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TENDER HEART HIGH SCHOOL, SEC-33B, CHD

CLASS- IX SUBJECT- CHEMISTRY

CHAPTER- 9 TEACHER- ANAMIKA

6. Sulphur dioxide.

Preparation:- Add dil. HCl or dil. H_2SO_4 to metallic sulphites.

Metal / Hydrogen sulphite + dil acid → Salt + Water + Sulphur dioxide

$$Na_2SO_3 + 2HCl \rightarrow 2NaCl + H_2O + SO_2\uparrow$$

$$Na_2SO_3 + H_2SO_4 \rightarrow Na_2SO_4 + H_2O + SO_2\uparrow$$

Recognition and Identification of gas.

(i) It evolves colourless gas with smell of burning sulphur (a suffocating odour)

(ii) It extinguished the burning wooden splinter in sulphur dioxide.

(iii) It turn moist blue litmus red and finally bleaches it. This is temporary.

(iv) The gas turns lime water turbid (milky). (Similar to carbon dioxide.)

$$Ca(OH)_2 + SO_2 \rightarrow CaSO_3\downarrow + H_2O$$

7. Hydrogen sulphide

Preparation:-

Add dil. HCl or dil. H_2SO_4 to metallic sulphides like ZnS, FeS etc.

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Metal sulphide + dil. Acid → Salt + Hydrogen Sulphide

$FeS + H_2SO_4 \rightarrow FeSO_4 + H_2S\uparrow$
$ZnS + 2HCl \rightarrow ZnCl_2 + H_2S\uparrow$

Recognition and Identification

(i) It evolves colourless gas with a foul smell as of rotten eggs.
(ii) It turns moist blue litmus red.
(iii) It turns lead acetate paper black.

$(CH_3COO)_2Pb + H_2S \rightarrow PbS\downarrow + 2CH_3COOH$
(colourless) (Black)

(iv) It also turns lead nitrate solution black.

$Pb(NO_3)_2 + H_2S \rightarrow PbS\downarrow + 2HNO_3$
colourless (black)

8. Ammonia

Preparation:- Add alkali to ammonium salt like ammonium chloride or ammonium sulphate and heat.

Ammonium salt + Alkali → Salt + Water + Ammonia

$2NH_4Cl + Ca(OH)_2 \rightarrow CaCl_2 + 2H_2O + 2NH_3\uparrow$

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Recognition and Identification of Gas.

(i) It evolves colourless with a characteristic sharp, pungent smell.
(ii) It turns moist red litmus blue.
(iii) It turns colourless Nessler's reagent, [i.e (K_2HgI_4) potassium mercuric iodide.] brown.

9. Water vapour

Preparation:- Heat a crystalline substance like hydrated sodium carbonate or hydrated copper sulphate.

$$Na_2CO_3 \cdot 10H_2O \xrightarrow{\Delta} Na_2CO_3 + 10H_2O$$
$$CuSO_4 \cdot 5H_2O \xrightarrow{\Delta} CuSO_4 + 5H_2O$$
(blue) (white)

Recognition and Identification
(1) It evolves colourless & odourless vapours condense to form a clear liquid on the cooler part of the test-tube.
(2) It is neutral to litmus
(3) This liquid turns anhydrous copper sulphate from white to blue.

$$CuSO_4 + 5H_2O \rightarrow CuSO_4 \cdot 5H_2O$$

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10. Nitrogen dioxide

Preparation:- Heat a heavy metal nitrate like copper nitrate or lead nitrate.

Metal nitrate → Metal oxide + Oxygen + Nitrogen dioxide

$2Cu(NO_3)_2 \xrightarrow{\Delta} 2CuO + O_2 + 4NO_2\uparrow$

$2Pb(NO_3)_2 \xrightarrow{\Delta} 2PbO + O_2 + 4NO_2\uparrow$

Recognition and Identification of Gas

(i) The gas is brown in colour, has an irritating (pungent) odour & is non-combustible.

