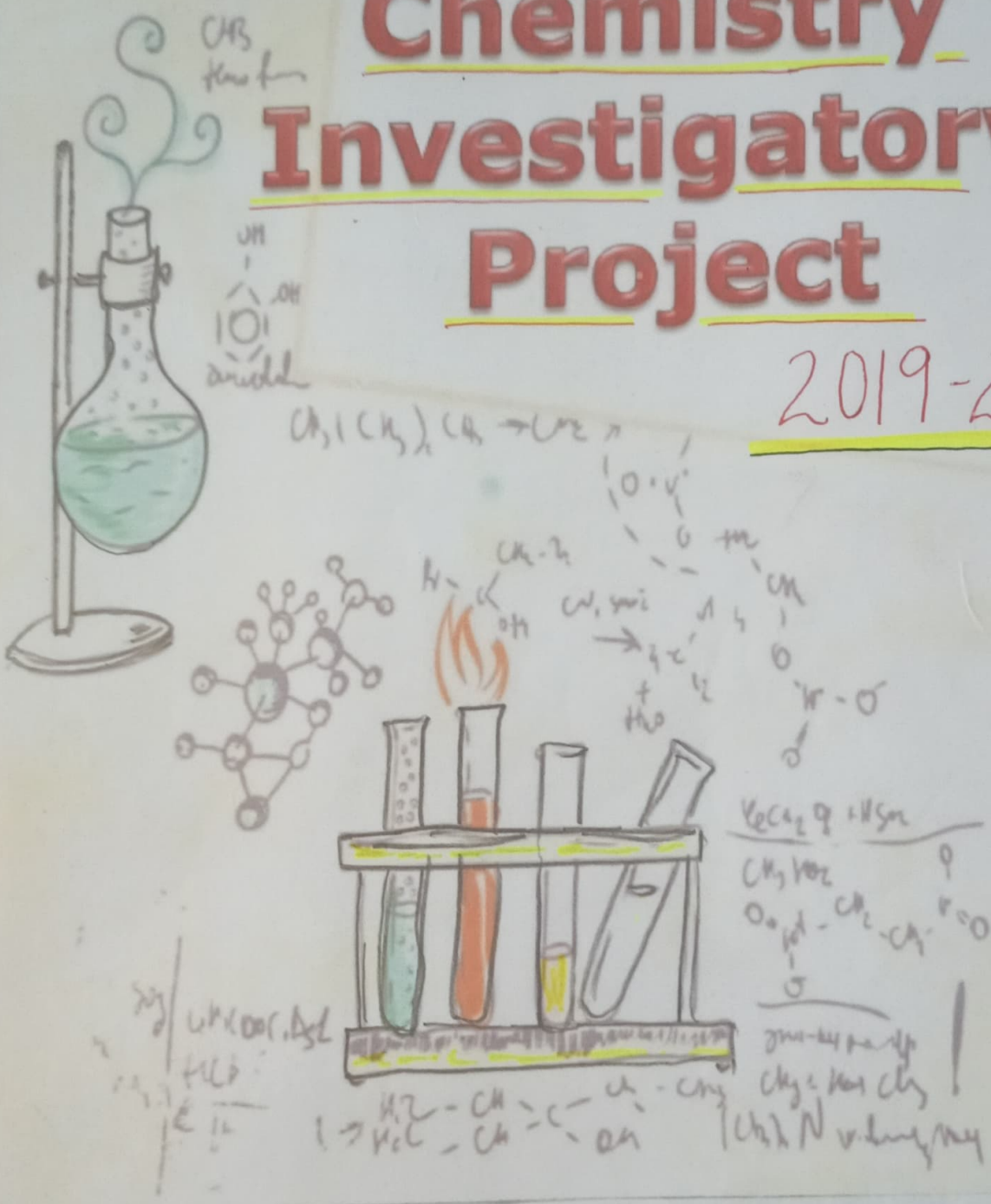
Chemistry Investigatory Project

2019-20



PROJECT BY :- BETHA PHILIP ANTONY

CLASS - XII ⇔ A

ROLL NO : - 16

EXAM NO: 2065194

(AISSCE)

CERTIFICATE

This is to certify that **BETHA PHILIP ANTONY** of class 12th "A" has successfully completed the project work in chemistry, titled as

"To analyse the given samples of commercial antacids by determining the amount of hydrochloric acid they can neutralize."

