WORKSHEET 1

Chapter 9 – Practical Work

A. Tick (✓) the correct option.

1. The gas which turns moist blue litmus red is
   a. carbon monoxide. b. hydrogen. c. carbon dioxide. d. oxygen.
2. The gas which gives dense white fumes with ammonia solution is
   a. chlorine. b. nitrogen. c. hydrogen chloride. d. sulphur dioxide.
3. The acid used for flame test is
   a. concentrated hydrochloric acid. b. dilute hydrochloric acid.
   c. concentrated nitric acid. d. dilute nitric acid.
4. The blue coloured salt which turns pink on addition of water is
   a. copper sulphate. b. lead nitrate. c. washing soda. d. cobalt chloride.
5. When dilute sulphuric acid is added to a sulphite, the gas evolved is
   a. H_2S. b. SO_2. c. SO_3. d. CO_2.

B. Fill in the blanks from the choices given within the brackets.

1. _________ (Hydrogen/Sulphur dioxide/Hydrogen sulphide) is identified by its characteristic foul smell of rotten egg.
2. _________ (Ammonium chloride/Ammonium dichromate/Iodine) sublimes to give violet coloured vapours.
3. Sulphur dioxide gas turns potassium permanganate solution from _________ (purple/blue) to colourless and potassium dichromate from _________ to _________ (orange/green/blue)
4. On heating, _________ (copper nitrate/lead nitrate/zinc nitrate) gives a yellow coloured residue, a coloured _________ (acidic/basic/neutral) gas and a colourless _________ (acidic/basic/neutral) gas.
5. Sodium chloride imparts a _________ (lilac/brick red/golden yellow) colour on application of the flame test for identification of the metallic radical in the salt.

C. State which of the substances given below evolve oxygen gas on thermal decomposition.

1. Zinc carbonate
2. Washing soda
3. Lead nitrate
4. Ammonium dichromate
5. Trilead tetraoxide
6. Zinc nitrate
7. Mercury (II) oxide
8. Anhydrous copper sulphate

Name: .... Teacher's signature: ....

Class: ....IX................................... Date: ....

D. Match the following salts given in column B with the colours given in column A which they would show when decomposed thermally.

	Column A	Column B
1.	Orange to reddish brown	Copper carbonate
2.	Blue to white	Copper nitrate
3.	Light green to black	Lead nitrate
4.	Blue to black	Hydrated copper sulphate
5.	White to reddish brown	Red lead

E. Answer the following.

1. Name a salt which on reaction with dilute sulphuric acid liberates a gas that turns lead acetate paper silvery black.
2. Using dilute sulphuric acid, how would you differentiate between
   a. sodium sulphide and sodium carbonate?
   b. copper and magnesium?
3. Give balanced chemical equations for the following conversions.
   a. Zinc nitrate to nitrogen dioxide
   b. Copper sulphate to sulphur dioxide
   c. Ammonium dichromate to nitrogen gas
4. Give a chemical test to distinguish between
   a. chlorine and nitrogen dioxide.
   b. ammonia and hydrogen chloride.
   c. carbon dioxide and sulphur dioxide.
   d. hydrogen and oxygen.
5. How will you determine the quality of water of local water bodies in terms of the following parameters?
   a. Turbidity
   b. Hardness
   c. Salinity
   d. pH
   e. Dissolved oxygen.

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. c 2. c 3. a 4. d 5. b

B. Fill in the blanks from the choices given within the brackets.

1. Hydrogen sulphide
2. Iodine
3. orange, green, purple
4. zinc nitrate, acidic, neutral
5. golden yellow

C. State which of the substances given below evolve oxygen gas on thermal decomposition.

3. Lead nitrate 5. Trilead tetraoxide 6. Zinc nitrate 7. Mercury (II) oxide

8. Anhydrous copper sulphate

D. Match the following salts given in column B with the colour given in column A which they would show when decomposed thermally.

	Column A	Column B
1.	Orange to reddish brown	Red lead
2.	Blue to white	Hydrated copper sulphate
3.	Light green to black	Copper carbonate
4.	Blue to black	Copper nitrate
5.	White to reddish brown	Lead nitrate

E. Answer the following.

1. Potassium sulphide

2. a.

Sodium sulphide	Sodium carbonate
When dilute sulphuric acid is added to a sodium sulphide, it liberates hydrogen sulphide gas which turns lead acetate paper silvery black.	When dilute sulphuric acid is added to a sodium carbonate, it liberates carbon dioxide with a brisk effervescence, which turns lime water milky and has no effect on acidified potassium dichromate paper.

b.

