample by EDTA method.	
2.		Determination of chloride content in water sample by precipitation titration method.	
3.		Determination of "Dissolved Oxygen" by iodometric method.	
4.		Conductometric titration (Acid-Base titration)	
5.		Determination of acid value of an oil sample.	
6.		To determine normality in normal term and strength in gram/lit. of HCl solution by titrating with Na ₂ CO ₃ solution.	
7.		Determination of saponification value of an oil sample.	
8.		Surface tension	
9.		Viscosity	
10.			
11.			
12.			

EXPERIMENT NO. 01

Aim: Determination of hardness of water sample by EDTA method.

Apparatus:

Chemical required:

Theory: - Ethelene diamine tetra-acetic acid is a well known complexing agent. It is also available under trade name as Versene and Tritriplex III. (EDTA is generally used in the form of disodium salt due to their greter solubility in water)

EDTA can form complexes with the Ca^{2+} and Mg^{2+} , as well as many other metal cations, in aqueous solutions.

- The indicator used is a complex organic compound (sodium – 1 – (1-hydroxy 2-naphthylazo)-6-nitro-2-naphthol-4-sutphonate), commonly known as Eriochrome black T (EBT). It has two ionisable phenolic hydrogen atoms
- In hard water sample the **total hardness** can be determined by titrating the Ca^{2+} and Mg^{2+} present in the water sample at pH-10 with EDTA using EBT indicator.
- To maintain the pH of the solution at 9-10, buffer solution ($\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$) is used.
- **Permanent hardness** can be determined by precipitating the temporary hardness by prolonged boiling followed by titration with EDTA solution.
- The difference in the titre values corresponds to the temporary hardness of the water sample.
- When Eriochrome Black-T dye is added to the hard water at pH around 10 it gives wine red colored Unstable complex with Ca^{2+} and Mg^{2+} ions of the sample water. Now when this wine red-colored complex is titrated against EDTA solution (of known strength) the color of the complex changes from wine red to original blue color showing the end point.

1. Observations :(PART-I)

1. In Burette: -

2. In pipette: -

3. Indicator: -

3. End point: -

Observation Table: (PART-I)

Sr. No	Volume of Hard water sample in ml	Volume of 0.01M EDTA run down (BURETTE READING)		MEAN (V ₁ ml)
		Initial	Final	
01				
02				
03				

2. Observations :(PART-II)

1. In Burette: -

2. In pipette: -

3. Indicator: -

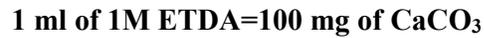
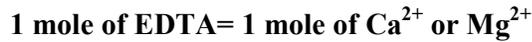
3. End point: -

Observation Table: (PART-II)

Sr. No	Volume of Hard water sample in ml	Volume of 0.01M EDTA run down (BURETTE READING)		MEAN (V ₂ ml)
		Initial	Final	
01				
02				
03				

Calculations:

Now, we know that



Total hardness: (PART-I)

$$V_1 \text{ ml of 0.01M EDTA} = \frac{100 * V_1 * 0.01}{1}$$

$$= \text{----- mg of CaCO}_3$$

i.e. Total hardness present in 50 ml of the water sample

$$= \text{-----mg of CaCO}_3$$

Therefore Total hardness present in 1 lit of the water sample

$$= \text{-----} * 1000/50 = \text{----- mg of CaCO}_3$$

Therefore Total hardness = ----- **mg/l** or ----- **ppm**

Permanent hardness: (PART-II)

$$V_2 \text{ ml of 0.01M EDTA} = \frac{100 * V_2 * 0.01}{1}$$

$$= \text{----- mg of CaCO}_3$$

i.e. Permanent hardness present in 50 ml of the water sample

$$= \text{----- mg of CaCO}_3$$

Therefore Permanent hardness present in 1 lit of the water sample

$$= \text{-----} * 1000/50 = \text{----- mg of CaCO}_3$$

Therefore permanent hardness = ----- **mg/l** or ----- **ppm**

Therefore,

$$\text{Temporary hardness} = \text{Total hardness} - \text{Permanent hardness}$$

$$\text{Temporary hardness} = \text{-----mg/l or -----ppm}$$

Result:

1. Permanent Hardness = **mg/l**
2. Temporary Hardness = **mg/l**
3. Total Hardness = **mg/l**

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EXPERIMENT NO. 02

Aim: Determination of chloride content in water sample by precipitation titration method.

