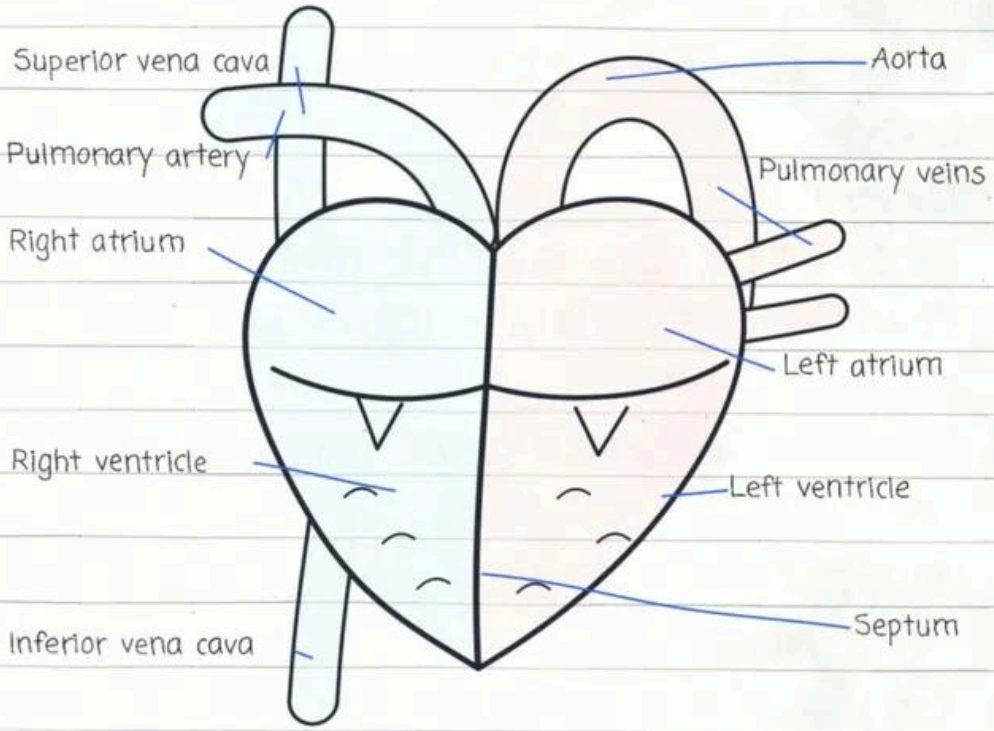
- Blood pressure is the force of blood on vessel walls. Normal about 120 over 80 mm of Hg (systolic over diastolic).

☆ Asked : 2018, 2019, 2022, 2023, 2024, 2025

The human heart



Human heart (simplified, front view): right side drawn on the left

Body (deoxygenated) —vena cava→ Right atrium

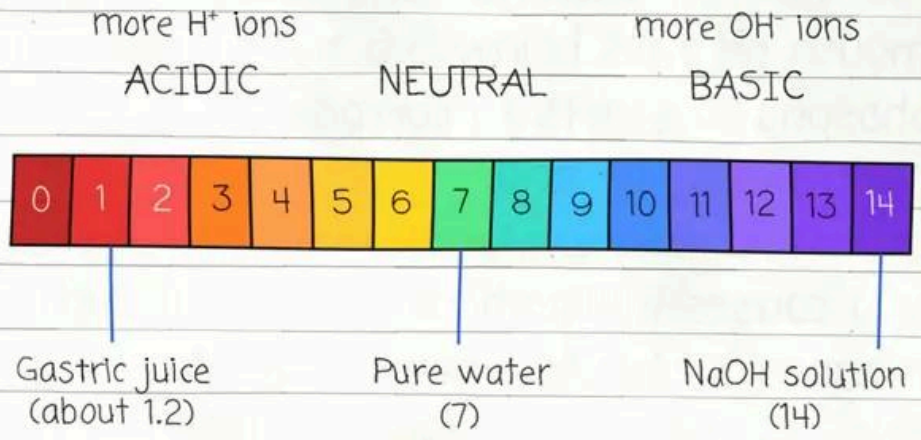
→ Right ventricle —pulmonary artery→ Lungs

pulmonary vein → Left atrium → Left ventricle

aorta → Body (oxygenated)

- Heart has 4 chambers: two atria (receive blood) and two ventricles (pump blood out).

