

YASASVI Science

Sample Paper – 2

Duration: 38 Minutes

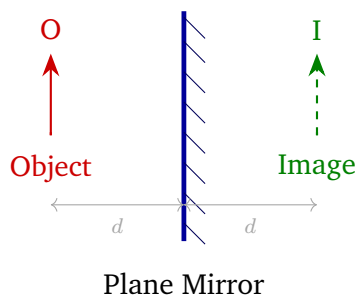
Maximum Marks: 100

Instructions

- This paper contains **25 Multiple Choice Questions (Single Correct Answer)**, modelled on the Science portion of the YASASVI entrance examination.
- Each correct answer carries **+4 marks**. Each incorrect answer carries **–1 mark** (negative marking). Unattempted questions carry **no penalty**.
- Only **one** option is correct per question. Choose carefully.
- Syllabus: **Class 8 NCERT Science** (YASASVI Class 9 YET)
- Calculators, mobile phones, and all electronic gadgets are **strictly prohibited**.

Questions (Q1 – Q25)

Q1. Which of the following statements **correctly** describes the image formed by a **plane mirror**?

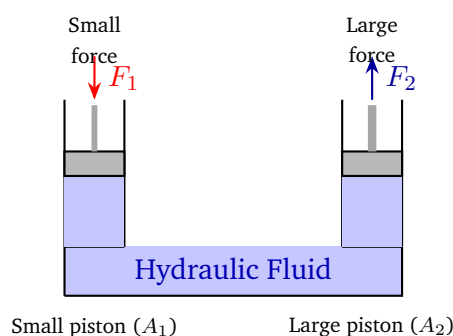


- (A) Virtual, erect, same size as object, and laterally inverted
- (B) Real, erect, same size as object, and laterally inverted
- (C) Virtual, inverted, same size as object
- (D) Real, inverted, magnified image



- Q2.** A driver uses the **rearview mirror** in a vehicle to see the traffic behind. Which type of mirror is preferred for this purpose, and why?
- (A) Concave mirror, because it forms a magnified image
 - (B) Plane mirror, because it forms an image of the same size
 - (C) Concave mirror, because it provides a wider field of view
 - (D) Convex mirror, because it provides a wider field of view and always forms a virtual, erect, and diminished image
- Q3.** When a ray of light travels from **air (rarer medium)** into **glass (denser medium)**, what happens to the ray at the boundary?
- (A) It bends away from the normal
 - (B) It bends towards the normal
 - (C) It continues in the same direction without any bending
 - (D) It gets completely reflected back into air
- Q4.** Atmospheric pressure at sea level is approximately 1.013×10^5 Pa, which is enormous. Yet we do **not feel** this pressure on our bodies. The best reason for this is:
- (A) Atmospheric pressure acts only in the downward direction on our bodies
 - (B) The Earth's gravitational force completely counterbalances atmospheric pressure
 - (C) The pressure exerted by fluids inside our body acts outward, balancing the inward atmospheric pressure from all sides
 - (D) Atmospheric pressure is not strong enough to be felt by human beings
- Q5.** The hydraulic lift shown below is used to lift heavy vehicles in a garage. The **principle** on which it works is:





- (A) Pressure applied to an enclosed fluid is transmitted equally in all directions (Pascal's Law)
- (B) A fluid at rest exerts pressure only at the bottom of the container
- (C) When a fluid is compressed, it loses pressure
- (D) A fluid exerts maximum pressure at its free surface

Q6. Ball bearings are used inside the wheels of bicycles and the axles of machines. The main reason for using them is:

- (A) Ball bearings increase the contact area, thereby increasing the grip
- (B) Ball bearings are made of a special material that repels metal surfaces
- (C) Sliding friction is always less than rolling friction, so they reduce speed
- (D) Rolling friction is much less than sliding friction, so they reduce energy loss

Q7. Riya claps her hands near a large wall and hears an echo. For a person to hear a **distinct echo** of a sound, the **minimum distance** between the source of sound and the reflecting surface must be approximately:

