

CLASS 7

Physics & Chemistry — Complete Formula Handbook

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PHYSICS

Heat

Temperature	Degree of hotness or coldness of a body
Thermometer scales	Celsius (°C), Fahrenheit (°F), Kelvin (K)
°F to °C	$C = (F - 32) \times 5/9$
°C to °F	$F = (C \times 9/5) + 32$
Heat transfer modes	Conduction, Convection, Radiation

Motion and Time

Speed	Speed = Distance / Time
Uniform motion	Equal distances in equal intervals of time
Non-uniform motion	Unequal distances in equal intervals of time
Simple pendulum time period	$T = \text{Time for 1 oscillation} = \text{Total time} / \text{No. of oscillations}$
SI unit of speed	m/s (also km/h)
Speedometer / Odometer	Measures speed / Measures distance travelled

Electric Current and its Effects

Circuit symbols	Cell, Battery, Switch (open/closed), Bulb, Wire
Heating effect	Current through a resistor produces heat (e.g., electric iron)
Magnetic effect	Current-carrying conductor behaves like a magnet (electromagnet)
Electromagnet strength	Increases with more turns of coil and higher current

Winds, Storms and Cyclones

Wind formation	Caused by uneven heating of air → pressure difference
Air pressure	Hot air rises (low pressure); cold air sinks (high pressure)

CHEMISTRY

Nutrition in Plants

Photosynthesis	$6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{(sunlight, chlorophyll)}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
Modes of nutrition	Autotrophic (self-made food), Heterotrophic (depend on others)
Parasitic nutrition example	Cuscuta (dodder plant)
Saprotrophic nutrition	Nutrition from dead and decaying matter (e.g., fungi)

Nutrition in Animals

Steps of digestion	Ingestion → Digestion → Absorption → Assimilation → Egestion
Human digestive pathway	Mouth → Oesophagus → Stomach → Small intestine → Large intestine → Rectum → Anus

Fibre to Fabric

Animal fibres	Wool (sheep/goat), Silk (silkworm cocoon)
Silk process	Sericulture → rearing of silkworms for silk

Acids, Bases and Salts

Acid	Sour-tasting substance; turns blue litmus red
Base	Bitter substance; turns red litmus blue
Indicator	Substance that shows different colours in acid/base (litmus, turmeric)
Neutralisation reaction	$\text{Acid} + \text{Base} \rightarrow \text{Salt} + \text{Water}$

Physical and Chemical Changes

Physical change	No new substance formed, often reversible (e.g., melting)
Chemical change	New substance formed, mostly irreversible (e.g., rusting)
Rusting equation	$\text{Fe} + \text{O}_2 + \text{H}_2\text{O} \rightarrow \text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ (rust)
Crystallisation	Method to obtain pure crystalline solid from solution

Water: A Precious Resource

Groundwater	Water stored in the ground below the water table
Water table	Upper limit of groundwater level

Forests: Our Lifeline

Canopy / Understorey / Forest floor

Layers of a forest ecosystem