For class XII practical examination of the "Central Board of Secondary Education "in the year 2019-2020.

It is further certified that this project is the individual work of the candidate.

10/1/20

PRINICIPAL

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SUBJECT TEACHER

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28/1/20.

ACKNOWLEDGEMENT

I hereby Acknowledge my deep sense of gratitude and indebtedness to the following personalities whose immense help, genius guidance, encouragement, necessary suggestions, initiations, enthusiasm and inspiration made this work a master art and a joint enterprise.

Mr.C.H.BABU RAO -(Principal)

Mr.K.SRINIVAS RAO – (Subject Teacher)

Secondly, I would like to thank my parents and friends who helped me a lot in finishing this project within the limited time.

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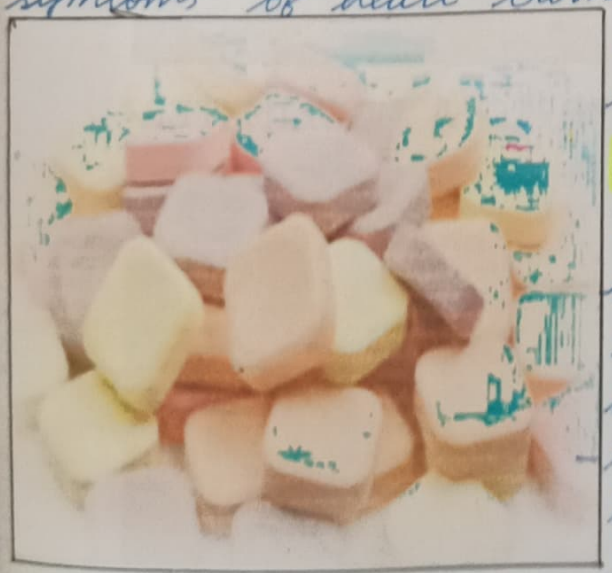
INTRODUCTION

"Digestion" in the stomach results in the formation and action of gastric fluid, which includes secreation of digestive enzyms mucous and hydrochloric acid. The acidic environment of stomach makes it possible for inactive forms of digestive enzymes to be converted into active forms of digestive enzymes to be converted into active forms i.e pepsinogen into pepsin and acid is also needed to dissolve minerals and kill bacteria that may enter the stomach along with food. However, excessive acid production (hyperacidy) results in the unpleasant symptoms of heartburn and may contribute to ulcer formation in the stomach lining.

"Antacids" are weak bases, most commonly bicarbonates, hydroxides and carbonates) that neutralize excess stomach acid and thus alleviate symtoms of heart burn.



The general neutralization reaction is:

$$\text{ANTACID} + HCl \longrightarrow \text{salts} + H_2O + CO_2$$

The hydrochloric acid solution used in this exp. (0.1) approx the acid conditions of the human stomach, which is typically 0.4 - 0.5 % HCl by mass (pH ~ 1). They help people who have or get heart.

☆. AIM :-

To Analyse the given samples of comm-ercial antacids by determining the amount of hydrochloric acid they can neutralize.