Apparatus:

Chemical required:

Theory: The amount of chloride present in water can be easily determined by titrating the given water sample with silver nitrate solution.

Silver nitrate reacts with chloride ion according to 1 mole of AgNO_3 reacts with 1 mole of chloride. The titrant concentration is generally 0.02M.

AgCl is precipitated quantitatively, before red silver chromate is formed. The end of titration is indicated by formation of red silver chromate from excess silver nitrate.

Preparation of Reagents:

• **Standard Sodium Chloride Solution(0.0282N):**

1. Weight 1.648 gm of NaCl .
2. Transfer in 1000 ml standard flask; dissolve in distilled water and adjust 1000 ml mark by adding distilled water.

• **Standard AgNO_3 Solution(0.0282N):**

1. Weight 4.791 gm of silver nitrate and dissolve in 1000 ml distilled water.
2. Store in an amber colored bottle.

• **Potassium Chromate Indicator:**

1. Weight 25 gm of K_2CrO_4 .
2. Transfer it to the beaker contains distilled water. Add few drops of silver nitrate solution until slight red ppt. is formed.
3. Allow to stand for 12 Hrs.
4. After 12 Hrs. filter the solution using filter paper and dilute the filtrate to 1000 ml with distilled water.

Procedure:

A. Standardization of AgNO_3 Solution

1. Take 25 ml of the standard 0.0282N NaCl solution in a clean 250 ml conical flask, add 1 ml Potassium chromate indicator to get light yellow color.
2. Titrate this solution against 0.0282 N AgNO_3 solutions until the color changes from light yellow to permanent brick red. This is the end point of titration.
3. Note the burette reading as V_1 ml

B. Titration with water sample

4. Rinse the burette with water and then silver nitrate solution.
5. Fill the burette with silver nitrate solution of 0.0282N. Adjust to zero and fix the burette in stand.
6. Take 50 ml of the water sample in a clean 250 ml conical flask, add 1 ml Potassium chromate indicator to get light yellow color.
7. Titrate this solution against 0.0282 N AgNO_3 solution until the color changes from light yellow to brick red. This is the end point of titration.
8. Note the volume of silver nitrate run down as V_2 ml.
9. Repeat the procedure for concordant values.

Observations: Part-A

1. In Burette:
2. In pipette:
3. Indicator :
4. End Point:

Observation Table: (Part-A)

Sr. No.	Volume of standard NaCl Solution ml.	Burette Reading (volume of AgNO_3 run down) in ml		Mean
		Initial	Final	
1.	25 ml			$V_1 =$
2.	25 ml			

Observations: (Part-B)

1. In Burette:
2. In pipette:
3. Indicator :
4. End point:

Observation Table: (Part-B)

Sr. No.	Volume of sample in ml	Burette Reading (volume of AgNO ₃ run down) in ml		Mean
		Initial	Final	
1.	50 ml			V ₂ =
2.	50 ml			
3.	50 ml			

Calculations:

A. Standardization of AgNO₃ Solution:

25 ml of 0.0282N NaCl = V₁ ml of AgNO₃ Solution

Therefore **Corrected Normality of AgNO₃** = 25*Normality of NaCl* (1/ V₁) N

B. Titration with water sample:

50 ml of water sample = (V₂) ml of AgNO₃ solution

Normality of the water sample (50 ml) with respect to chlorine = $\frac{(V_2) * \text{Corrected normality of AgNO}_3}{\text{Volume of water sample taken}}$ N

Strength of chlorine = Normality * Eq. wt. of Cl

Therefore strength of chlorine = $\frac{(V_3) * \text{Corr. Normality of AgNO}_3 * 35.45}{\text{Volume of water sample taken}}$ gm/Litre

Therefore strength of chlorine = $\frac{(V_3) * \text{Corr. Normality of AgNO}_3 * 1000 * 35.45}{\text{Volume of water sample taken}}$ mg/Litre

Result: The amount of chlorine present in given water sample is = ----- mg/Lit. **OR** ppm.

EXPERIMENT NO. 03

Aim Determination of "Dissolved Oxygen" by iodometric method.