(ii) It turns moist blue litmus paper red.

(iii) It liberates iodine (violet vapours) from potassium iodide (KI) solution or turns potassium iodide paper brown.

$2KI + 2NO_2 \rightarrow 2KNO_2 + I_2\uparrow$

(iii) It turns green acidified ferrous sulphate solution brown.

Action Of Heat On A Brown (Unknown) Substance.

(P.T.O)

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	Observation	Identification of Substance
A1.	(i) Light green amorphous powder turn to black, on strong heating (ii) Turn lime water milky	$CuCO_3 \xrightarrow{\Delta} CuO + CO_2$ (Black) Gas evolved is CO_2
2.	(i) On strong heating the light, amorphous white solid, changes to pale yellow	$ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$ Gas evolved is CO_2
B1.	(i) White crystalline solid, on strong heating, swells, crumbles and then melt, giving steamy vapour (ii) On cooling, a white amorphous residue is left	$Na_2CO_3 \cdot 10H_2O \xrightarrow{\Delta} Na_2CO_3 + 10H_2O$ (Steam) Gas evolved is water vapour
2.	(i) Blue crystal solid, on heating, crumbles to form a white amorphous powder	$CuSO_4 \cdot 5H_2O \xrightarrow{\Delta} CuSO_4 + 5H_2O$ $2CuSO_4 \xrightarrow{\Delta} 2CuO + 2SO_2 + O_2$ Gas evolved are SO_2 and O_2
C1.	(i) Blue crystalline solid, on heating crumble to form a white amorphous powder (ii) The evolved gas turn moist blue litmus red and changes colour of acidified $K_2Cr_2O_7$ solution from orange to green	$Zn(NO_3)_2 \cdot 6H_2O \xrightarrow{\Delta} Zn(NO_3)_2 + 6H_2O$ $2Zn(NO_3)_2 \xrightarrow{\Delta} 2ZnO + 4NO_2\uparrow + O_2\uparrow$ Gas evolved are water vapour nitrogen dioxide and oxygen

	Observation	Identification of substance
2	(i) Bluish green crystal solid on heating melt to form green mass and give off steamy vapour that condense on cooler part of test tube to form droplet of liquid (water) (ii) It also give us a gas that rekindles a glowing splinder i.e. oxygen	$Cu(NO_3)_2 \cdot 6H_2O \xrightarrow{\Delta} Cu(NO_3)_2 + 6H_2O$ $2Cu(NO_3)_2 \xrightarrow{\Delta} 2CuO + 4NO_2\uparrow + O_2\uparrow$ Gas evolved are water vapour, nitrogen dioxide, and oxygen.
3	(i) Heavy white crystalline solid, on strong heating, crumbles with a cracking noise (ii) The residue is redish brown when hot. On cooling it changes to yellow partly fuses in green and stain it yellow.	$2Pb(NO_3)_2 \xrightarrow{\Delta} 2PbO + 4NO_2 + O_2$ Gas evolved are nitrogen dioxide and oxygen.
21.	(i) White crystalline solid on strong heating sublimated to form a basic gas (NH_3) and acidic gas (HCl) (ii) No residue is left behind.	$NH_4Cl \underset{cool}{\overset{heat}{\rightleftharpoons}} NH_3\uparrow + HCl\uparrow$ substance is ammonium chloride.

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Observation	Identification of substance
2. (i) Violet crystalin solid on strong heating sublimates to form violet vapours. These vapours settled down on cooler part of test tube to form violet crystal (ii) These vapour turn paper dipped in silver nitrate solution yellow.	$I_2 \xrightarrow{\Delta} 2I \uparrow$ (violet) (vapour) Substance is iodine.
3. (i) Orange red crystalline solid on strong heating, swells up and decompose violetly with flashes of light leaving green residue (ii) Greenish grey mass of Chromium oxide is left behind	$(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} Cr_2O_3 + N_2\uparrow + 4H_2O$ (orange red) (greenish gray) Gas evolved are water vapour and nitrogen.

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