

CHEMISTRY 9th (New Book)

CHAPTER NO 9

Group Properties and Elements

Exercise: Multiple Choice Questions

1.	Iodine	2.	NiCl ₂
3.	Mg	4.	Sixth Group
5.	HI	6.	Na ₂ O
7.	First Group www.ilmkidunya.com	8.	Cl ₂ and NaI
9.	X is unreactive	10.	Low catalytic activity

Q#2: Short Question Answer

i. Why does it become easier to cut an alkali metal when we move from top to bottom in a group I?

As we move down Group I (from lithium to cesium):

- The atomic size increases
- The metallic bonding becomes weaker
- The density increases slightly, but the outer electrons are less tightly held
- The metals become softer

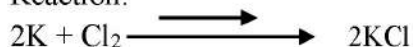
Therefore, it becomes easier to cut alkali metals down the group because they become softer due to weaker metallic bonds and increased atomic size.

ii. Predict the reactivity of potassium towards halogens.

Reactivity of Potassium: www.ilmkidunya.com

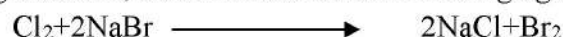
- Potassium (K) is a very reactive alkali metal with a strong tendency to lose one electron and form K⁺.
- Halogens (like Cl₂, Br₂, I₂) are highly electronegative and readily gain electrons.

Reaction:



- Potassium reacts vigorously with halogens to form **ionic salts (like KCl)**.
- The reaction is **highly exothermic** and often **explosive**, especially with chlorine.

iii. In the following reaction, chlorine acts as an oxidizing agent. Which is the reducing agent?



- **Reducing Agent:** NaBr
- In this reaction, NaBr is reducing agent because it donates electron and helps in the reduction of chlorine.

www.ilmkidunya.com

iv. Why does iodine exist in the solid state at room temperature?

Iodine (I₂) exists as a **solid at room temperature** because:

- It is a large diatomic molecule with many electrons.
- This leads to **strong London dispersion forces (van der Waals forces)** between molecules.

v. How does Ni catalyse the reaction involving hydrogenation of oil?

A transition metal **Nickel** is used as a catalyst for the hydrogenation of oil to give solid margarine (Banaspatti ghee). Margarine is less likely to spoil than butter.

Reaction:



Q#3: Constructed Response Questions

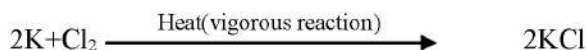
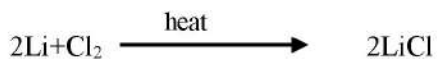
i. Which noble gas should have the lowest boiling point and why?

- **Helium (He)** has the lowest boiling point because it has the smallest atomic size and weakest van der Waals forces, so less energy is needed to turn it into a gas.

ii. Compare the reactions of alkali metals with chlorine.

Alkali metals react with chlorine to form metal chlorides. The reaction becomes vigorous as we go down the group because atomic size increases.

www.ilmkidunya.com



iii. Why are almost all the metals solids while non-metals generally exist as gases and solids?

- Metals have **strong metallic bonds** that hold atoms tightly, making them solid.
- Non-metals have **weak intermolecular forces**, so many exist as gases or brittle solids.

iv. Name any three elements in the periodic table which exist as liquids.

- **Mercury (Hg):** metal
- **Bromine (Br₂):** non-metal
- **Francium (Fr):** predicted to be liquid near room temperature (rare and radioactive)

www.ilmkidunya.com

v. Why are transition elements different from normal elements?

Transition elements have **partially filled d-orbitals**, allowing:

- Variable oxidation states
- Colored compounds
- Catalytic properties
- High melting and boiling points

vi. Compare the reactivity of chlorine and bromine as an oxidizing agent.

- **Chlorine is a stronger oxidizing agent** than bromine because:
- It is more electronegative
- It has a smaller atomic radius, so it gains electrons more easily

www.ilmkidunya.com

vii. Which element is the most reactive and which is the least reactive among halogens? Give two reasons to explain your answer.

- **Most reactive:** Fluorine (F₂)
- **Least reactive:** Iodine (I₂)

Reasons:

1. Fluorine has the highest electronegativity, so it attracts electrons most strongly.
2. Fluorine has a small atomic size, so it gains electrons easily while iodine has largest size and weaker attraction for electrons.