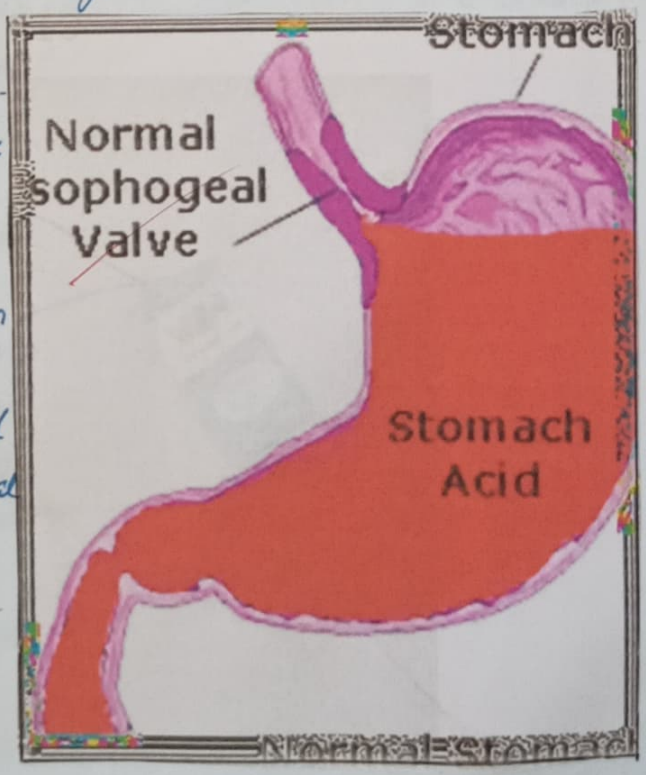
☆. APPARATUS :

1. Burette
2. Pipette
3. Titration flask
4. Beakers
5. Weight Box
6. Fractional Weights
7. Sodium Hydroxide
8. Sodium Carbonate
9. Phenolphthalein

☆. THEORY :

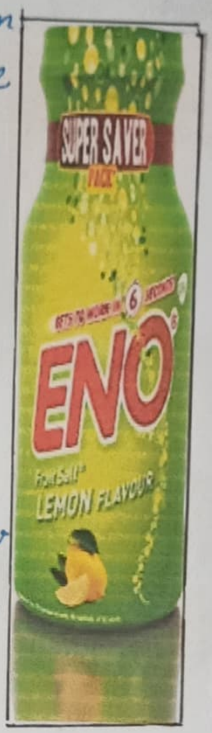
1. STOMACH ACID :

Stomach acid is very dangerous - Stomach acid is highly acidic and has a pH of 1.6 - Stom-ach acid is hydrochloric acid produced by the stomach. If there is too much acid it can cause heart burn. Heartburn is when acid is produced in abnormal amounts or location. One of the symptoms of heartburn is a burning feeling in the chest or abdomen.



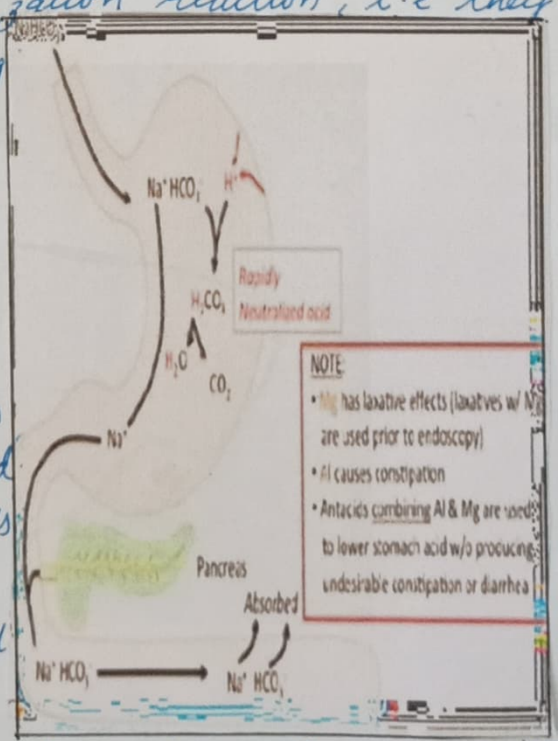
2. ANTACID:

An antacid is a substance that can neutralize an acid. All antacids are bases. The pH of a base is 7.1-14. All antacids have chemical in them called a buffer. When an antacid is mixed with an acid the buffer tries to even out the acidity and that is how stomach acid is neutralized. In an antacid it is not the name brand that tells us how it works, it is something called an active ingredients and some have all the active ingredients. The active ingredient of most of the antacids is bases of Calcium, Magnesium and Aluminium.



