Sr.	Experiment	Observations	Inference
1.	Ammonia (NH_3) It is liberated :- (a) by heating ammonium salts with alkalis (b) by treating metal nitrides with hot water	(i) It is a colourless gas having typical pungent smell. (ii) It turns moist red litmus blue (iii) It gives dense white fumes when a glass rod dipped in conc. HCl is brought near it.	NH_3 gas

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EXPERIMENT 1

Aim: To identify Ammonia gas

Apparatus and Chemicals: Test tubes, Test tube holder, bunsen burner, Ammonia gas, common laboratory reagents like dil. HCl, dil. H_2SO_4, etc.

Sr.	Experiment	Observations	Inference
2.	Chlorine (Cl_2) It is liberated :- (a) by heating MnO_2, PbO_2, Pb_3O_4, $KMnO_4$ or $K_2Cr_2O_7$ with conc. HCl (b) by the action of bleaching powder with dil HCl or dil H_2SO_4	(i) It is a greenish yellow gas having pungent irritating smell. (ii) It turns moist blue litmus paper red and then bleaches it. (iii) It turns moist starch iodide paper blue-black	Cl_2 gas

EXPERIMENT 2

Aim: To identify chlorine gas

Apparatus and Chemicals: Test tubes, Test tube holder, bunsen burner, Chlorine gas, common laboratory reagents like dil. HCl, dil. H_2SO_4, etc.

S. No	Experiment	Observation	Inference
3.	CO_2 It is liberated: (a) by heating strongly metal carbonates except Na_2CO_3 and K_2CO_3 (b) by heating strongly metal bicarbonates (c) by the action of dil. HCl or dil. H_2SO_4 with metal carbonates or bicarbonates.	(i) It is a colourless, odourless gas (ii) It turns moist blue litmus paper red. (iii) It extinguishes a glowing wooden splinter. (iv) It turns freshly prepared lime water milky	CO_2 gas

EXPERIMENT 3

Aim : To identify carbon dioxide gas

Apparatus and chemicals : Test tubes, Test tube holder, bunsen burner, carbon dioxide gas, common laboratory reagents like dil HCl or dil H_2SO_4, etc.

S. No	Experiment	Observation	Inference
4.	Hydrogen (H_2) It is liberated by the action of active metals like magnesium, zinc with dil. hydrochloric acid or dilute sulphuric acid	(i) It is a colourless, odourless gas. (ii) It is neutral towards litmus (iii) When a burning wooden splinter is brought near it, it goes off and the gas burns with a pale blue flame producing a pop sound.	: H_2 gas

EXPERIMENT 4

Aim: To identify hydrogen gas

Apparatus and chemicals: Test tubes, Test Tube holder, bunsen burner, Hydrogen gas, common laboratory reagents like dil. HCl or dil. H_2SO_4, etc.

Sr. No	Experiment	Observations	Inference
5.	Hydrogen Sulphide (H_2S) It is liberated by the action of dil. HCl or dil. H_2SO_4 on metal sulphides.	(i) It is a colourless, odourless gas having smell of rotten eggs (ii) It turns moist red litmus blue (iii) It turns lead acetate paper black	H_2S gas

EXPERIMENT 5

Aim : To identify hydrogen sulphide gas

Apparatus and chemicals : Test tubes, Test tube holder, bunsen burner, Hydrogen Sulphide gas, common laboratory reagents like dil. HCl or dil. H_2SO_4, etc.

S. No.	Experiment	Observation	Inference
6.	$[NO_2]$ It is liberated: (a) by heating metal nitrates (except $NaNO_3$ and KNO_3) (b) by heating metal nitrates with conc. H_2SO_4	(i) It is a reddish brown gas having pungent, irritating smell. (ii) It turns moist blue litmus paper red (iii) It turns moist potassium iodide paper brown	: NO_2 gas

EXPERIMENT-6

Aim: To identify Nitrogen dioxide gas

Apparatus and Chemicals: Test Tubes, Test tube holder, bunsen burner, Nitrogen dioxide gas, common laboratory reagents like dil. HCl or dil. H_2SO_4, etc.