- Scale 0 to 14: below 7 acidic, 7 neutral (pure water), above 7 basic.
- pH is checked with universal indicator (gives a different colour for each pH) or pH paper.
- Strong acid (HCl, H_2SO_4, HNO_3) gives many H^+ ions. Weak acid (CH_3COOH) gives few.
- Strong base: $NaOH$, KOH. Weak base: NH_4OH.
- Mg ribbon fizzes faster in HCl than in CH_3COOH of the same concentration, because HCl gives more H^+.



pH scale with universal indicator colours: red (acid), green (neutral), blue to violet (base)

pH range	Universal indicator colour	Nature
0 to 3	red	strongly acidic
4 to 6	orange to yellow	weakly acidic
7	green	neutral
8 to 10	blue	weakly basic
11 to 14	violet	strongly basic

Chapter - 2

Acids, Bases and Salts

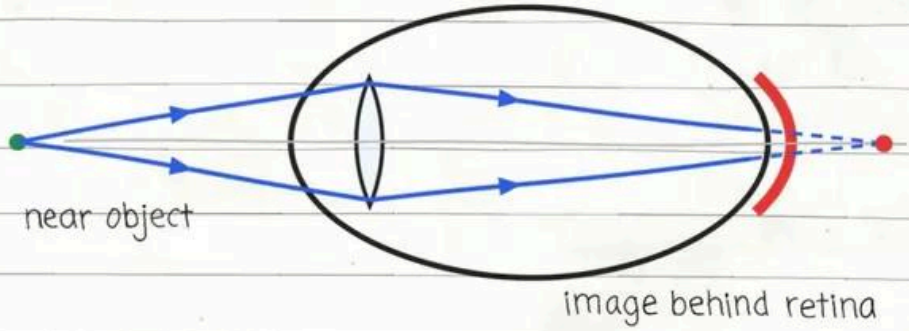
✯ Most asked in boards

- pH scale, universal indicator, strong vs weak acids
  - ✯ Asked : 2019, 2020, 2022, 2023, 2024, 2025, 2026 (1 to 4 marks)
- Baking soda and baking powder
  - ✯ Asked : 2018, 2019, 2020, 2022, 2023, 2025, 2026 (1 to 4 marks)
- Chlor-alkali process and bleaching powder
  - ✯ Asked : 2016, 2019, 2020, 2022, 2023, 2025, 2026 (1 to 4 marks)
- Water of crystallisation
  - ✯ Asked : 2016, 2017, 2020, 2022, 2023, 2024, 2025 (1 to 5 marks)
- Importance of pH in daily life
  - ✯ Asked : 2017, 2020, 2023, 2024, 2025, 2026 (1 to 4 marks)

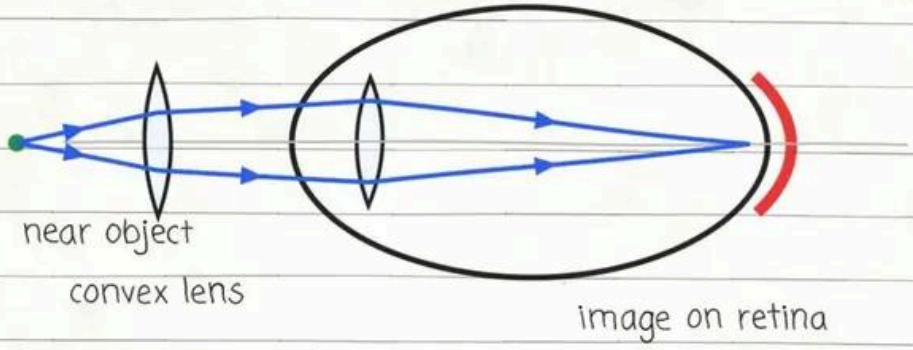
✯ 1. Indicators

- An indicator shows by a colour or smell change whether a substance is acid or base.
- Acids taste sour and turn blue litmus red. Bases taste bitter, feel soapy and turn red litmus blue.