- (A) 5 m
- (B) 17 m
- (C) 50 m
- (D) 100 m



- Q8.** A mosquito produces a **high-pitched** sound, while a lion's roar has a **low pitch**. This difference in pitch is because:
- (A) The mosquito has a larger body than the lion
 - (B) The lion vibrates at a higher frequency than the mosquito
 - (C) The mosquito vibrates its wings at a much higher frequency than the lion produces its roar
 - (D) The pitch of sound depends on the amplitude of vibration, not the frequency
- Q9.** A student sets up a simple circuit with a battery, a bulb, and two wires dipped into different liquids one at a time. Which liquid will make the **bulb glow**, showing that it is a **good conductor of electricity**?
- (A) Lemon juice
 - (B) Distilled water
 - (C) Pure vegetable oil
 - (D) Ethanol (pure alcohol)
- Q10.** During a severe thunderstorm with lightning, which of the following is the **safest** action?
- (A) Stand under a tall tree for shelter from rain
 - (B) Hold an umbrella with a metal tip above your head
 - (C) Stand in an open field, away from trees
 - (D) Take shelter inside a building, or sit inside a car with windows closed
- Q11.** Which of the following groups contains **only inflammable substances** (substances that catch fire easily)?
- (A) Water, petrol, sand
 - (B) Petrol, alcohol, LPG
 - (C) Petrol, water, LPG



(D) Sand, alcohol, stone

Q12. Which of the following fuels is described as a **cleaner fuel** and is widely used in vehicles and domestic cooking as **CNG** (Compressed Natural Gas)?

(A) Coal

(B) Petroleum (crude oil)

(C) Natural gas

(D) Kerosene

Q13. Which of the following pairs **correctly** matches a non-metal element with its primary use?

(A) Oxygen — used for breathing; Nitrogen — used in fertilizers

(B) Oxygen — used in fertilizers; Nitrogen — used for breathing

(C) Sulphur — used as a fuel; Phosphorus — used for breathing

(D) Carbon — used in fertilizers; Nitrogen — used as fuel

Q14. Sodium is a very reactive metal. When a small piece of sodium is added to water, which **products** are formed?

(A) Sodium oxide and hydrogen gas

(B) Sodium chloride and oxygen gas

(C) Sodium carbonate and water

(D) Sodium hydroxide (NaOH) and hydrogen gas (H₂)

Q15. Which of the following is a **genuine advantage** of synthetic fibres (such as nylon, polyester) over natural fibres like cotton and wool?

(A) Synthetic fibres absorb more moisture, keeping the body cool in summer

(B) Synthetic fibres are more durable, wrinkle-resistant, and available at a lower cost compared to many natural fibres

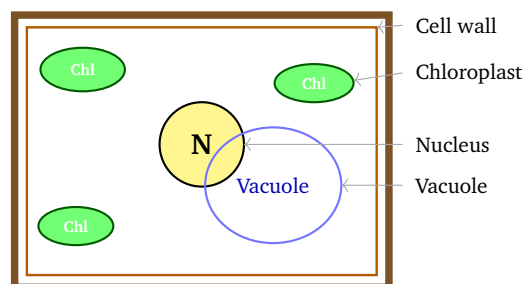


- (C) Synthetic fibres are biodegradable and therefore eco-friendly
- (D) Synthetic fibres are better conductors of heat and keep the body warmer in winter than wool

Q16. Which combination of features is found in a **plant cell** but is **absent in an animal cell**?

- (A) Nucleus and mitochondria
- (B) Cell membrane and ribosomes
- (C) Cell wall, chloroplasts, and a large central vacuole
- (D) Cytoplasm and endoplasmic reticulum

Q17. The chloroplast is often called the “kitchen of the cell.” Study the diagram of a plant cell below and identify the **correct** statement about the chloroplast:



- (A) Chloroplasts contain chlorophyll and are the site where food (glucose) is manufactured using sunlight, CO_2 , and water (photosynthesis)
- (B) Chloroplasts store the food manufactured by other organelles of the cell
- (C) Chloroplasts break down food molecules to release energy for cell activities
- (D) Chloroplasts control all activities of the cell, including food production