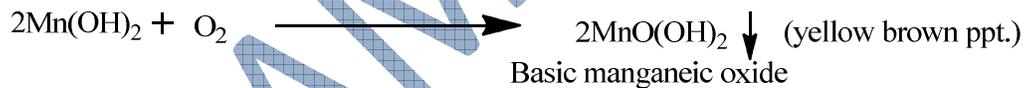
Reagents:-

Apparatus:-

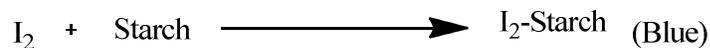
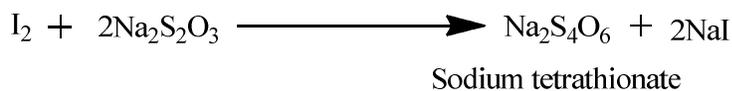
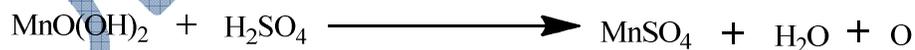
Theory: Dissolved oxygen level depends upon physical, chemical and biological activities in water bodies.

The analysis of DO plays important role in water pollution control activities and treatment process.

The principle involved for determination of DO is to bring about the oxidation of KI to I₂ with DO present in water sample after adding MnSO₄, NaOH and KI.



The ppt. dissolves in concentrated sulphuric acid liberating iodine and the liberated iodine is titrated against Na₂S₂O₃ using starch as a indicator.



Procedure:

1. Collect the water sample in a 250 ml BOD bottle with aeration.
2. Add 2 ml of $MnSO_4$ solution followed by 2 ml of alkaline iodide- azide reagent in such a way that tip of the pipette should dip in the liquid.
3. Stopper the bottle immediately and mix well by inverting the bottle 3 to 4 times.
4. Allow standing for 5 minutes and precipitate is settled down.
5. Add 2 ml of concentrated sulphuric acid mix well till the precipitate goes into the solution.

(Thus 4 ml of reagent is added in full BOD bottle, 4 ml of original water sample is lost. Hence titrate 203ml of water sample)

6. Take 50 ml of water sample in conical flask.
7. Add 2 to 4 drops of starch indicator and titrate against 0.025N sodium thiosulphate solution.
8. End point is Blue to colorless.

Observations:

1. In Burette:
2. In pipette
3. Indicator :
4. End point:

Observation Table:

Sr. No	Volume of water sample in ml	Volume Of 0.025N sodium thiosulphate solution runs down. (BURETTE READING)		MEAN (BURETTE READING)
		Initial	Final	
01	50			
02	50			
03	50			

Calculations:

$$\text{Strength of DO} = \frac{\text{CBR} \cdot \text{N} \cdot 8}{\text{Vol. of water sample}} \quad \text{gm/lit.}$$

$$\text{Strength of DO} = \frac{\text{CBR} \cdot \text{N} \cdot 8 \cdot 1000}{\text{Vol. of water sample}} \quad \text{mg/lit.}$$

Where N= Normality of sodium thiosulphate.

Result: The amount of DO in given water sample is _____ **mg/lit.**

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EXPERIMENT NO. 04

Aim: Determine the normality and strength of given acid solution by using conductivity meter.

Apparatus / Equipments:

Chemicals:

Procedure:

1. Switch on the conductivity meter 30 min before to start the experiment.
2. Wash the conductivity cell with distilled water.
3. Conductometer is standardized with KCl solution.
4. Take 10 ml of given sample in 100 ml beaker and add 40ml of distilled water.
5. Immerse the conductivity cell in this solution in such a way that plates of electrode must be immersed into the solution and measure the specific conductance.
6. Add 0.1N NaOH solution from burette to this solution stir for 30 seconds, measure the specific conductance.
7. Then repeat the same procedure for addition of 20 to 25 ml of 0.1N NaOH (1 ml each time).
8. Plot a graph specific conductance V/S volume of 0.1N NaOH added.
9. From graph we can know the end point of titration and from that we can calculate normality and strength of given acid solution.

Observations:

1. In Burette :
2. Solution in beaker :
3. End point :

Observation Table:

Sr. No.	Volume of NaOH added in ml	Specific conductivity $K \cdot 10^{-3}$
1	00	
2	1	
3	2	
4	3	
5	4	
6	5	
7	6	
8	7	
9	8	
10	9	
11	10	
12	11	
13	12	
14	13	
15	14	
16	15	
17	16	
18	17	
19	18	
20	19	
21	20	
22	21	
23	22	

Calculations:

$$\text{Acid} = \text{Base}$$

$$N_1 V_1 = N_2 V_2$$

$$N_1 = \frac{N_2 V_2}{V_1}$$

$$\text{Normality of acid (N}_1\text{)} = \text{-----N}$$

Therefore Strength of acid = Normality of acid * Equivalent weight

$$= \text{----- gm/lit.}$$

Result:

1. Normality of given acid =-----N.
2. Strength of given acid = -----gm/lit.

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EXPERIMENT NO.05

Aim: Determination of acid value of lubricating oil .