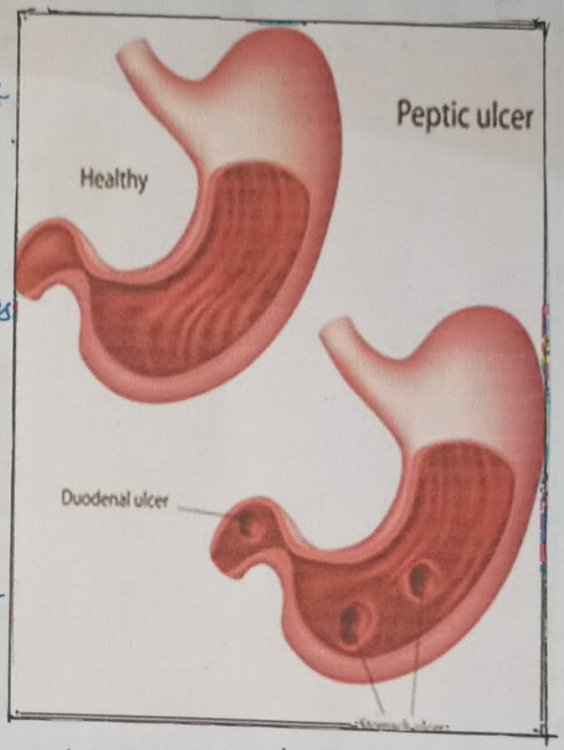
3. ACTION MECHANISM:

Antacids perform neutralization reaction, i.e they buffer gastric acid, raising the pH to reduce acidity in the stomach. When gastric HCl reaches the ner in the gastrointestinal mucosa, they signal pain to the CNS. This happens when the nerves are exposed as in peptic ulcers. Antacids are commonly used in to neutralize stomach acid. The action of antacids is based on the fact that a base reacts with acid to form salt and water.



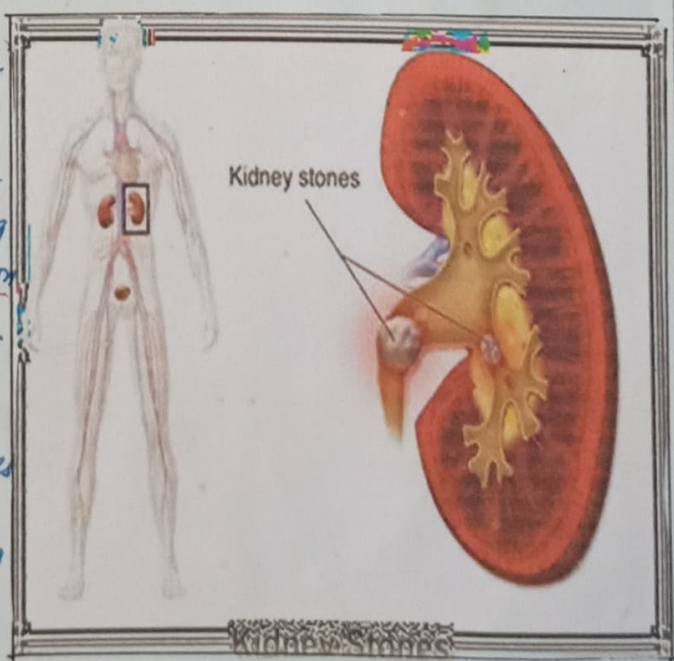
4. INDICATIONS:

Antacids are taken by mouth to relieve heartburn, the major symptom of gastro esophageal flux disease or acid indigestion. Treatment with antacids alone is symptoms for minor symptoms. Peptic ulcers may require H_2 receptor antagonist or proton pump inhibitors. The usefulness of many combinations of antacids is not clear, although the combination of antacids are not clear, although the combinations of magnesium and aluminium salts may prevent alteration of bowel habits.