Q18. Root nodules of **leguminous plants** (beans, peas, groundnut) contain



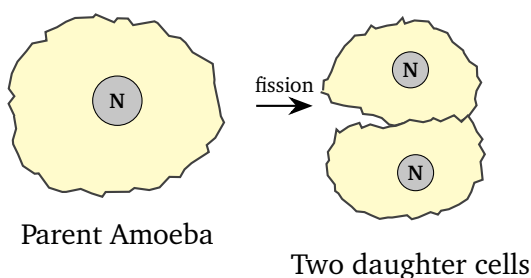
bacteria that convert atmospheric nitrogen into a form usable by plants. These bacteria are called:

- (A) *Lactobacillus*
- (B) *Clostridium*
- (C) *Escherichia coli*
- (D) *Rhizobium*

Q19. Edward Jenner is celebrated as the father of immunology. He developed the **first vaccine** in the world, which was used to protect against:

- (A) Polio
- (B) Smallpox
- (C) Cholera
- (D) Tuberculosis

Q20. The diagram below shows an Amoeba undergoing asexual reproduction by splitting into two identical daughter cells. This mode of reproduction is called:



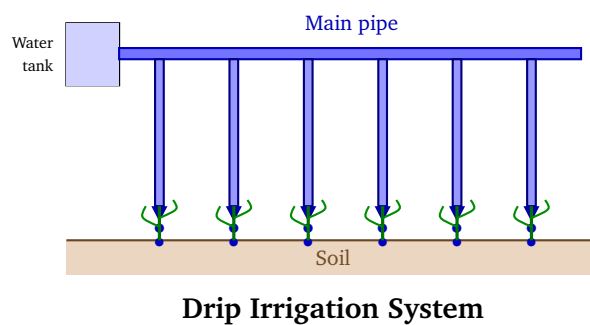
- (A) Budding
- (B) Spore formation
- (C) Binary fission
- (D) Fragmentation

Q21. The **Red Data Book** is maintained by international conservation organisations such as the IUCN. Its **primary purpose** is to:



- (A) List all plant and animal species that are threatened, endangered, or at risk of extinction
- (B) Record information about mineral and fossil-fuel deposits around the world
- (C) List all species that have been successfully bred and conserved in captivity
- (D) Provide data on invasive or harmful species that threaten native ecosystems

Q22. The diagram below shows one method of irrigation. This method delivers water **directly to the roots** of plants drop by drop, making it the **most water-efficient** method. Identify this irrigation method.



- (A) Moat (lever-and-bucket system)
- (B) Chain pump
- (C) Sprinkler system
- (D) Drip system

Q23. Which of the following gives the **correct order** of the eight planets of our Solar System, arranged from the **nearest to the farthest** from the Sun?

- (A) Mercury, Earth, Venus, Mars, Jupiter, Saturn, Uranus, Neptune
- (B) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
- (C) Mercury, Venus, Mars, Earth, Jupiter, Saturn, Neptune, Uranus
- (D) Venus, Mercury, Earth, Mars, Saturn, Jupiter, Uranus, Neptune



- Q24.** Which of the following are the **major sources of water pollution** in rivers and lakes?
- (A) Rainfall runoff and irrigation return water
 - (B) Fishing activities and swimming in rivers
 - (C) Untreated industrial effluents and raw sewage discharged directly into water bodies
 - (D) Use of organic (natural) fertilizers in farming
- Q25.** Hormones play a vital role in bringing about changes during **adolescence**. Which of the following statements is **correct** about sex hormones?
- (A) Testosterone is produced by the ovaries in females; estrogen is produced by the testes in males
 - (B) Both testosterone and estrogen are produced by the pituitary gland in the brain
 - (C) Estrogen controls secondary sexual characteristics in males; testosterone does so in females
 - (D) Testosterone is produced by the testes in males and controls male secondary sexual characteristics; estrogen is produced by the ovaries in females and controls female secondary sexual characteristics



Detailed Solutions

Q1.

Solution

Concept — Image in a Plane Mirror: A plane mirror always forms an image that is (i) **virtual** (cannot be caught on a screen), (ii) **erect** (upright), (iii) the **same size** as the object, and (iv) **laterally inverted** (left–right reversed).

