Chapter 4 – Quick Revision Sheet

Carbon and its Compounds

Covalent Bond

Definition:

Covalent bond is formed by sharing of electrons between atoms.

Key Points:

- Formed between non-metals
- No gain/loss of electrons
- Forms molecules (not ions)
- Types: single, double, triple bond
- Example: CH_4, O_2, N_2

Allotropes of Carbon

Different forms of carbon having different properties.

Types:

- Diamond → hardest, no conductivity
- Graphite → soft, conducts electricity
- Fullerene → spherical structure

Versatile Nature of Carbon

- Catenation → forms long chains (straight, branched, ring)
- Tetravalency → forms 4 covalent bonds
- Forms stable and large number of compounds

Hydrocarbons

Compounds containing only carbon and hydrogen.

Types:

• Saturated (Alkanes) → single bond, less reactive

• Unsaturated:

– Alkenes → double bond

– Alkynes → triple bond

Functional Group

Atom/group that determines chemical properties of compound.

Table:

Functional Group	Formula	Example
Alcohol	–OH	Ethanol
Aldehyde	–CHO	Ethanal
Ketone	–CO–	Propanone
Carboxylic acid	–COOH	Ethanoic acid
Halo	–Cl, –Br	Chloromethane

Nomenclature

Key Points:

- Count carbon atoms → meth, eth, prop, but
- Identify functional group
- Add suffix/prefix

Examples:

- CH_4 → Methane
- C_2H_5OH → Ethanol
- CH_3COOH → Ethanoic acid
- C_2H_4 → Ethene

Chemical Properties

Reaction	Description	Example
Combustion	Burns in oxygen	$CH_4 + O_2 \rightarrow CO_2 + H_2O$
Oxidation	Addition of oxygen	Alcohol → Acid
Addition	Unsaturated → saturated	Ethene → Ethane
Substitution	Replacement reaction	$CH_4 + Cl_2 \rightarrow CH_3Cl$

Ethanol (C_2H_5OH)

Properties:

- Colourless liquid
- Good solvent
- Miscible with water

REACTION	RESULT
WITH SODIUM	H_2 gas produced
DEHYDRATION	Ethene formed

Ethanoic Acid (CH_3COOH)

Properties:

- Weak acid
- Called acetic acid
- Vinegar (5–8%)

REACTION	RESULT
ESTERIFICATION	Ester (fruity smell)
WITH BASE	Salt + Water
WITH CARBONATES	CO_2 gas