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 x 10^-11 Nm^2/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 (m1 m2) / r^2**
- Acceleration due to Gravity: **g = GM / R^2**
- Escape Velocity: **v_esc = √(2gR)**
- Weight: **W = mg**
- Kinematical Equations (for free fall, u=0, a=g):
    1. **v = gt**
    2. **s = 1/2 gt^2**
    3. **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 x Weight on Earth).

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.

Chapter 3: Chemical Reactions and Equations

Fill in the Blanks / Objective:

- The reaction CaCO3 --(heat)--> CaO + CO2 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: Fe2O3.xH2O)

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: Ag + HCl --> AgCl + H2.

Important Formulas:

- Combination: **A + B --> AB**
- Decomposition: **AB --> A + B**
- Displacement: **A + BC --> AC + B**
- Double Displacement: **AB + CD --> AD + CB**

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 kWh = _____ Joules. (Ans: 3.6 x 10^6 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.

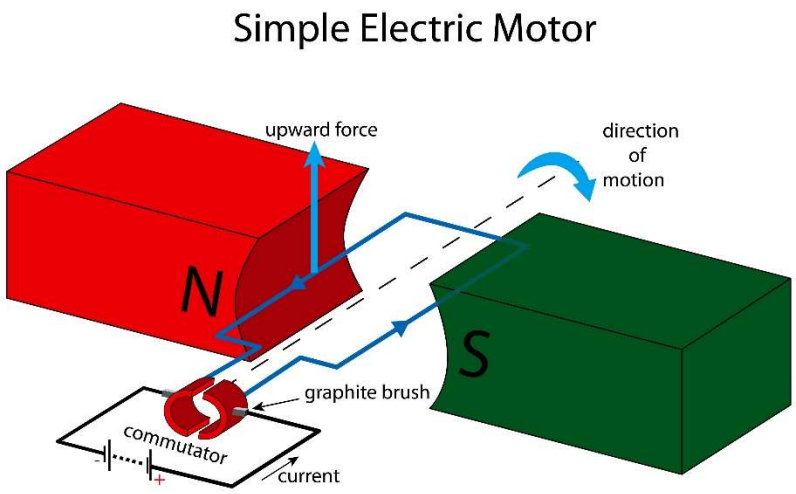


Diagram Analysis: Identify the magnetic field produced by a solenoid or straight conductor.

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 Delta T is change in temperature)
- Principle of Heat Exchange: **Heat Lost by Hot Object = Heat Gained by Cold Object**
- % Relative Humidity = **(Actual mass of vapor / Mass of vapor needed for saturation) x 100**

Numericals:

- Calculate the heat energy required to raise the temperature of 5 kg of water from 20 C to 100 C.

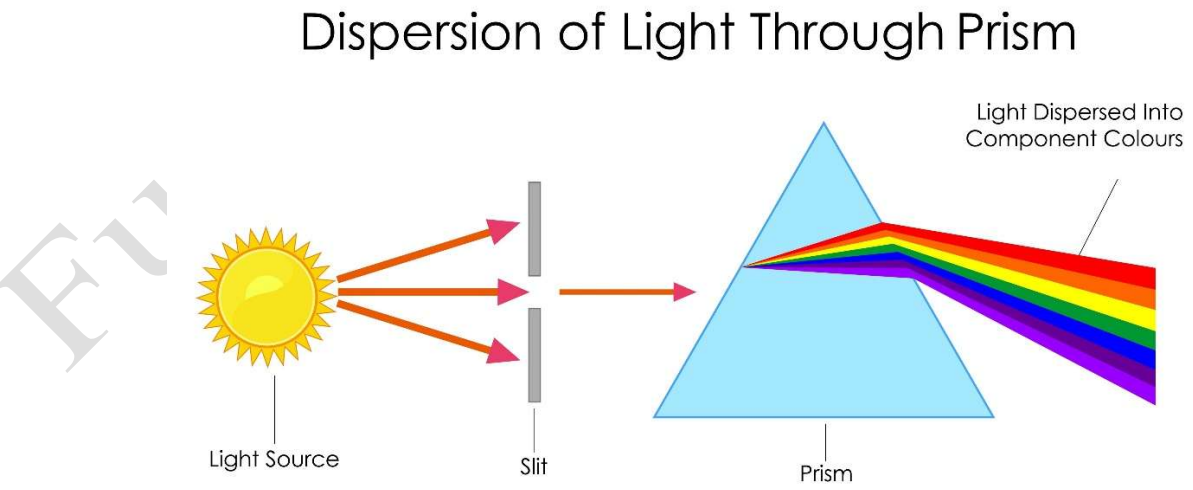
Chapter 6: Refraction of Light

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.



Important Formulas:

- Absolute Refractive Index: **n = c / v** (c = speed in vacuum, v = speed in medium)
- Relative Refractive Index: **2n1 = v1 / v2**
- 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 x 10^8 m/s).

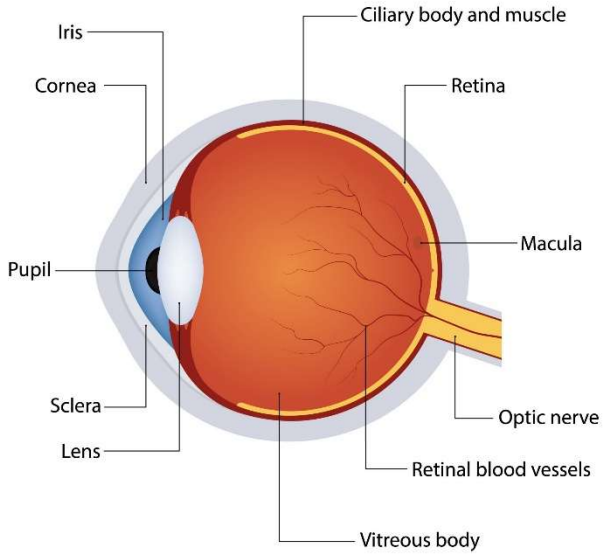
Chapter 7: Lenses

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 2F1, the image is formed at _____. (Ans: 2F2)

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: **1/v - 1/u = 1/f**
- Magnification: **M = h2/h1 = v/u**
- Power of Lens: **P = 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:** Al2O3.2H2O + 2NaOH --> 2NaAlO2 + 3H2O
- **Electrolysis of Alumina:**
  - Cathode: **Al^3+ + 3e^- --> Al** (Reduction)
  - Anode: **2O^2- --> O2 + 4e^-** (Oxidation)

Chapter 9: Carbon Compounds

Fill in the Blanks / Objective:

- The general formula of Alkanes is _____. (Ans: CnH(2n+2))
- The functional group -COOH represents _____. (Ans: Carboxylic Acid)
- Ethanol is oxidized by alkaline KMnO4 to form _____. (Ans: Ethanoic Acid)

Questions:

- **Short Answer:** Write the IUPAC names for compounds like CH3-CH2-OH (Ethanol), CH3-COOH (Propanoic Acid), CH3-CO-CH3 (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 (CH4) and Ethene (C2H4).

Important Formulas:

- Alkanes: **CnH(2n+2)**
- Alkenes: **CnH2n**
- Alkynes: **CnH(2n-2)**

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).