Why other options are wrong:

- (B): The image in a plane mirror is *never* real; it is always virtual.
- (C): The image is erect, not inverted. Lateral inversion is a distinct property and is not the same as being inverted.
- (D): A plane mirror cannot form a real or magnified image.

Final Answer: Virtual, erect, same size, and laterally inverted $\Rightarrow$ **A**

Answer: (A) [Go Back to Q1](#)

Q2.

Solution

Concept — Convex Mirror as Rearview Mirror: A **convex mirror** always forms a virtual, erect, and **diminished** image regardless of object distance. Its outward-curved surface provides a **wider field of view** than a plane or concave mirror of the same size, allowing the driver to see a larger region of traffic behind.

Why other options are wrong:

- (A): Concave mirrors form magnified images but provide a *narrow* field of view. They are used for shaving/makeup mirrors, not rearview mirrors.
- (B): A plane mirror gives the same field of view as its physical size. It cannot cover a wide area behind the vehicle.
- (C): Concave mirrors do *not* provide a wide field of view; they are converging mirrors.

Final Answer: Convex mirror provides wider field of view, always gives virtual erect diminished image $\Rightarrow$ **D**

Answer: (D) [Go Back to Q2](#)



Q3.

Solution

Concept — Refraction of Light: When light travels from a **rarer medium** (e.g., air) to a **denser medium** (e.g., glass), it slows down and **bends towards the normal** at the point of incidence. This bending is called refraction.

Key rule: Rarer $\rightarrow$ Denser: bends *towards* the normal (angle of refraction $<$ angle of incidence).

Why other options are wrong:

- (A): Bending away from the normal happens when light goes from a denser to a rarer medium.
- (C): Light changes direction at the boundary unless it hits at 0° incidence (along the normal).
- (D): Total internal reflection occurs only when light travels from a denser to a rarer medium beyond the critical angle.

Final Answer: Bends towards the normal when air $\rightarrow$ glass $\Rightarrow$ **B**

Answer: (B) [Go Back to Q3](#)

Q4.

Solution

Concept — Atmospheric Pressure and the Body: Our bodies are subjected to atmospheric pressure from all sides. However, the **fluids inside our body** (blood, tissue fluids) exert an equal and opposite pressure **outwards**, which exactly balances the atmospheric pressure. This is why we do not feel crushed.

Why other options are wrong:

- (A): Atmospheric pressure acts equally from *all* directions, not just downward.
- (B): Gravity acts on the body's mass; it does not counterbalance the pressure of air on body surfaces.
- (D): Atmospheric pressure is indeed enormous ($\approx 10^5$ Pa); it is the internal body pressure that balances it.

Final Answer: Internal body fluid pressure balances atmospheric pressure from all sides $\Rightarrow$ **C**

Answer: (C) [Go Back to Q4](#)



Q5.

Solution

Concept — Pascal's Law: **Pascal's Law** states: *Pressure applied to an enclosed fluid at rest is transmitted undiminished in all directions throughout the fluid.* In a hydraulic lift, a small force F_1 on the small piston (area A_1) creates pressure $P = F_1/A_1$. This pressure is transmitted equally to the large piston (area A_2), producing a much larger force $F_2 = P \times A_2$.

Step-by-step: $P = \frac{F_1}{A_1} = \frac{F_2}{A_2}$, so $F_2 = F_1 \times \frac{A_2}{A_1} \gg F_1$.

Why other options are wrong:

- (B): Fluids exert pressure in *all* directions, not only at the bottom.
- (C): Compressing a fluid transmits the pressure; the fluid does not lose pressure.
- (D): Fluids exert zero gauge pressure at their free surface; pressure increases with depth.

Final Answer: Pascal's Law — pressure transmitted equally in all directions $\Rightarrow$ A

Answer: (A) [Go Back to Q5](#)

Q6.

Solution

Concept — Types of Friction: Friction types in decreasing order: **static** > **sliding** > **rolling** (least). Ball bearings convert the sliding motion between metal surfaces into rolling motion, thereby greatly reducing friction and the energy wasted as heat.