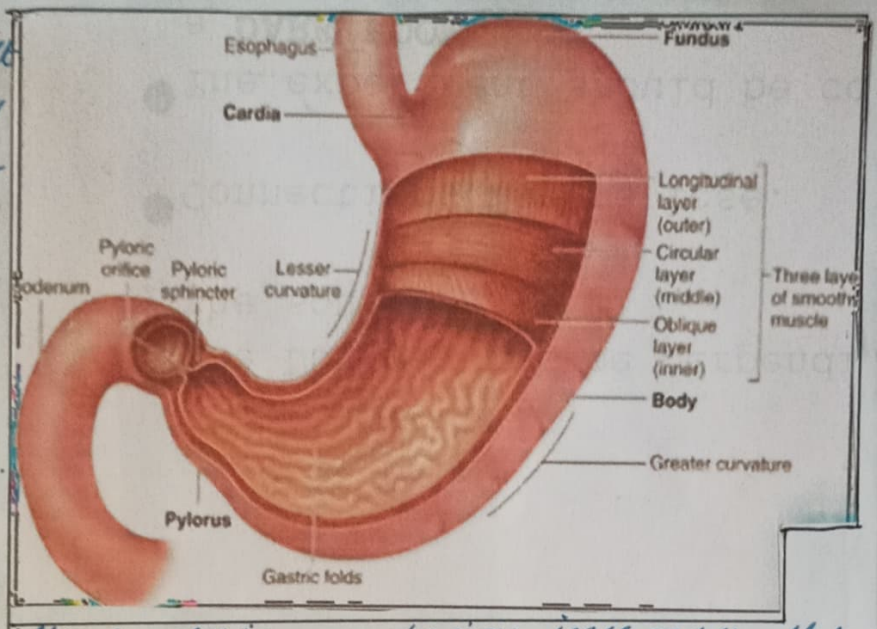
5. SIDE EFFECTS:

* $Al(OH)_3$: may lead to the formation of insoluble aluminium phosphate complexes, hypophosphatemia and osteomalacia. Aluminium containing drugs may cause constipation.
* $Mg(OH)_2$: has a laxative prop. Magnesium may accumulate in patients with renal failure leading to hypermagnesemia with cardiovascular and neurological complications.
* Calcium: compounds containing calcium may increase calcium output in the urine, which might be associated to renal stones. Calcium salts may cause constipation.



6. PROBLEMS WITH REDUCED STOMACH ACIDITY:

Reduced stomach acidity may result in an impaired acidity ability to digest and absorb certain nutrients, such as iron and the B-vitamins. Since, the low pH of the stomach normally kills bacteria, antacids increases the vulnerabcaly to infection. It could also resulted in the reduced bioavaliability of drugs. For Example, Ketoconazole (antifugal), is reduced at high intra-gastric pH.

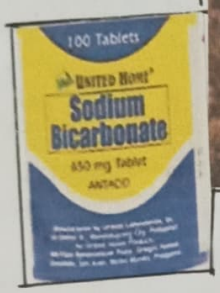


7. SOME FAMOUS ANTACID BRANDS:

1. Alka-Seltzer - $NaHCO_3$ and $KHCO_3$
2. Equacil - $Al(OH)_3$ and $Mg(OH)_2$
3. Gaviscon - $Al(OH)_3$
4. Maalon (liquid) - $Al(OH)_3$
5. Maalon (tabld) - $CaCO_3$
6. Milk of Magnesium - $Mg(OH)_2$
7. Pepto-Bismol - HOC_6H_4COO
8. Pepto-Bismol Children's - $CaCO_3$
9. Tums - $CaCO_3$
10. Mylanta
11. ENO

8. DRUG NAMES:

1. Aluminium Hydroxide
2. Magnesium Hydroxide
3. Calcium carbonate
4. Sodium Bicarbonate
5. Bismuth Subsalicylate
6. Histamine
7. Cimetidine
8. Ranitidine
9. Omeprazole
10. Lansoprazole



★. PROCEDURE:

1. Standardization of NaOH: First we will take 20 ml of 0.1 M HCl and titrate it with unknown concentration solution of NaOH to find its concentration.
2. Determine the mass of antacid for analysis: Since maximum of our antacids are tablet, so we will pulverize and grind the antacid tablet with a mortar and pestle. Measure not more than 0.2g of the pulverized commercial antacid tablet in a 250 mL Erlenmeyer flask having a known mass.
3. Prepare the antacid for analysis: Pipette 40 ml of standardize 0.1 M HCl into the flask and swirl.
4. Preperation the burette for titration: Prepare a clean burette. Rinse the clean burette with two 3-10 5 mL portions of a standard NaOH solution. Record the actual molar concentration of the NaOH. Fill the burette with the NaOH solution.
5. Titrate the sample:

→Record all data on the report sheet;

★. OBSERVATION:

TABLE-1: STANDARDIZATION OF NaOH sol USING 0.1 M HCl

S.NO	PIPETTE SOLUTION (mL)	BURETTE SOLUTION (mL)		TITRATE VALUE	CONCORDANT VALUE
		INITIAL	FINAL		
1.	20	0	11.2	11.2	11.2
2.	20	11.2	22.5	11.3	
3.	20	22.5	33.7	11.2	

TABLE-2: TITRATION OF GELUCIL USING 0.1 M HCl

S.NO	PIPETTE SOLUTION (mL)	BURETTE SOLUTION (mL)		TITRATE VALUE	CONCORDANT VALUE
		INITIAL	FINAL		
1.	40	0	8.1	8.1	8.1
2.	40	8.1	16.3	8.2	
3.	40	16.3	24.4	8.1	

TABLE-3: TITRATION OF DGENE USING 0.1 M HCl

S.NO	PIPETTE SOLUTION (mL)	BURETTE SOLUTION (mL)		TITRATE VALUE	CONCORDANT VALUE
		INITIAL	FINAL		
1.	40	0	15.4	15.4	15.4
2.	40	15.4	30.9	15.5	
3.	40	30.9	46.3	15.4	

TABLE-4: TITRATION OF END USING 0.1 M HCl

S.NO	PIPETTE SOLUTION (mL)	BURETTE SOLUTION (mL)		TITRATE VALUE	CONCORDANT VALUE
		INITIAL	FINAL		
1.	40	0	13.3	13.3	13.3
2.	40	13.3	26.7	13.4	
3.	40	26.7	40	13.3	

★. OBSERVATION [CONT.]

TABLE - 5 : TITRATION OF OCID - 20 USING 0.1 M HCl

Sr. No	PIPETTE SOLUTION (ML)	BURETTE SOLUTION (ML)		TITRATE VALUE	CONCORD - ANT VALUE
		INITIAL	FINAL		
1.	40	0	14.6	14.6	14.6
2.	40	14.6	29.3	14.7	
3.	40	29.3	43.9	14.6	

TABLE - 6 : TITRATION OF GASOFAST USING 0.1 M HCl

Sr. No.	PIPETTE SOLUTION (ML)	BURETTE SOLUTION (ML)		TITRATE VALUE	CONCORDANT VALUE
		INITIAL	FINAL		
1.	40	0	15.7	15.7	15.7
2.	40	15.7	31.5	15.8	
3.	40	31.5	47.2	15.7	

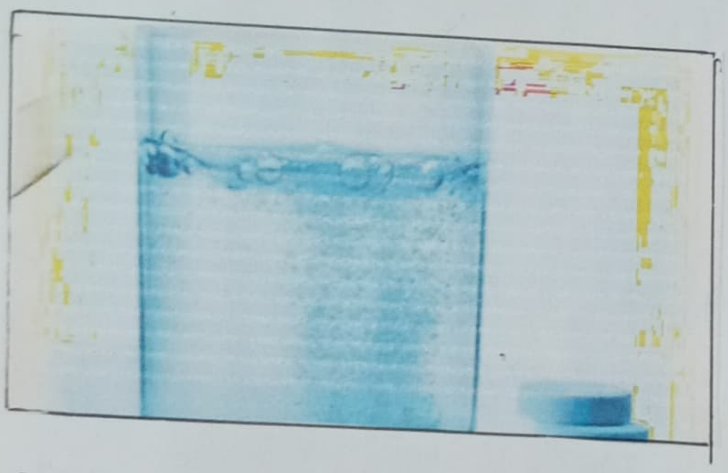
★. RESULT :

Clearly, from the graph gelucil required least amount of NaOH for reaching end point thus it is more effective than other antacids products used.

GELUCIL > ENO > OCID20 > DIGENE > GASOFAST

PRECAUTIONS:

1. All aparatus should be clean and washed properly;
2. Burette and Pipette must be rinsed with respective solution to be put in them.
3. Last drop of the pipette should be not to removed by blowing



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Thank You