

Science & Technology Part 1: Final Revision Sheet (2026)

Chapter 1: Gravitation

Fill in the Blanks / Objective:

- The value of the universal gravitational constant (G) is _____. (Ans: $6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$)
- As we go above the earth's surface, the value of 'g' _____. (Ans: Decreases)
- The velocity required to overcome Earth's gravitational pull is called _____. (Ans: Escape Velocity)
- State the value of 'g' at the center of the Earth. (Ans: Zero)

Questions:

- Give Scientific Reason:** The value of 'g' is zero at the center of the Earth.
- Give Scientific Reason:** Mass is constant everywhere, but weight varies from place to place.
- Distinguish Between:** Mass and Weight.
- Long Answer:** State and explain Kepler's three laws of planetary motion. (Draw the ellipse diagram).
- Derivation:** Derive the expression for Escape Velocity using the Law of Conservation of Energy.

Important Formulas:

- Newton's Law of Gravitation: $F = G (m_1 m_2) / r^2$
- Acceleration due to Gravity: $g = GM / R^2$
- Escape Velocity: $v_{\text{esc}} = \sqrt{2gR}$
- Weight: $W = mg$
- Kinematical Equations (for free fall, $u=0$, $a=g$):
 - $v = gt$
 - $s = 1/2 gt^2$
 - $v^2 = 2gs$

Numericals:

- Calculate the value of 'g' on a planet where an object takes 5 seconds to reach the ground from a height of 5m.
 - Problems involving calculating weight on the Moon (Weight on Moon = $1/6 \times$ Weight on Earth).
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Chapter 2: Periodic Classification of Elements

Fill in the Blanks / Objective:

- In the modern periodic table, the transition elements are placed in the _____ block. (Ans: d-block)
- Find the Odd One Out: Li, Na, Mg, K. (Ans: Mg - It is Group 2, others are Group 1)
- The elements in Group 18 are known as _____. (Ans: Inert/Noble Gases)
- An element with electronic configuration 2, 8, 2 belongs to Group _____. (Ans: 2)

Questions:

- **Give Scientific Reason:** Atomic radius decreases while going from left to right in a period.
- **Give Scientific Reason:** Inert gases exist in the form of monoatomic molecules.
- **Short Answer:** Write the demerits of Mendeleev's Periodic Table.
- **Distinguish Between:** Mendeleev's Periodic Table and Modern Periodic Table.
- **Case Study:** Identify an element's group, period, and valency given its electronic configuration (e.g., 2, 8, 1).

Important Trends:

- **Atomic Radius:** Decreases across a period (left to right); Increases down a group (top to bottom).
 - **Valency:** Increases from 1 to 4 then decreases to 0 across a period; Remains constant down a group.
 - **Metallic Character:** Decreases across a period; Increases down a group.
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Chapter 3: Chemical Reactions and Equations

Fill in the Blanks / Objective:

- The reaction $\text{CaCO}_3 \xrightarrow{\text{(heat)}} \text{CaO} + \text{CO}_2$ is a _____ reaction. (Ans: Thermal Decomposition)
- A reaction in which heat is released is called an _____ reaction. (Ans: Exothermic)
- The chemical formula for rust is _____. (Ans: $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$)

Questions:

- Give Scientific Reason:** Edible oil is flushed with Nitrogen gas before packing.
- Give Scientific Reason:** The rate of reaction increases with the fineness of catalyst/reactant particles.
- Short Answer:** Explain the factors affecting the rate of a chemical reaction.
- Long Answer:** Explain Redox Reaction with an example. Identify the oxidant and reductant.
- Activity:** Identify the type of reaction and balance the equation: $\text{Ag} + \text{HCl} \rightarrow \text{AgCl} + \text{H}_2$.