Why other options are wrong:

- (A): Ball bearings *reduce* the actual contact area (point contact), which reduces friction.
- (B): There is no special repelling material; ball bearings work by changing the type of friction.
- (C): This is factually incorrect. Rolling friction is *less* than sliding friction, not greater.

Final Answer: Rolling friction < sliding friction; ball bearings reduce energy loss $\Rightarrow$ D

Answer: (D) [Go Back to Q6](#)



Q7.

Solution

Concept — Condition for an Echo: The human ear can distinguish two sounds as separate only if there is a time gap of at least **0.1 seconds** between them. Speed of sound in air ≈ 340 m/s. For an echo, the sound must travel to the wall and back, so the **minimum distance** d satisfies:

$$2d = v \times t = 340 \times 0.1 = 34 \text{ m} \implies d = 17 \text{ m}.$$

Why other options are wrong:

- (A) 5 m: Too close; the reflected sound reaches the ear in only 0.03 s and merges with the original.
- (C) 50 m and (D) 100 m: These are more than adequate, but not the *minimum* required distance.

Final Answer: Minimum distance for echo = 17 m $\Rightarrow$ B

Answer: (B) [Go Back to Q7](#)

Q8.

Solution

Concept — Frequency and Pitch: Pitch is determined by the **frequency** of a sound wave. Higher frequency = higher pitch. A mosquito beats its tiny wings at approximately **500–600 Hz**, producing a high-pitched buzz. A lion's roar involves slow vibrations of its large vocal cords at a very low frequency, producing a low-pitched sound.

Why other options are wrong:

- (A): Pitch has nothing to do with body size directly; it depends on the frequency of vibration.
- (B): The lion has *lower* frequency vibrations than the mosquito, not higher.
- (D): Amplitude determines the *loudness* (volume) of a sound, not its pitch.

Final Answer: Mosquito's wings vibrate at much higher frequency $\Rightarrow$ higher pitch $\Rightarrow$ C

Answer: (C) [Go Back to Q8](#)



Q9.

Solution

Concept — Chemical Effects of Electric Current: For a liquid to conduct electricity, it must contain **free ions** that can carry charge. **Lemon juice** contains citric acid, which dissociates to give H^+ and $citrate^-$ ions, making it a conductor. The bulb glows (or the LED lights up) in a simple circuit.

Why other options are wrong:

- (B): **Distilled water** has virtually no dissolved ions and is a very poor conductor.
- (C): Vegetable oil is a non-polar organic liquid with no free ions; it does not conduct electricity.
- (D): Pure ethanol is a covalent compound with negligible ionic dissociation; it does not conduct electricity.

Final Answer: Lemon juice contains free ions and conducts electricity $\Rightarrow$ A

Answer: (A) [Go Back to Q9](#)

Q10.

Solution

Concept — Lightning Safety: Lightning is a massive electrical discharge that **follows the path of least resistance** and tends to strike tall or pointed objects. Safe actions include taking shelter inside a building or inside a car (which acts like a Faraday cage with its metal body).

Why other options are wrong:

- (A): Tall trees are frequent targets of lightning; standing under them is extremely dangerous.
- (B): A metal-tipped umbrella can conduct lightning directly to the person holding it.
- (C): Standing in an open field makes you the highest point and a prime lightning target.

Final Answer: Take shelter inside a building or a car with windows closed $\Rightarrow$ D

Answer: (D) [Go Back to Q10](#)



Q11.

Solution

Concept — Inflammable Substances: Inflammable substances have a very low **ignition temperature** and catch fire easily in the presence of air. Petrol, alcohol (ethanol), and LPG are all highly inflammable hydrocarbons or organic compounds, with low flash points.

Why other options are wrong:

- (A): Water and sand are *not* inflammable. Sand is actually used to extinguish fires (by cutting off oxygen supply).
- (C): Water is not inflammable and would actually suppress a petrol fire if not used carefully.
- (D): Sand and stone are non-combustible; only alcohol in this group is inflammable.