S.No	Experiment	Observation...	Inference
7	Sulphur dioxide (SO_2) It is liberated:- (a) by heating metal sulphites except Na_2SO_3 and K_2SO_3. (b) by heating metal-hydrogen sulphites (c) by the action of metal sulphites or metal hydrogen sulphites with dil. HCl or dil. H_2SO_4	(i) It is a colourless, odourless gas having pungent suffocating smell like that of burning sulphur. (ii) It turns moist blue litmus paper red. (iii) It extinguishes a glowing wooden splinter (iv) It decolourises acidified KMO_4 solution. (v) It turns acidified potassium dichromate solution from orange to green	SO_2 gas

EXPERIMENT NO. 7

Aim : To identify sulphur dioxide gas

Apparatus and Chemicals : Test tubes, Test tube holder, bunsen burner, Sulphur Dioxide gas, common laboratory reagents like dil HCl or dil H_2SO_4, etc.

Sr. No	Experiment	Observations	Inferenc
8.	Water (H_2O) gas It is liberated on heating :- (a) hydrated salts like $CuSO_4 . 5H_2O$ (b) metal hydroxides except NaOH and KOH (c) metal hydrogen carbo -nates or metal hydrogen Sulphites	(i) It is a colourless, odourless gas or vapour (ii) It is neutral towards litmus (iii) It turns white anhydrous copper sulphate blue (iv) It turns blue cobalt chloride paper pink. (v) Colourless liquid condenses on cooler sides of a test tube	H_2O vapour

EXPERIMENT 8

Aim :- To identify water vapour

Apparatus and chemicals :- Test tubes, Test tube holder, Bunsen burner, Water vapour, common laboratory reagents like dil HCl or dil H_2SO_4, etc.

Sr. No	Experiment	Observations	Inference
9.	Oxygen (O_2) It is liberated on heating :- (a) metal nitrates like $Pb(NO_3)_2$ (b) metal oxides like HgO, PbO_2, Pb_3O_4, etc (c) oxysalts like potassium chlorate, potassium dichromate, potassium permanganate, etc.	(i) It is a colourless, odourless gas. (ii) It is neutral towards litmus. (iii) It rekindles glowing wooden splinter	O_2 gas

EXPERIMENT 9

Aim :- To identify oxygen gas

Apparatus and Chemicals :- Test tubes, Test tube holder, Bunsen burner, Oxygen gas, common laboratory reagents like dil. HCl or dil. H_2SO_4, etc.

Colour imparted to the flame (with naked eye)	Colour imparted to the flame (with blue glass)	Inference
Golden yellow	Invisible	Sodium (Na^+)
Violet	Violet or pink	Potassium (K^+)
Brick red	Light green	Calcium (Ca^{2+})
Peacock bluish green	Bluish green	Copper (Cu^{2+})
Apple green	Bluish green	Barium (Ba^{2+})
Crimson red	Purple	Strontium (Sr^{2}

EXPERIMENT 10

Aim:- To identify the metallic ion or basic radical present in the given salt by flame test

Apparatus and Chemicals:- A platinum wire (one end fused in a glass rod), watch glass, glass rod, pencil, Bunsen burner, blue glass, concentrated hydrochloric acid (HCl), given unknown substance

Precautions:

Always clean the platinum wire with conc. HCl before and after performing the flame test.

Only pure concentrated hydrochloric acid (HCl) should be used for cleaning the platinum wire and for preparing a paste of the salt.

While cleaning the platinum wire, never dip it in the bottle containing concentrated hydrochloric acid. Always take a little of the acid in a clean test tube or watch glass.

After cleaning the platinum wire, throw away the acid into the sink since it cannot be used for any other purpose.

Teacher's Signature .....