Important Formulas:

- Combination: $\text{A} + \text{B} \rightarrow \text{AB}$
 - Decomposition: $\text{AB} \rightarrow \text{A} + \text{B}$
 - Displacement: $\text{A} + \text{BC} \rightarrow \text{AC} + \text{B}$
 - Double Displacement: $\text{AB} + \text{CD} \rightarrow \text{AD} + \text{CB}$
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Chapter 4: Effects of Electric Current

Fill in the Blanks / Objective:

- To convert mechanical energy into electrical energy, a _____ is used. (Ans: Electric Generator)
- The frequency of AC supply in India is _____. (Ans: 50 Hz)
- The device used to protect an electric circuit from overloading is a _____. (Ans: Fuse)
- $1 \text{ kWh} = \text{_____ Joules}$. (Ans: $3.6 \times 10^6 \text{ J}$)

Questions:

- **Give Scientific Reason:** Tungsten metal is used to make solenoid type coils in electric bulbs.
- **Give Scientific Reason:** For electric power transmission, copper or aluminium wire is used.
- **Distinguish Between:** AC Generator and DC Generator.
- **Long Answer:** Explain the construction and working of an Electric Motor with a neat diagram. Apply Fleming's Left-Hand Rule.

Simple Electric Motor

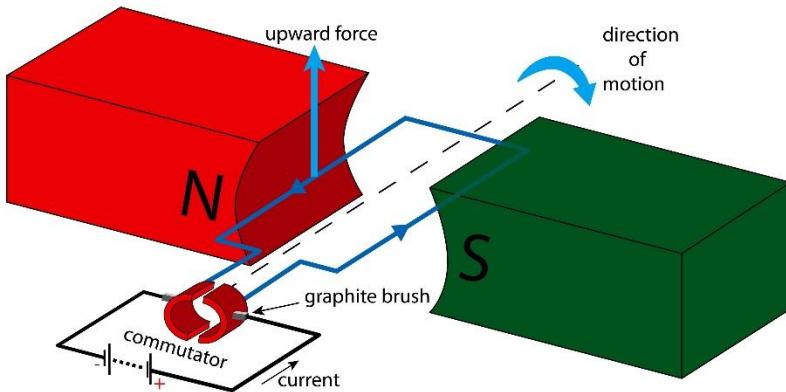


Diagram Analysis: Identify the magnetic field produced by a solenoid or straight conductor.

Important Formulas:

- Ohm's Law: $V = IR$
- Heat Generated (Joule's Law): $H = I^2 Rt$
- Electrical Power: $P = VI$ OR $P = I^2 R$ OR $P = V^2 / R$
- Electrical Energy consumption: **Energy = Power x Time**

Numericals:

- A 100W electric bulb is used for 5 hours daily. Calculate the energy consumed in the month of April.

Chapter 5: Heat

Fill in the Blanks / Objective:

- The SI unit of specific heat capacity is _____. (Ans: J/kg C)
- At 4 degrees Celsius, the density of water is _____. (Ans: Maximum)
- The amount of water vapor in air is determined in terms of _____. (Ans: Absolute Humidity)

Questions:

- **Give Scientific Reason:** In cold regions, water pipes break in winter.
- **Give Scientific Reason:** We feel the air is dry in winter.
- **Short Answer:** Explain the Anomalous Behaviour of Water using Hope's Apparatus (with diagram showing T1 and T2 graphs).
- **Short Answer:** Define Latent Heat of Fusion and Latent Heat of Vaporization.

Important Formulas:

- Heat Energy: $Q = mc(\Delta T)$ (where ΔT is change in temperature)
- Principle of Heat Exchange: **Heat Lost by Hot Object = Heat Gained by Cold Object**
- % Relative Humidity = $(\text{Actual mass of vapor} / \text{Mass of vapor needed for saturation}) \times 100$

Numericals:

- Calculate the heat energy required to raise the temperature of 5 kg of water from 20 C to 100 C.
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Chapter 6: Refraction of Light