Final Answer: Petrol, alcohol, and LPG are all inflammable $\Rightarrow$ **B**

Answer: (B) [Go Back to Q11](#)

Q12.

Solution

Concept — CNG as a Clean Fuel: Natural gas is composed mainly of methane (CH_4). When compressed, it is called **CNG (Compressed Natural Gas)**. It burns cleanly, producing mainly CO_2 and H_2O with negligible particulates or sulphur compounds, making it much cleaner than petrol or diesel.

Why other options are wrong:

- (A): Coal is the dirtiest fossil fuel; burning it releases large amounts of SO_2 , NO_x , and soot.
- (B): Petroleum (diesel/petrol) releases more pollutants per unit energy than natural gas.
- (D): Kerosene is a liquid hydrocarbon fuel that produces soot and is not referred to as CNG.

Final Answer: Natural gas compressed as CNG is a clean fuel $\Rightarrow$ **C**

Answer: (C) [Go Back to Q12](#)



Q13.

Solution

Concept — Uses of Non-Metals: Non-metals are essential in everyday life:

- **Oxygen** (O_2): required for **respiration** (breathing) in all aerobic organisms. Also used in hospitals, welding, and combustion.
- **Nitrogen** (N_2): used in the manufacture of ammonia (Haber process), which is the base for nitrogenous **fertilizers** such as urea and ammonium nitrate. Also used in refrigeration and packaging.

Why other options are wrong:

- (B): The uses of oxygen and nitrogen are swapped. Oxygen is for breathing; nitrogen is for fertilizers.
- (C): Sulphur is not a primary fuel for breathing; phosphorus is used in matchsticks, not breathing.
- (D): Carbon (as coal/coke) is used as a fuel for combustion, not fertilizers. Nitrogen is not used as a fuel.

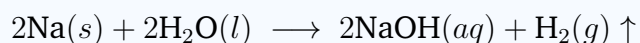
Final Answer: Oxygen for breathing; Nitrogen for fertilizers $\Rightarrow$ A

Answer: (A) [Go Back to Q13](#)

Q14.

Solution

Concept — Sodium Reacting with Water: Sodium is a highly reactive alkali metal. It reacts vigorously with water to produce **sodium hydroxide** ($NaOH$) and **hydrogen gas** (H_2):



The reaction is highly exothermic; the hydrogen gas produced may catch fire spontaneously.

Why other options are wrong:

- (A): Sodium oxide (Na_2O) reacts with water to give $NaOH$, but $Na +$ water directly gives $NaOH + H_2$, not Na_2O .
- (B): Sodium chloride ($NaCl$) is formed when sodium reacts with hydrochloric acid (HCl), not with water.
- (C): Sodium carbonate (Na_2CO_3) requires a carbon source; water contains



no carbon.

Final Answer: $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2 \uparrow \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q14](#)

Q15.

Solution

Concept — Advantages of Synthetic Fibres: Synthetic fibres such as **nylon**, **polyester**, and **acrylic** are manufactured from petrochemicals and offer key advantages:

- **High durability:** They resist wear and tear and last longer.
- **Wrinkle-resistant:** They do not crease easily, reducing the need for ironing.
- **Lower cost:** Mass production makes them affordable.
- **Dry quickly:** They absorb very little moisture.

Why other options are wrong:

- (A): Synthetic fibres absorb *less* moisture than cotton, making cotton more comfortable in summer.
- (C): Synthetic fibres are *not* biodegradable — this is a significant environmental disadvantage.
- (D): Synthetic fibres are generally poor heat insulators; wool (a natural fibre) provides superior warmth in winter.

Final Answer: More durable, wrinkle-resistant, and cost-effective $\Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q15](#)

Q16.

Solution

Concept — Plant Cell vs. Animal Cell: Both cell types share: nucleus, cytoplasm, cell membrane, mitochondria, ribosomes, and endoplasmic reticulum. However, **plant cells alone** possess:

- **Cell wall** (rigid, made of cellulose): gives definite shape and mechanical support.
- **Chloroplasts:** contain chlorophyll for photosynthesis.
- **Large central vacuole:** stores water, minerals, and waste products.