Reagents required:

Theory:

The acid value of lubricating oil is defined as the number of milligrams of potassium hydroxide required to neutralize the free acid present in 1 gram of the oil. The presence of mineral acids in lubricating oils is so rare that it is almost unnecessary to look for it, unless the oil is refined in a faulty manner. Free organic acids or acidic bodies are always found in lubricating oil whether they be pure mineral oils, compounded oils with fatty oils. In unused refined petroleum oils, the quantity is invariably negligible. When fatty acids are present, or in the case of used oils, the acid content should not be determined because it gives any direct evidence of corrosion hazard, but to sound a warning that a corrosion test might be revealing. In good lubricating oils, the acid value should be very low. Increase in acid value should be taken as an indicator of oxidation of the oil which may lead to gum and sludge formation besides corrosion. The acid value of fatty oils may vary from 0.2 to 50 and it shows the extent of hydrolysis of glycerol ester of the oil.

Procedure:

1. Weigh the oil under test into a conical flask and specified amount of neutral alcohol.
2. Heat the flask over a water bath for about 20 to 30 minutes; Cool the flask and allow the contents to room temperature and add a few drops of phenolphthalein indicator.
3. Titrate with the standard 0.1N KOH solution until a faint permanent pink colour appears at the end-point.



Note. Sometimes, the pink colour at the end-point may fade away after a little while due to the attack of alkali upon some easily reactable material in the oil, particularly when the mixture is violently shaken. In such cases, the titration should be done rapidly and the first end-point only should be considered.

Observations:

1. Wt. of the conical flask = A
2. Wt. of the conical flask + Oil sample = B
3. Wt. of the Oil sample for acid value = B – A = C
4. In Burette :
5. . Indicator
6. End point :

Observation Table:

Sr. No.	ml of 0.1N KOH solution run down (BURETTE READING)	
	Initial	Final
01		

Calculations:

$$\text{Acid value} = \frac{\text{No. of ml of 0.1N KOH run down (CBR)}}{\text{Weight of oil taken in gram(C)}} * 5.6$$

Where 5.6 represents the amount of KOH in mg present per each ml of 0.1N KOH solution

(1000 ml of 1N KOH = 56 gm of KOH).

(1000 ml of 0.1N KOH = 5.6 gm of KOH).

Result: Acid value of given oil sample is ----- mg of KOH

EXPERIMENT NO. 06

Aim: To determine normality in normal term and strength in gram/lit. of HCl solution by titrating with Na_2CO_3 solution.

Apparatus / Equipments:

Chemicals:

Reactions:



Procedure:

PART – I: Titration of HNO_3 V/S Na_2CO_3

1. Wash burette and pipette with distilled water.
2. Rinse the burette with HNO_3 and fill up to the zero mark with the same solution.
3. Pipette out exactly 10 ml Na_2CO_3 solution and transfer into the conical flask.
4. Add 2 to 3 drops of methyl orange indicator and shake well.
5. Titrate this solution against HNO_3 solution with constant stirring.
6. Color of the solution changes from yellow to orange this is the end point of titration.
7. Record this burette reading.
8. Repeat the same procedure for 2 to 4 times and find out constant burette reading.
9. From that calculate the normality of Na_2CO_3 solution.

PART – II: Titration of Na₂CO₃ V/S HCl

1. Wash burette and pipette with distilled water.
2. Rinse the burette with HCl and fill up to the zero mark with the same solution.
3. Pipette out exactly 10ml Na₂CO₃ solution and transfer into the conical flask.
4. Add 2 to 3 drops of methyl orange indicator and shake well.
5. Titrate this solution against HCl solution with constant stirring.
6. End point is from yellow to orange.
7. Repeat the same procedure for 2 to 3 times and find out constant burette reading.
8. From that calculate the normality of HCl solution.