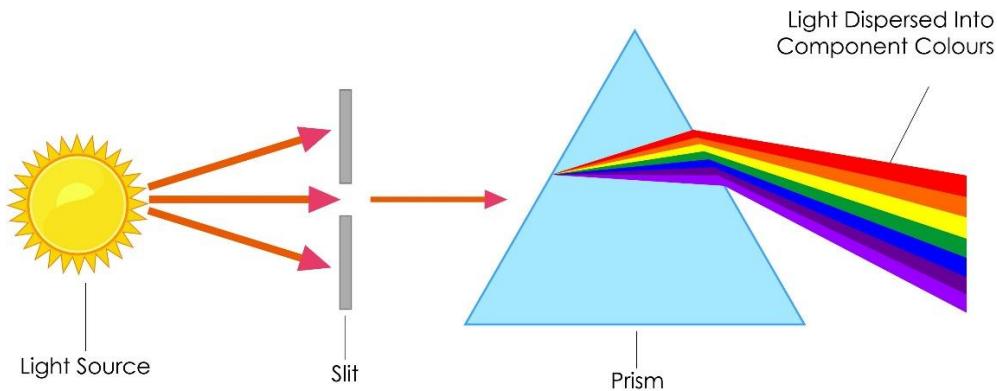
Fill in the Blanks / Objective:

- The splitting of white light into its component colors is called _____. (Ans: Dispersion)
- When light passes from a rarer medium to a denser medium, it bends _____ the normal. (Ans: Towards)
- The refractive index of vacuum is _____. (Ans: 1)

Questions:

- Give Scientific Reason:** Stars twinkle at night but planets do not.
- Give Scientific Reason:** The sun appears reddish early in the morning.
- Long Answer:** Explain the formation of a Rainbow (Diagram must show Refraction, Internal Reflection, and Dispersion).
- Diagram:** Draw ray diagrams for refraction through a glass slab (Lateral Shift) and a glass prism.

Dispersion of Light Through Prism



Important Formulas:

- Absolute Refractive Index: $n = c / v$ (c = speed in vacuum, v = speed in medium)
- Relative Refractive Index: $2n_1 = v_1 / v_2$
- Snell's Law: $n = \sin i / \sin r$

Numericals:

- Calculate the speed of light in a medium if the refractive index is given (take $c = 3 \times 10^8$ m/s).

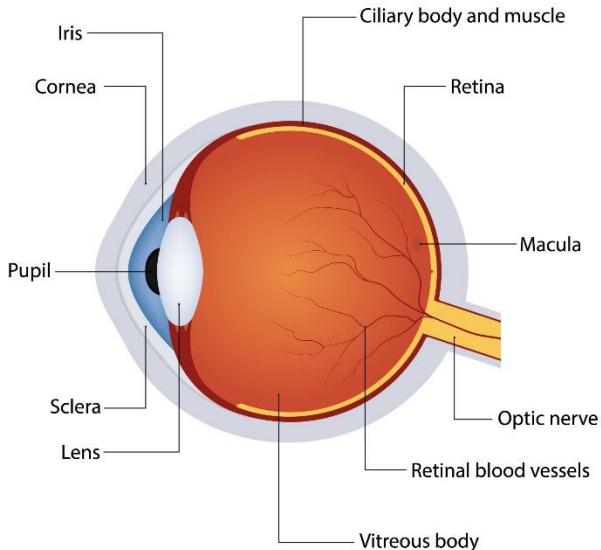
Chapter 7: Lenses

Fill in the Blanks / Objective:

- A convex lens is also known as a _____ lens. (Ans: Converging)
- The unit of Power of a Lens is _____. (Ans: Diopter / D)
- For a convex lens, if the object is at $2F_1$, the image is formed at _____. (Ans: $2F_2$)

Questions:

- **Distinguish Between:** Myopia (Near-sightedness) and Hypermetropia (Far-sightedness).
- **Distinguish Between:** Convex Lens and Concave Lens.
- **Long Answer:** Draw a neat labelled diagram of the Human Eye and explain the function of the Iris, Pupil, and Retina.