Why other options are wrong:

- (A) and (D): Nucleus, mitochondria, cytoplasm, and ER are present in *both* cell types.
- (B): Cell membrane and ribosomes are also present in animal cells.

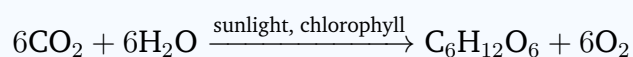
Final Answer: Cell wall, chloroplasts, large central vacuole are exclusive to plant cells $\Rightarrow$

Answer: (C) [Go Back to Q16](#)

Q17.

Solution

Concept — Chloroplast and Photosynthesis: Chloroplasts are the organelles where photosynthesis takes place. They contain the green pigment **chlorophyll**, which absorbs light energy. This energy is used to convert CO_2 and H_2O into glucose and oxygen:



Why other options are wrong:

- (B): Chloroplasts *make* food, not store it. Storage occurs in leucoplasts (colourless plastids).
- (C): Breaking down food to release energy (cellular respiration) is the function of **mitochondria**.
- (D): Controlling all cell activities is the function of the **nucleus**.

Final Answer: Chloroplast = site of photosynthesis (food manufacture using sunlight) $\Rightarrow$

Answer: (A) [Go Back to Q17](#)



Q18.

Solution

Concept — Biological Nitrogen Fixation: Atmospheric nitrogen (N_2) cannot be used directly by plants. The bacterium *Rhizobium* lives **symbiotically** in the root nodules of leguminous plants (beans, peas, soybean, groundnut). It **fixes** atmospheric N_2 into ammonia (NH_3) and then into nitrates (NO_3^-), which the plant can absorb. In return, the plant provides carbohydrates to the bacterium — a mutualistic relationship.

Why other options are wrong:

- (A): *Lactobacillus* is used in dairy fermentation (making curd and yoghurt).
- (B): *Clostridium* can fix nitrogen but lives freely in soil, not in legume root nodules.
- (C): *E. coli* lives in the large intestine of animals and does not fix nitrogen.

Final Answer: *Rhizobium* in legume root nodules fixes atmospheric nitrogen $\Rightarrow$

D

Answer: (D) [Go Back to Q18](#)

Q19.

Solution

Concept — History of Vaccination: In 1796, English physician **Edward Jenner** noticed that milkmaids who contracted **cowpox** (a mild disease) did not get **smallpox** (a deadly disease). He inoculated a boy with cowpox material and showed the boy became immune to smallpox. This was the world's **first vaccine**, earning Jenner the title "Father of Immunology."

Why other options are wrong:

- (A): The polio vaccine was developed by **Jonas Salk** (1955) and Albert Sabin (oral vaccine).
- (C): The cholera vaccine was developed by **Louis Pasteur** and later Walde-mar Haffkine (1893).
- (D): The tuberculosis vaccine (BCG) was developed by **Calmette and Guérin** (1921).

Final Answer: Edward Jenner's first vaccine was against smallpox $\Rightarrow$ **B**

Answer: (B) [Go Back to Q19](#)



Q20.

Solution

Concept — Binary Fission: Binary fission is an asexual mode of reproduction in which a **unicellular organism** divides into **two equal daughter cells**. The parent cell's nucleus first divides (karyokinesis), followed by division of the cytoplasm (cytokinesis). Both daughter cells are genetically identical to the parent. Amoeba, Paramecium, and bacteria reproduce by binary fission.

Why other options are wrong:

- (A): **Budding** produces an unequal outgrowth (bud) that detaches from the parent (e.g., Hydra, Yeast).
- (B): **Spore formation** involves production of many small spores inside a sporangium (e.g., bread mould *Rhizopus*).
- (D): **Fragmentation** is reproduction in multicellular organisms (e.g., *Spirogyra*) where the body breaks into fragments, each growing into a new organism.

Final Answer: Amoeba divides into two equal cells — this is binary fission ⇒ **C**

Answer: (C) [Go Back to Q20](#)

Q21.

Solution

Concept — Red Data Book: The Red Data Book (Red List) is maintained by the **International Union for Conservation of Nature (IUCN)**. It categorises all known species according to their conservation status: Extinct (EX), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), etc. Its primary purpose is to highlight species at risk and guide conservation efforts worldwide.

