

EXPERIMENT NO :1

DATE :

AIM OF THE EXPERIMENT: To detect the gas evolved in the chemical reaction (Hydrogen)

Detection of Hydrogen gas

EXPERIMENT	OBSERVATION	INFERENCE
Add few drops of dilute Hydrochloric acid to pieces of Zinc taken in the test tube.	Brisk effervescence is seen. $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$	Some gas is evolved.
Introduce a piece of moist blue litmus paper into the test tube.	moist blue litmus paper remains blue.	Gas evolved is not acidic in nature.
Introduce a burning splinter into the test tube	burning splinter goes off with a pop sound. $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$	1. Gas evolved is not a supporter of combustion. 2. Presence of hydrogen gas is confirmed.

EXPERIMENT No. : 2

DATE :

AIM OF THE EXPERIMENT : To detect the gas evolved in the chemical reaction (carbon dioxide and sulphur dioxide)

a) DETECTION OF CARBON DI OXIDE GAS

EXPERIMENT	OBSERVATION	INFERENCE
Add dilute sulphuric acid to white amorphous calcium carbonate taken in the test tube.	Brisk effervescence is seen. $\text{Na}_2\text{CO}_3 + \text{dil } 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 \uparrow$	Some gas is evolved.
Introduce a piece of moist blue litmus paper into the test tube.	Moist blue litmus paper turns red.	Gas evolved is acidic in nature.
Introduce a burning splinter into the test tube.	Burning splinter goes off.	1. Gas evolved is not a supporter of combustion. 2. Carbon dioxide gas may be present.
Pass the gas through clear lime water.	Lime water turns milky. $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$	Carbon dioxide gas may be present.

Introduce a piece of orange acidified potassium dichromate paper into the test tube.	Orange acidified potassium dichromate paper remains orange.	Carbon dioxide gas is present.
Add few drops of pink potassium permanganate solution into the test tube.	Pink potassium permanganate solution remains pink.	Carbon dioxide gas is present.

b) DETECTION OF SULPHUR DIOXIDE GAS

EXPERIMENT	OBSERVATION	INFERENCE
Add a few drops of dilute sulphuric acid to white crystalline sodium sulphite taken in the test tube.	<p>1. Brisk effervescence is seen.</p> <p>2. Pungent odour is observed.</p> $\text{Na}_2\text{SO}_3 + \text{dil } 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{SO}_2\uparrow$	Some gas is evolved.
Introduce a piece of moist blue litmus paper into the test tube.	Moist blue litmus paper turns red.	Gas evolved is acidic in nature.
Introduce a glowing splinter into the test tube.	Burning splinter goes off.	<p>1. Gas evolved is not a supporter of combustion.</p> <p>2. Sulphur dioxide gas may be present.</p>

Pass the gas through clear lime water.	Lime water turns milky. $\text{Ca(OH)}_2 + \text{SO}_2 \rightarrow \text{CaSO}_3 + \text{H}_2\text{O}$	Sulphur dioxide gas may be present.
Introduce a piece of orange acidified potassium dichromate paper into the test tube.	Orange acidified potassium dichromate paper turns green. $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 + 3\text{SO}_2 \rightarrow \text{K}_2\text{SO}_4 + \text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$	Sulphur dioxide gas is present.
Add few drops of pink potassium permanganate solution into the test tube.	Pink potassium permanganate solution decolourises. $2\text{KMnO}_4 + 2\text{H}_2\text{O} + 5\text{SO}_2 \rightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 2\text{H}_2\text{SO}_4$	Presence of sulphur dioxide gas is confirmed.

EXPERIMENT No. : 4

DATE :

AIM OF THE EXPERIMENT: To detect the gas evolved in the chemical reaction (hydrogen sulphide and ammonia)

a) DETECTION OF HYDROGEN SULPHIDE GAS

EXPERIMENT	OBSERVATION	INFERENCE
Add few drops of dilute hydrochloric acid to yellow flakes of sodium sulphide taken in the test tube	1. Pungent odour of rotten egg is observed. 2. Effervescence is seen. $\text{Na}_2\text{S} + \text{dil } 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{S}$	Some gas is evolved.

Introduce a piece of moist blue litmus paper into the test tube	Moist blue litmus paper turns red.	Gas evolved is acidic in nature.
Introduce a piece of moist white lead nitrate paper into the test tube	Moist white lead nitrate paper turns silvery black. $\text{Pb}(\text{NO}_3)_2 + \text{H}_2\text{S} \rightarrow 2\text{HNO}_3 + \text{PbS}\downarrow$	Hydrogen sulphide gas is present.
Introduce a piece of moist white lead acetate paper into the test tube	Moist white lead acetate paper turns silvery black. $\text{Pb}(\text{CH}_3\text{COO})_2 + \text{H}_2\text{S} \rightarrow 2\text{CH}_3\text{COOH} + \text{PbS}\downarrow$	Presence of hydrogen sulphide gas is confirmed.

a) DETECTION OF AMMONIA GAS

EXPERIMENT	OBSERVATION	INFERENCE
Boil equal volume of ammonium chloride solution and sodium hydroxide solution in a test tube	Sharp pungent biting odour is observed. Effervescence is seen. $\text{NH}_4\text{Cl (aq)} + \text{NaOH (aq)} \rightarrow \text{NaCl (aq)} + \text{H}_2\text{O} + \text{NH}_3\uparrow$	Some gas is evolved.