Indicator	In acid	In base
Litmus (blue or red paper)	red	blue
Phenolphthalein	colourless	pink
Methyl orange	red	yellow
Turmeric	yellow (no change)	red
China rose (hibiscus) extract	dark pink	green



Hypermetropia: image forms behind the retina



Correction of hypermetropia with a convex lens

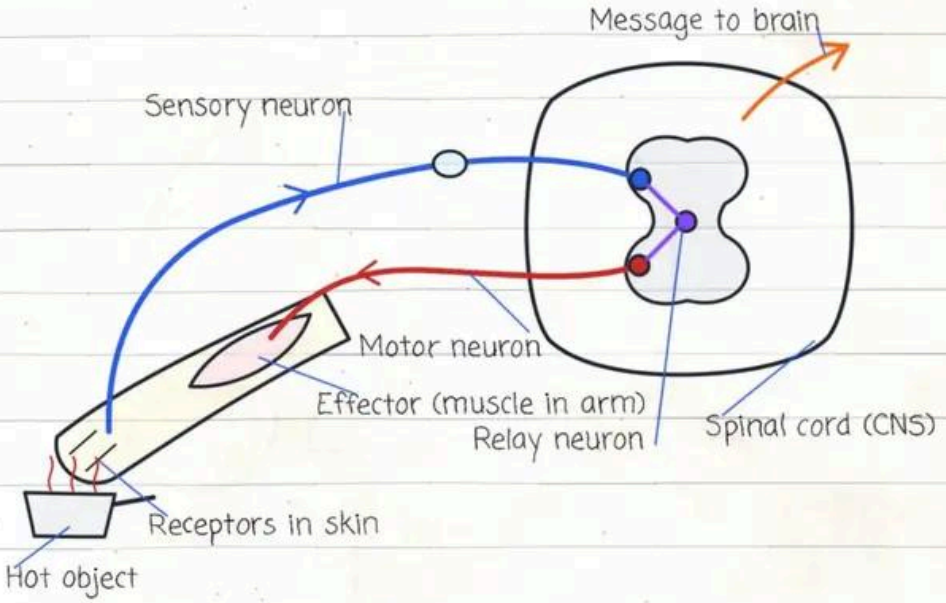
☆ Asked : 2020, 2023, 2024, 2026

Myopia	Hypermetropia
Distant objects blurred	Near objects blurred
Image in front of retina	Image behind retina
Eyeball too long or lens too curved	Eyeball too short or lens too flat
Far point nearer than infinity	Near point farther than 25 cm
Concave lens (negative power)	Convex lens (positive power)

Reflex action and reflex arc

Reflex action : A **sudden, automatic response** to a stimulus, done without thinking. Examples: pulling hand from a hot object, sneezing, blinking.

Receptor (skin) → Sensory neuron → Relay neuron in spinal cord → Motor neuron → Effector (muscle)



Reflex arc: the signal goes through the spinal cord, not the brain, so the response is quick

- **Reflex arc**: the shortest path of a reflex. It is processed at the spinal cord (or other junction), so response is fast. Brain is told later.
- Why reflex: quick response is needed in danger, and thinking would take too long.

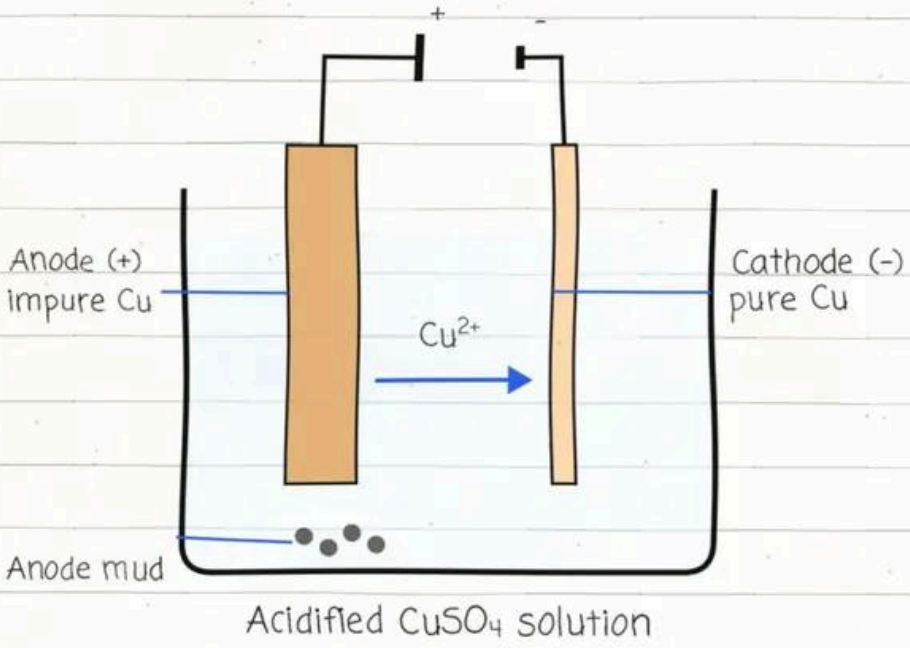
$$2NaCl(l) \rightarrow 2Na(l) + Cl_2(g)$$
$$Na^+ + e^- \rightarrow Na$$
$$2Cl^- \rightarrow Cl_2 + 2e^-$$

overall: at cathode (-) sodium forms; at anode (+) chlorine forms

☆ Asked : Highly reactive metals by electrolysis of molten chlorides
2020, 2025, 2026