Never use a glass rod for performing flame test. Glass contains sodium silicate as one of the constituents and hence will always impart a golden yellow colour to the flame.

Never sprinkle the salt powder into the flame as the bunsen burner is spoiled and the colour is often not imparted to the flame.

S.no	Experiment	Observation	inference
1	light green powder		
1	Heat a pinch of light green powder ($CuCO_3$) in a dry test tube	1. light green amorphous powder changes to a black on strong heating 2. It gives odour & colourless gas which turns freshly prepare lime water milky (CO_2 gas)	light green powder is $CuCO_3$ The reaction taking place is $CuCO_3 \xrightarrow{heat} CuO + CO_2\uparrow$
2	White powder	1. The light white amorphous powder turns pale yellow on strong heating	The given salt is washing soda ($ZnCO_3$)
	Heat a pinch of given salt ($ZnCO_3$) in a dry test tube	2. Colour & odourless gas is given off which extinguish a glowing wooden splinter 3. On cooling the residue becomes white	The reaction taking place is $ZnCO_3 \xrightarrow{heat} ZnO + CO_2$

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Experiment - 11

Aim - To study effects of heat on some substances

Apparatus and chemicals - Test tube, test tube holder, bunsen burner, unknown substance (different chemicals)

S.no	Experiment	Observation	inference
3	White flakes Heat a pinch of given salt in a dry test tube	1. White chrystalline solid which on heating swells, melts and then gives steamy vapour (H_2O) 2. colour & odourless vapour evolved on heating, condenses on the cooler parts of the test tube forming tiny droplets of colourless liquid which turns $Na_2CO_3.10H_2O$ to Na_2CO_3 3. On cooling a white amorphous residue is left	1. The given salt is $Na_2CO_3.10H_2O$ 2. The reaction taking place is: $Na_2CO_3.10H_2O \xrightarrow{heat} Na_2CO_3 + 10H_2O\uparrow$
4	Blue crystals: Heat a few blue crystals in a dry test tube.	1. $CuSO_4.5H_2O$ on heating gives white amorphous powder, 2. Steamy vapours are given off	The blue crystals are of $CuSO_4.5H_2O$ The reaction taking place is:

Sn	Experiment	Observation	inference
		which condenses on the cooler parts of the test tube to form H_2O vapour	$CuSO_4.5H_2O \xrightarrow{heat} CuSO_4 + 5H_2O$
5	Orange/red Crystals: Heat a few crystals in a dry test tube	1. red lead oxide on strong heating turns yellow in colour giving off O_2 2. colour and odourless gas is involved which is neutral in nature and shows no effect on litmus paper	1. The orange crystals are Pb_3O_4 2. The reaction taking place is: $Pb_3O_4 \xrightarrow{heat} PbO + O_2\uparrow$
6	Yellow powder Heat a pinch of yellow powder in a dry test tube	1. HgO on heating turns greyish and shiny in appearance 2. Mercury condenses on the cool parts of the	The yellow powder is HgO The reaction taking place is: $2HgO \xrightarrow{heat} 2Hg + O_2$

Sno	Experiment	Observation	inference
		of the test tube forming a silver mirror 3. Colour and odourless gas is evolved which rekindles a glowing splinter	
7	black powder take a pinch of given powder in a test tube and heat it	1. It decomposes upon heating to yellow/red coloured PbO crystals 2. Colour and odour less gas is evolved which rekindles a glowing splinter	The black powder is PbO_2 The reaction taking place is $PbO_2 \xrightarrow{heat} PbO + O_2$
8	White powder: Heat a little of the given powder	1. White coloured $PbCO_3$ decomposes to form yellow coloured PbO 2. It gives colourless & odourless	The white powder is $PbCO_3$ The reaction taking place is $PbCO_3 \xrightarrow{heat}$

Snd	Experiment	Observation	inference
		gas which turns freshly prepared lime water milky	$PbO + CO_2$