Introduce a piece of moist red litmus paper into the test tube	Moist red litmus paper turns blue.	Gas evolved is alkaline in nature.
Place a glass rod dipped in concentrated hydrochloric acid over the mouth of the test tube	Dense white fumes are seen. $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$	Presence of ammonia gas is confirmed.

EXPERIMENT NO : 8

DATE :

AIM OF THE EXPERIMENT : To study the tests that distinguish aqueous solution to be acid or alkali.

Tests for detecting aqueous solution to be Acid

EXPERIMENT	OBSERVATION	INFERENCE
Add one or two drops of blue litmus solution to the test tube containing the aqueous solution.	Blue litmus solution turns red.	Gas evolved is acidic in nature.
Add one or two drops of red litmus solution to the test tube containing the aqueous solution.	Red litmus solution remains red.	Gas evolved is acidic in nature.
Add one or two drops of orange methyl orange solution to the test tube containing the aqueous solution.	Orange methyl orange solution turns red.	Gas evolved is acidic in nature.

Add one or two drops of colourless phenolphthalein solution to the test tube containing the aqueous solution.	Colourless phenolphthalein solution remains colourless.	Gas evolved is acidic in nature.
Treat few drops of the given aqueous solution with white crystalline sodium sulphite taken in the test tube.	Effervescence is seen. Pungent odour is observed. $\text{Na}_2\text{SO}_3 + \text{dil } 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{SO}_2 \uparrow$	Some gas is evolved.
Introduce a piece of orange acidified potassium dichromate paper into the test tube.	Orange acidified potassium dichromate paper turns green. $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 + 3\text{SO}_2 \rightarrow \text{K}_2\text{SO}_4 + \text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$	Sulphur dioxide gas is present.
Add few drops of pink potassium permanganate solution into the test tube	Pink potassium permanganate solution decolourises. $2\text{KMnO}_4 + 2\text{H}_2\text{O} + 5\text{SO}_2 \rightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 2\text{H}_2\text{SO}_4$	Sulphur dioxide gas is present.

CONCLUSION: The given aqueous solution is : an acid.

Tests for detecting aqueous solution to be Alkali

EXPERIMENT	OBSERVATION	INFERENCE
Add one or two drops of blue litmus solution to the test tube containing the aqueous solution.	Blue litmus solution remains blue.	Gas evolved is alkaline in nature.
Add one or two drops of red litmus solution to the test tube containing the aqueous solution.	Red litmus solution turns blue.	Gas evolved is alkaline in nature.
Add one or two drops of orange methyl orange solution to the test tube containing the aqueous solution.	Orange methyl orange solution turns yellow.	Gas evolved is alkaline in nature.
Add one or two drops of colourless phenolphthalein solution to the test tube containing the aqueous solution.	Colourless phenolphthalein solution turns pink.	Gas evolved is alkaline in nature.
Boil equal volume of the given aqueous solution and ammonium chloride solution in a test tube.	<p>Effervescence is seen.</p> <p>Sharp pungent biting odour is observed.</p> $\text{NH}_4\text{Cl (aq)} + \text{NaOH (aq)} \rightarrow \text{NaCl (aq)} + \text{H}_2\text{O} + \text{NH}_3 \uparrow$	Some gas is evolved.

Introduce a piece of moist red litmus paper into the test tube.	Moist red litmus paper turns blue.	Gas evolved is basic in nature. Ammonia gas may be present.
Place a glass rod dipped in concentrated hydrochloric acid over the mouth of the test tube.	Dense white fumes are seen. $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$	Presence of ammonia gas is confirmed.

CONCLUSION: The given aqueous solution is an alkali.

EXPERIMENT No. : 13

DATE :

AIM OF THE EXPERIMENT : To measure the pH of solutions using pH paper.

THEORY: pH is defined as negative logarithm of hydrogen ion concentration of a solution. It otherwise refer to the concentration of hydrogen ion or hydroxyl ion that defines strength of acid and alkali.

The measurement of pH is done on 14 point scale that range from 0 to 14. On this scale pH7 represents solution to be neutral where concentration of hydrogen ion is equal to concentration of hydroxyl ion. pH 0 to 6.99 represents pH of acidic solutions in which concentration of hydrogen ion would be greater than concentration of hydroxyl ion. Further pH 7.1 to 14 represents pH of alkaline solutions in which concentration of hydrogen ion would be less than concentration of hydroxyl ion.

For conceptual development of pH measurement in laboratory, measurement is done using pH paper which is nothing but universal indicator. Measure of pH of a solution obtained using pH paper through not precise is good enough to refer the gross range of pH.

ACTIVITY:

The activity initially involves dipping the pH paper into the given aqueous solution and observing the new colour attained by the paper. Following this activity, the colour so obtained is then compared with the standard colours that correspond to various pH values available as reference. This activity is repeated for various solutions under study and recorded.

TABLE OF OBSERVATION

SL. NO	SOLUTION	pHVALUE
1	Tamarind solution	5
2	Soil solution	7
3	Sewage water	10
4	Saliva	6-7

NOTE: Write this table on the unruled page of your record note book.