Copper	Magnesium
Dilute sulphuric acid has no reaction with copper.	Dilute sulphuric acid reacts with magnesium to liberate hydrogen gas.

3. a. $2Zn(NO_3)_2 \xrightarrow{heat} 2ZnO + 4NO_2 + O_2$

b. $2CuSO_4 \xrightarrow[650\,°C]{heat} 2CuO + 2SO_2 + O_2$

c. $(NH_4)_2Cr_2O_7 \xrightarrow{heat} Cr_2O_3 + N_2 + 4H_2O$

4. a.

Chlorine	Nitrogen dioxide
Chlorine forms white precipitate when passed through silver nitrate solution.	Nitrogen dioxide turns acidified ferrous sulphate solution brown.

b.

Ammonia	Hydrogen chloride
Ammonia turns Nessler's reagent (K_2HgI_4) solution brown.	Hydrogen chloride forms curdy white precipitate when passes through a silver nitrate solution. The precipitate dissolves in excess amount of ammonium hydroxide solution.

c.

Carbon dioxide	Sulphur dioxide
Carbon dioxide has no effect on acidified potassium permanganate and potassium dichromate solution.	Sulphur dioxide turns acidified potassium permanganate solution from purple to colourless as well as turns acidified potassium dichromate solution from orange to green.

d.

Hydrogen	Oxygen
Hydrogen burns with a pale blue flame when a burning splinter is brought near it.	Oxygen relights a glowing splinter and turns a colourless alkaline pyrogallol solution to brown when passed through it.

5. a. **Turbidity** is a measure of amount of particulate matter and suspended solids present in the water. Suspended solids commonly found in water bodies are mud, clay, algae, bacteria, silica, $CaCO_3$ and Fe_2O_3. It is measured by a Sechi disc or by using a 500 mL glass cylinder kept on paper marked with a black cross. These particles prevent light from reaching submerged organisms, and also raise the temperature of water.

b. **Hardness** of water is tested by titration. Hard water has high concentration of Ca^{2+} and Mg^{2+} ions, and does not produce lather easily with soap. The causes of hardness in water are gypsum ($CaSO_4.2H_2O$), calcite ($CaCO_3$), dolomite [$CaMg(CO_3)_2$] and calcium bicarbonate [$Ca(HCO_3)_2$], which get dissolved when water flows over rocks. Magnesium ion levels are often high in irrigation water. By titration of the water sample, amounts of Ca^{2+} and Mg^{2+} present can be measured. The acceptable value of total hardness of potable water is between 200 and 500 mg/L.

c. **Salinity** is also measured by titration. Salinity is a measure of the mass of dissolved salts (ionic constituents) in a given mass of solution. Ions commonly found in water include calcium, magnesium, potassium and sodium cations and bicarbonate, carbonate, chloride, nitrate and sulphate anions. Many aquatic organisms survive only in a narrow range of salt concentration, since salt controls the osmotic pressure. Thus, increase in salinity threatens existence of many aquatic organisms.

High levels of salinity poses, a threat to the many users and industries that rely on the water resource. For example, high levels of salinity can damage crops when used for irrigation, and may cause health problems when used as drinking water. High salt results in long-term damage to the soil, as well as to infrastructure and industrial equipment.

d. **pH** is a measure of the strength of the acidic or basic nature of a substance. Natural acidity in water is due to dissolved $CO_2(g)$ and $H_2S(g)$. The causes of increase in acidic nature of water are acids used in industry, acid mine drainage and acid rain.

Natural alkalinity is due to dissolving of carbonate rocks (limestone, dolomite) in flowing water. The causes of increase in alkaline nature of water are caustic substances (NaOH, KOH) from industry, soil additives in agriculture [$Ca(OH)_2$, $CaSO_4$, $Ca(H_2PO_4)_2$], soaps and detergents. The acceptable pH value for potable water is 7.0–8.5.

e. **Dissolved oxygen** (DO) is measured by the Winkler titration method, using the kit. Dissolved oxygen (DO) content of water is defined as the amount of free oxygen available in the water body, and is an important parameter to determine the quality of a water body. Collect the water sample, ensuring there are no trapped bubbles.

The causes for lowering of DO are increase in temperature of water (for example, due to discharge of hot water from power stations), increase in aerobic oxidation (for example, due to organic matter from sewage, inorganic fertilisers such as phosphates and nitrates and excess algal growth).

Low DO concentrations favour anaerobic (without oxygen) bacterial activity that produces foul-smelling gases in polluted water bodies.