Observations (PART – I)

1. In Burette: -
2. In pipette: -
3. Indicator: -
4. End point: -

Sr. No.	BURETTE READING		MEAN
	Initial	Final	
1.			
2.			
3.			

Calculations (PART – I):-

HNO₃ V/S Na₂CO₃

$$N_1V_1 = N_2V_2$$

$$\text{Normality of Na}_2\text{CO}_3 (N_2) = \frac{N_1V_1}{V_2}$$

$$N_2 = \text{-----}N$$

Observations (PART – II)

1. In Burette: -
2. In pipette: -
3. Indicator: -
4. End point: -

Sr. No.	BURETTE READING		MEAN
	Initial	Final	
1.			
2.			
3.			

Calculations (PART – II):-

HCl V/S Na₂CO₃

$$N_1 V_1 = N_2 V_2$$

$$\text{Normality of HCl (N}_1\text{)} = \frac{N_2 V_2}{V_1}$$

$$N_1 = \text{-----} N$$

Strength of HCl solution = Normality * Equivalent weight

$$= N_1 * 36.5 \text{ gm/lit}$$

$$= \text{----- gm/lit}$$

Result:-

1. Normality of Na₂CO₃ =
2. Normality of HCl =
3. Strength of HCl solution =

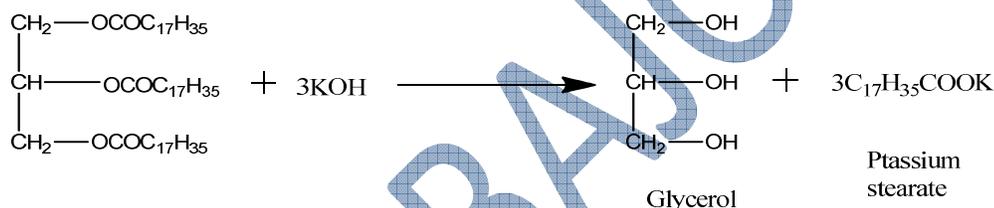
EXPERIMENT NO.07

Aim: Determination of saponification value of lubricating oil .

Reagents required:

Theory:

The saponification value of lubricating oil is defined as the number of milligrams of potassium hydroxide required to saponify one gram of the oil. The vegetable or animal oils are esters of fatty acid and they react with KOH to form potassium salts of fatty acid. The saponification value of oil is determined by refluxing a known quantity of the sample with a known excess of standard KOH solution and determining the alkali consumed by titrating the unreacted alkali.



Animal and vegetable oils undergo saponification but a mineral oil does not. Hence determination of saponification value helps to know the presence of Animal or vegetable oils in a lubricant.

Procedure:

1. Weigh about 5 gm of oil sample in a 250 ml conical flask fitted with a reflux condenser.
2. Add 50 ml of N/2 alcoholic KOH solution into the flask.
3. Reflux the contents over a water bath for about one hour.
4. Remove the flask from water bath and cool at RT.
5. Add 2 to 4 drops of phenolphthalein indicator and titrate against N/2 HCl until solution becomes colorless.
6. Perform the blank experiment (To know ml of KOH consumed) by repeating the whole procedure similarly but without using the oil and titrate with N/2 HCl solution described above.

Observations: (For test Expt.)

1. In Burette :
2. In conical flask:
3. Indicator :
4. End point :

Observations :(For blank Expt.)

1. In Burette :
2. In conical flask:
3. Indicator :
4. End point :

Observation Table:

Sr. No	BURETTE READING		CBR
	Initial	Final	
Test Expt.			
Blank Expt.			

Calculations:

$$\text{Acid value} = \frac{\text{ml of N/2 KOH consumed}}{\text{Weight of oil taken in gram}} * 28$$

$$\left[\text{ml of N/2 KOH consumed} = \left(\text{Vol. in ml of N/2 HCl used in blankexpt.} \right) - \left(\text{Vol. in ml of N/2 HCl used in test expt} \right) \right]$$

(1000 ml of N/2 KOH = 56/2 = 28 gm of KOH).

(1 ml of N/2 KOH = 28 mg of KOH).

Result: Acid value of given oil sample is ----- mg of KOH

EXPERIMENT NO. 08

Aim: To determine the surface tension of the liquid using drop number method.

Apparatus: -

Reagents required: -

Theory:

“In this method surface tension of a given liquid can be determined in relation to another liquid (water) whose surface tension is known.”

