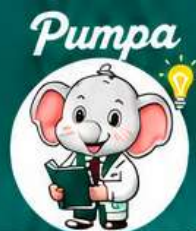




NCERT – GRADE 10 CHEAT SHEET METALS AND NON-METALS



Part A – Key Concepts and Reactions



Physical Properties

- **Metals:** Shiny, malleable, ductile, good conductors of heat and electricity, usually high melting and boiling points (except Hg), generally solid.
- **Non-metals:** Dull, brittle (except I₂), poor conductors (except graphite), varied states (solid, liquid, gas), lower melting and boiling points (generally).

Metals

- Shiny
- Malleable & ductile
- Good conductors
- High m.p. & b.p.
- Usually solid



Non-metals

- Dull
- Brittle (except I₂)
- Poor conductors
- Lower m.p. & b.p.
- Solid, liquid or gas



Metals

- Good conductors of heat and electricity.
- Malleable and ductile.
- Generally solid at room temperature (except Hg).
- High melting and boiling points (except Hg).
- Form positive ions (lose electrons).
- React with non-metals to form ionic compounds.

Examples:

Fe, Cu, Al, Ag, Au, Na, Mg, Zn



Iron
(Fe)



Copper
(Cu)



Aluminium
(Al)



Non-metals

- Poor conductors of heat and electricity (except graphite).
- Generally brittle (except I₂).
- Lower melting and boiling points (generally).
- Form negative ions (gain electrons).
- React with metals to form ionic compounds and with each other to form covalent compounds.

Examples:

C, N, O, S, P, Cl, Br, I



Sulphur
(S)



Carbon
(C)



Bromine
(Br)



Chemical Properties of Metals

- React with oxygen to form metal oxides.
- React with water (some metals).
- React with acids to form salt + hydrogen gas.
- React with solutions of other metal salts.

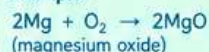
Metals are more electropositive and lose electrons to form positive ions.



What Happens When Metals are Burnt in Air?

- Metals react with oxygen in air to form metal oxides.
- The reaction is called **combustion**.

Example:



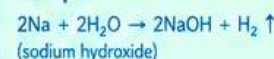
Magnesium burns in air forming magnesium oxide.



What Happens When Metals React with Water?

- Some metals react with cold water, producing metal hydroxide and hydrogen gas. e.g. Sodium, potassium.
- Less reactive metals react with **steam**, producing metal oxide and hydrogen gas. e.g. Iron, zinc.

Example:



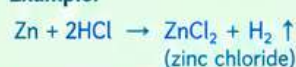
Sodium reacts with water.



What Happens When Metals React with Acids?

- Metals react with dilute acids to form a salt and hydrogen gas.
- More reactive metals react faster.

Example:



Zinc reacts with hydrochloric acid.



How do Metals React with Solutions of other Metal Salts?

- A more reactive metal can displace a less reactive metal from its salt solution.
- The displaced metal gets deposited.

Example:



CuSO₄ solution
(blue)



Copper deposited
on iron nail

Iron nail in copper sulphate solution.



The Reactivity Series

- A series of metals arranged in the order of their reactivity.
- Helps us predict displacement reactions and reactivity with water and acids.

The Reactivity Series (most to least reactive)

K	Potassium
Na	Sodium
Ca	Calcium
Mg	Magnesium
Al	Aluminium
Zn	Zinc
Fe	Iron
Pb	Lead
H	Hydrogen
Cu	Copper
Ag	Silver
Au	Gold

More reactive

Metals above hydrogen can react with dilute acids.

Less reactive



Common Mistakes

- ✗ Thinking all metals react with water (e.g. copper does not).
- ✗ Believing non-metals are always gases (e.g. sulphur is a solid).
- ✗ Confusing displacement reactions with combination reactions.
- ✗ Misunderstanding the reactivity series order.



KEY TAKEAWAY

- ✓ Metals: shiny, malleable, good conductors, form positive ions.
- ✓ Non-metals: dull, brittle, poor conductors, form negative ions.
- ✓ Metals burn in air to form oxides.
- ✓ Some metals react with water and acids, releasing hydrogen gas.
- ✓ More reactive metals can displace less reactive metals from their salt solutions.
- ✓ The reactivity series helps predict reactions.



Metals and Non-metals...
different properties,
unique uses,
together they make
the world work!

Pumpa

Explore · Learn · Excel