

Carbon and Its Various Forms

These notes are your ultimate revision weapon to revise Carbon and its Various Forms. We've distilled years of previous exam questions (PYQs) into one powerful, concise resource. Everything you need to know, nothing you don't.

- **PYQs, Decoded:** All key concepts from past exams, organized and simplified.
- **Revise in Record Time:** Short, precise, and designed for last-minute review.
- **Focus on What Matters:** Master high-probability topics and boost your confidence.

Carbon and Its Allotropes

General Properties of Carbon



- Carbon forms the maximum number of compounds among all elements.
- **Substances containing carbon:** Diamond, Graphite, Coal, Lignite.
- **Substances not containing carbon:** Sand, Tin, Silver, Iron.

Allotropes of Carbon (Forms of Pure Carbon)

- **Primary/Well-Known Allotropes:**
 - **Diamond:**
 - Hardest natural material.
 - Crystalline in form.
 - Can scratch or etch glass.
 - Unit of weight is a **carat** (1 carat = 200 mg).
 - **Graphite:**
 - Crystalline form of carbon.
 - Used as a lubricant in heavy machines.
 - Good conductor of electricity.

- Used in pencil leads.
- **Additional/Novel Allotropes:**
 - **Fullerene:** The third major allotrope discovered.
 - **Graphene:**
 - A nanostructure and two-dimensional material.
 - Composed purely of carbon atoms (an allotrope, not an alloy or isotope).
 - One of the thinnest but strongest materials known (stronger than steel, brass, german silver).
 - Has excellent electrical conductivity.
 - Used as 'conducting electrodes' in touchscreens, LCDs, and organic LEDs.
 - It is **not** made of silicon.
 - **Oxocarbon:** Also recognized as a form of carbon.

Discovery, Synthesis, and Composition

Discovery of Fullerenes



- The Nobel Prize-winning discovery team consisted of **H.W. Kroto, R.F. Curl, and R.E. Smalley**.
- *Note: Faimen was not part of the team.*

Chronological Order of First Lab Synthesis

- The correct order is: **Kevlar → Fullerene → Graphene → Black gold.**

Composition of Specific Substances

- **Substances made of carbon only:** Diamond, Graphite, Graphene.
- **Substances NOT made of carbon only:**
 - **Kevlar, Lexan:** Synthetic polymers.
 - **Spider silk, Keratin:** Proteins.
 - *These contain other elements besides carbon.*

Coal and Carbon Content

Types of Coal (by Increasing Carbon Content)

- The order of increasing carbon percentage is: **Peat** → **Lignite** → **Bituminous** → **Anthracite**.
- **Anthracite** has the highest percentage of carbon.

Carbon in Iron and Steel

- **Pig Iron** contains the highest amount of carbon among iron/steel products.
- **Wrought iron** has a very low carbon content.

Other Important Substances and Facts

Crystals

- **Crystalline substances:** Diamond, Quartz, Graphite.
- **Non-crystalline substance:** Sulphur (in the context of the given question).

Glass Etching/Scratching

- Glass can be etched or scratched by:
 1. **Diamond** (due to its hardness).
 2. **Hydrofluoric Acid** (due to a chemical reaction).

Gases and Ice

- **Dry Ice:** Solid form of **Carbon Dioxide** (CO_2).
- **Water Gas:** A mixture of **Carbon Monoxide** and **Hydrogen** ($\text{CO} + \text{H}_2$).
- **Gas from Soda Water:** **Carbon Dioxide** (CO_2).

Chemical Bonds

- The bond order of the **CO (Carbon Monoxide)** group is 3.

Miscellaneous Facts

- **Water Hardness:** Caused by the presence of **Calcium Sulphate**.
- **Air Composition:** **Oxygen** is the main component of air.
- **Nitrogen Use:** Used in the manufacture of vegetable ghee (hydrogenation process).

Common Misconceptions and Correct Matches

Incorrectly Matched Pair

- **Fullerene** is **not** an "Organic compound containing fluorine" or a "Fluorine-containing polymer." It is an allotrope of carbon.

Correctly Matched Pairs (for Context)

- **Dry Ice** = Solid Carbon Dioxide.
- **Mustard Gas** = Poisonous liquid used in chemical warfare.
- **Teflon** = Polymer containing fluorine.
- **Keratin** = Protein found in the outer layer of human skin.

Know More About Carbon and its Various Forms:

- [Carbon and its Various Forms – Old Year Questions](#)
- [Carbon and its Various Forms One Liner Questions & Answers](#)