When liquid is allowed to flow very slowly through capillary tube, drop from which grow up to certain size and then fall. Let the radius at the end of the tube is “r”. Then the total surface tension supporting the drop will be “ $2\pi r T$ ”. The drop fall when its weight “w” is just equal to surface tension.

$$W = T * 2\pi r$$

Instead of determining weight of drop determine no of drops by fixed volume of liquid and surface tension is determined by using the formula...

$$T_1 / T_w = n_w / n_1 * d_l / d_w$$

Where,

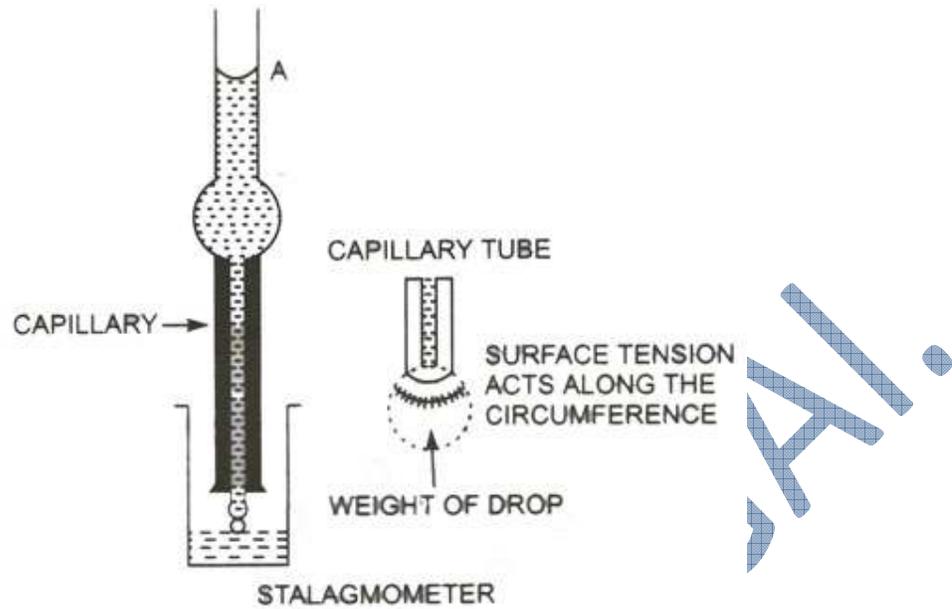
T_1 and T_w are surface tension of liquid and water.

N_1 and n_w are number of drops of liquid and water.

D_1 and d_w are densities of liquid and water.

Procedure:-

1. Wash the drop pipette with distilled water and then rinse with acetone and dry it.
2. Fill the drop pipette with distilled water.
3. Count number of drops of fixed volume.
4. Repeat the same procedure with aniline.



Observation table:-

Sr. No.	Liquid	No. of drops
1.		
2.		

Calculations:-

$$T_1 / T_w = n_w / n_1 * d_1 / d_w$$

$$T_1 = n_w / n_1 * d_1 / d_w * T_w$$

Given-

$$T_w = 72.8 \text{ dynes/cm}$$

$$d_w = 1.0 \text{ gm/cm}^3$$

$$d_1 = 1.021 \text{ gm/cm}^3$$

Result: - Surface tension of aniline is ----- dynes/cm

EXPERIMENT NO: - 09

Aim: - Determine the relative viscosity of a given liquid by Oswald's viscometer.

Apparatus: -

Chemicals: -

Theory:-

When liquid flow through narrow tube, the layer in contact with glass remains stationary and layer next to it are flowing in the direction of the flow. The central layer moves rapidly. Thus the layers of the liquid are moving with different velocities due to internal friction in between the two layers. So such layers exert a drag pressure on another layer due to which there will be restriction. Viscosity is a force in dynes required to maintain the unit difference in velocities of two adjacent layers of a liquid.

Viscosity can be determined by formula

$$n_{\text{liq.}}/n_{\text{water}} = d_{\text{liq.}}/d_{\text{water}} \times t_{\text{liq.}}/t_{\text{water}}$$

Where...

$n_{\text{liq.}}$ And n_{water} are viscosity of liquid and water.

$d_{\text{liq.}}$ And d_{water} are densities of liquid and water.

$t_{\text{liq.}}$ And t_{water} are time required for liquid and water.