Why other options are wrong:

- (B): Mineral deposits are recorded by geological surveys, not conservation organisations.
- (C): Captive breeding records are maintained separately by individual zoos and wildlife programs.
- (D): Invasive species are tracked by different specialised groups and listed separately, not in the Red Data Book.

Final Answer: Red Data Book lists threatened and endangered species ⇒ **A**

Answer: (A) [Go Back to Q21](#)



Q22.

Solution

Concept — Drip Irrigation: Drip (trickle) irrigation uses a network of pipes, tubes, and emitters (drippers) to deliver water **slowly and directly** to the root zone of each plant. Water use efficiency is 90–95%, compared to only 50–60% for flood irrigation.

Comparison of irrigation methods:

- **Moat:** Lever-and-bucket system; traditional, very labour-intensive.
- **Chain pump:** Chains with buckets lift water; wasteful due to evaporation.
- **Sprinkler:** Simulates rainfall; more efficient than flood but loses water to evaporation.
- **Drip:** Most water-efficient; no surface runoff; ideal for fruits, vegetables.

Final Answer: Drip system delivers water directly to roots with minimum wastage
⇒

Answer: (D) [Go Back to Q22](#)

Q23.

Solution

Concept — Order of Planets from the Sun: The eight planets of our Solar System in order from the Sun are:

Mercury → Venus → Earth → Mars → Jupiter → Saturn → Uranus → Neptune
1st 2nd 3rd 4th 5th 6th 7th 8th

Mnemonic: **My Very Educated Mother Just Served Us Noodles.**

Why other options are wrong:

- (A): Places Earth before Venus — incorrect. Venus is the second planet from the Sun.
- (C): Places Mars before Earth — incorrect. Earth is the third planet.
- (D): Swaps Mercury and Venus, and also swaps Saturn and Jupiter.

Final Answer: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune ⇒

Answer: (B) [Go Back to Q23](#)



Q24.

Solution

Concept — Major Sources of Water Pollution: Water pollution results from harmful substances entering water bodies. The two **major sources** are:

- **Industrial effluents:** Factories discharge chemicals, heavy metals (lead, mercury, arsenic), dyes, and acids into rivers without adequate treatment.
- **Sewage discharge:** Untreated human waste contains bacteria, viruses, nitrates, and organic matter that deplete dissolved oxygen and spread water-borne diseases.

Why other options are wrong:

- (A): Rainfall is a natural process; irrigation return water can carry minor pollutants but is not a *major* source.
- (B): Fishing and swimming cause minimal pollution compared to industrial and sewage sources.
- (D): Organic (natural) fertilizers break down naturally and are far less polluting than industrial effluents.

Final Answer: Industrial effluents and raw sewage are major sources of water pollution ⇒

Answer: (C) [Go Back to Q24](#)

Q25.

Solution

Concept — Sex Hormones and Adolescence: Sex hormones are produced by the **gonads** (reproductive glands) under pituitary control:

- **Testosterone:** secreted by the **testes** in males. Causes voice deepening, growth of facial and body hair, increased muscle mass, and sperm production.
- **Estrogen** (oestrogen): secreted by the **ovaries** in females. Causes breast development, widening of hips, onset of menstrual cycle, and other female secondary sexual characteristics.

Why other options are wrong:

- (A): Testosterone is produced by *testes* (males) and estrogen by *ovaries* (females) — not the other way around.



- (B): The **pituitary gland** secretes FSH and LH (which stimulate the gonads), not testosterone or estrogen directly.
- (C): The roles are completely swapped. Estrogen is the female hormone; testosterone is the male hormone.

Final Answer: Testosterone from testes (males); estrogen from ovaries (females)

⇒

Answer: (D) [Go Back to Q25](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	D	3	B	4	C	5	A
6	D	7	B	8	C	9	A	10	D
11	B	12	C	13	A	14	D	15	B
16	C	17	A	18	D	19	B	20	C
21	A	22	D	23	B	24	C	25	D