☆ Asked : Extraction of low and medium reactivity metals
2018, 2019, 2020, 2023, 2026

Refining: electrolytic refining of copper

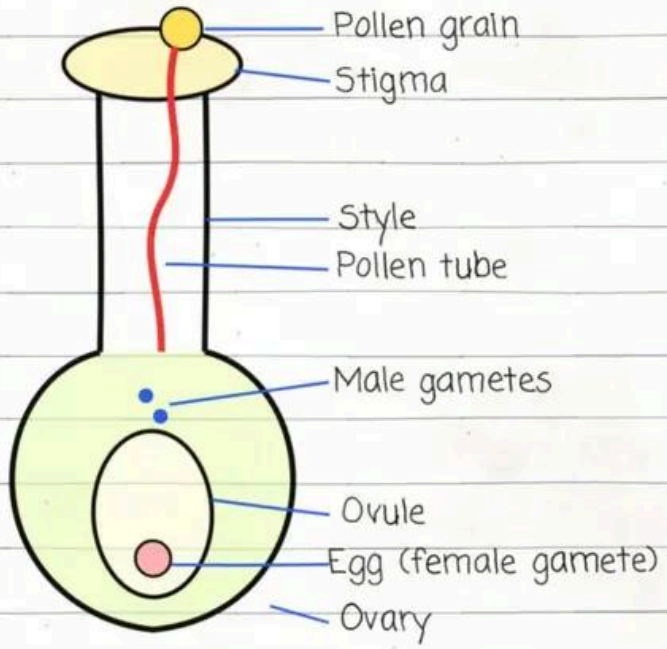


Electrolytic refining of copper

- Anode (+): thick block of impure copper. Cathode (-): thin strip of pure copper.
- Electrolyte: acidified copper sulphate solution.

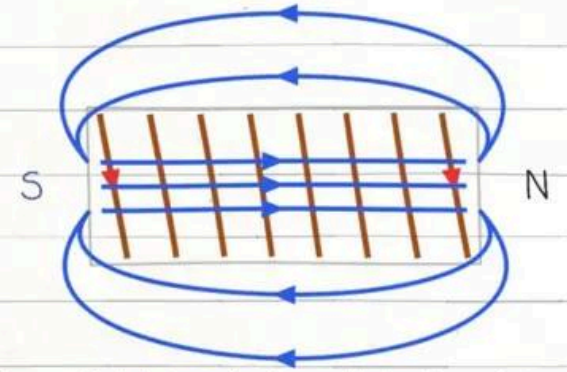
Self-pollination	Cross-pollination
Pollen goes to the stigma of the same flower	Pollen goes from one flower to another flower (usually on a different plant)
Little variation	More variation
No agent needed	Needs wind, water, insects or animals

Fertilisation and what follows



Pollen grain germinates on the stigma; the pollen tube carries male gametes to the ovule

- After pollination the pollen grain germinates on the stigma and grows a pollen tube down the style to the ovule.
- Pollen tube grows towards the ovule because of chemical signals (chemotropism).
- A male gamete fuses with the egg: fertilisation. This forms the zygote.



Uniform field inside (parallel straight lines)
Current in front turns flows downward: right end is N

Magnetic field of a current-carrying solenoid

- Electromagnet: soft iron core placed inside a solenoid.
- The core becomes a strong magnet while current flows. It stops being a magnet when current is switched off.
- Soft iron is used because it loses its magnetism easily (temporary magnet). Steel keeps magnetism (permanent magnet).
- Strength depends on: current, number of turns, and the core material.
- Uses: cranes lifting scrap iron, electric bells, door locks, medical equipment.

Solenoid	Bar magnet
Magnetism due to current	Permanent magnetism
Can be switched on or off	Always magnetic
Strength changed by current or turns	Strength fixed
Poles reverse by reversing current	Poles fixed

* Asked : 2019, 2020, 2022, 2023, 2024, 2025, 2026