Short Answer: State the 3 rules for drawing ray diagrams for convex lenses.

Important Formulas:

- Lens Formula: $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$
- Magnification: $M = \frac{h_2}{h_1} = \frac{v}{u}$
- Power of Lens: $P = \frac{1}{f}$ (in meters)

Numericals:

- Find the focal length and power of a lens used to correct Myopia/Hypermetropia.
- An object is placed at 20 cm from a convex lens of focal length 10 cm. Find the image position.

Chapter 8: Metallurgy

Fill in the Blanks / Objective:

- The main ore of aluminium is _____. (Ans: Bauxite)
- Cinnabar is an ore of _____. (Ans: Mercury)
- The chemical formula of Cryolite is _____. (Ans: Na₃AlF₆)

Questions:

- **Give Scientific Reason:** Lemon or tamarind is used for cleaning copper vessels.
- **Give Scientific Reason:** Sodium is always kept in kerosene.
- **Give Scientific Reason:** Anodes need to be replaced from time to time during the electrolysis of alumina.
- **Distinguish Between:** Calcination and Roasting.
- **Distinguish Between:** Metals and Non-metals (Physical/Chemical properties).
- **Long Answer:** Explain the Electrolytic Reduction of Alumina with a neat diagram (Hall-Heroult process). Write the cathode and anode reactions.

Important Reactions:

- **Bayer's Process:** $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O} + 2\text{NaOH} \rightarrow 2\text{NaAlO}_2 + 3\text{H}_2\text{O}$
 - **Electrolysis of Alumina:**
 - Cathode: $\text{Al}^{3+} + 3\text{e}^- \rightarrow \text{Al}$ (Reduction)
 - Anode: $2\text{O}^{2-} \rightarrow \text{O}_2 + 4\text{e}^-$ (Oxidation)
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Chapter 9: Carbon Compounds

Fill in the Blanks / Objective:

- The general formula of Alkanes is _____. (Ans: $C_nH_{(2n+2)}$)
- The functional group -COOH represents _____. (Ans: Carboxylic Acid)
- Ethanol is oxidized by alkaline $KMnO_4$ to form _____. (Ans: Ethanoic Acid)

Questions:

- **Short Answer:** Write the IUPAC names for compounds like CH_3-CH_2-OH (Ethanol), CH_3-COOH (Propanoic Acid), $CH_3-CO-CH_3$ (Propanone).
- **Short Answer:** Explain Homologous Series with an example.
- **Short Answer:** Explain the cleansing action of soap (Hydrophilic/Hydrophobic ends).
- **Long Answer:** Explain the chemical properties of Ethanol (Reaction with Sodium, Dehydration, Oxidation).
- **Draw:** Electron dot structure of Methane (CH_4) and Ethene (C_2H_4).

Important Formulas:

- Alkanes: **$C_nH_{(2n+2)}$**
 - Alkenes: **C_nH_{2n}**
 - Alkynes: **$C_nH_{(2n-2)}$**
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Chapter 10: Space Missions

Fill in the Blanks / Objective:

- The first Indian astronaut to travel in space was _____. (Ans: Rakesh Sharma)
- The full form of PSLV is _____. (Ans: Polar Satellite Launch Vehicle)
- A satellite revolving at a height of 35,780 km is called a _____ satellite. (Ans: Geostationary/High Earth Orbit)

Questions:

- **Give Scientific Reason:** Geostationary satellites are not useful for studies of polar regions.
- **Short Answer:** Classify the orbits of artificial satellites (HEO, MEO, LEO) based on altitude.
- **Short Answer:** Explain the structure of a Satellite Launch Vehicle (PSLV) with a diagram.
- **Short Answer:** What is "Space Debris" and why is it harmful?

Important Formulas:

- Critical Velocity: $v_c = \sqrt{GM / (R+h)}$
- Escape Velocity: $v_{esc} = \sqrt{2gR}$ (from surface)

Calculate the time taken for a satellite to complete one revolution (Period T).