Procedure:-

1. Clean the viscometer properly with water and then acetone or CCl_4 and dry it to remove any trace of the solvent.
2. Take distilled water in wide bulb.
3. Suck it up to above mark "A".
4. Allow it to flow from "A" to "B" mark and simultaneously note down the time required.
5. Repeat the same procedure for two times and calculate the mean.
6. Then Repeat the same procedure replacing the water with given liquid(glycerin).
7. Note down the time required for glycerin flow from "A" to "B" mark.
8. Repeat the same procedure for two times and calculate the mean.

Observation table:-

Sr. No.	Liquid	Density gm/cm ³	Time in second		Mean
			T ₁	T ₂	
1.	Water	1.0			
2.	Glycerin	1.255			

Calculations:-

$$n_{\text{liq.}} \cdot n_{\text{water}} = d_{\text{liq.}} / d_{\text{water}} \times t_{\text{liq.}} / t_{\text{water}}$$

$$n_{\text{liq.}} = d_{\text{liq.}} / d_{\text{water}} \times t_{\text{liq.}} / t_{\text{water}} \times n_{\text{water}}$$

Given-

Viscosity of water = 1.02×10^{-2} poise

Density of water = 1.0 gm/cm³

Density of glycerin = 1.255 gm/cm³

Result: - Viscosity of Glycerin is ----- poise

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LABORATORY INSTRUCTIONS

DO'S

The Chemistry laboratory must be a safe place in which to work and learn about Chemistry. Most of these involve just using common sense.

1. Use protective clothing all the time (e.g. lab coat and safety glasses).
2. Be familiar with your lab assignment **before** you come to lab. Follow all written and verbal instructions carefully. Observe the safety alerts in the laboratory directions. If you do not understand a direction or part of a procedure, ask the teacher before proceeding.
3. Wash acid, base, or any chemical spill off of yourself immediately with large amounts of water. Notify your teacher of the spill.
4. Clean up spills immediately. If you spill a very reactive substance such as an acid or base, notify the people in the area and then obtain assistance from your teacher. Acid spills should be neutralized with baking soda, base spills with vinegar before cleaning them up.
5. If chemical substances get in your eye, wash the eye out for 15 minutes. Hold your eye open with your fingers while washing it out.
6. Place the reagents in a systemic manner.
7. If you burn yourself on a hot object, immediately hold the burned area under cold water for 15 minutes. Inform your teacher.
8. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times. Only lab notebooks or lab handouts should be out on the table while performing an experiment. Books and book bags should not be on the lab table. Passageways need to be clear at all times.
9. Always add acid to water and stir the solution while adding the acid. Never add water to an acid.
10. Report all accidents to your teacher.

11. Thoroughly clean your laboratory work space at the end of the laboratory session. Make sure that all equipments are clean, and returned to its original place.
12. Wash your hands well before leaving the laboratory.
13. Keep your hands away from your face, while working.
14. Handle the apparatus and chemicals carefully.
15. Leave plenty of tap water after discarding the waste in the sink.

DON'T

1. Work in the laboratory without an instructor present. Work only with your lab partner(s). Do not venture to other lab stations for any reason.
2. Wear bulky or dangling clothing.
3. Eat or drink in the laboratory. Don't chew on the end of a pen which was lying on the lab bench.
4. Waste the reagents.
5. When entering the lab/classroom, do not touch any equipment, chemicals, or other materials without being instructed to do so. Perform only those experiments authorized by the instructor.
6. When weighing never place chemicals directly on the balance pan. **Never weigh a hot object.**
7. Smell anything in the laboratory unless your teacher tells you it is safe. Do not smell a substance by putting your nose directly over the container and inhaling. Instead, waft the vapors toward your nose by gently fanning the vapors toward yourself.
8. Absolutely no running, practical jokes, or horseplay is allowed in the laboratory.
9. Allow the reagent bottles to accumulate on the table.
10. Never eat, drink, or taste anything in the laboratory.
11. Smoking & use of cell phones are strictly prohibited in the laboratory.

Lab In charge

ACKNOWLEDGEMENT BY STUDENT

I have read and understood the Laboratory Safety Regulations. The details have been called to my attention by the instructor/ laboratory incharge in charge of my laboratory.

I agree to follow these regulations in the interest of my own safety and that of my other batch mates.

Name: _____ Roll No.: _____

Branch: _____

Student's
Signature with Date

Lab. Incharge
Signature with Date