YASASVI Science

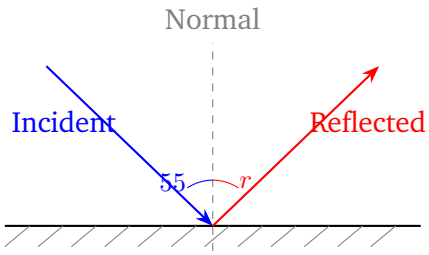
Sample Paper – 1

Duration: 38 Minutes **Maximum Marks: 100**

Instructions

- This paper contains **25** Multiple Choice Questions (Single Correct Answer), modelled on the Science portion of **YASASVI** entrance.
- Each correct answer carries **+4 marks**. There is **−1 mark** for each incorrect answer. Unattempted questions carry no penalty.
- Only **one** option is correct per question.
- Syllabus level: **Class 8 NCERT Science** (for YASASVI Class 9 YET)
- Use of calculators, mobile phones, or electronic gadgets is strictly prohibited.

Q1. A ray of light strikes a plane mirror making an angle of 35 with the mirror surface. What is the angle of reflection?



(A) 35

(B) 55

(C) 70

(D) 90

Q2. Which of the following correctly pairs a type of mirror with its practical use?

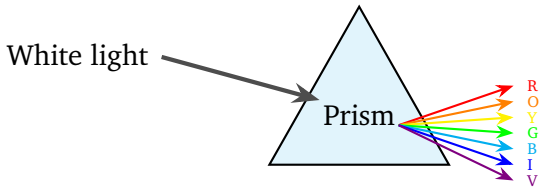
(A) Concave mirror — rear-view mirror in vehicles

(B) Convex mirror — reflector in a torch

(C) Convex mirror — rear-view mirror in vehicles

(D) Concave mirror — used in periscopes

Q3. When a beam of white light passes through a glass prism it splits into a band of colours called the spectrum. Which sequence correctly gives the order from the *least deviated* colour to the *most deviated* colour?



(A) Violet, Indigo, Blue, Green, Yellow, Orange, Red

(B) Red, Orange, Yellow, Green, Blue, Indigo, Violet

(C) Green, Yellow, Orange, Red, Blue, Indigo, Violet

(D) Blue, Indigo, Violet, Red, Orange, Yellow, Green

Q4. A force of $120\,\text{N}$ is applied over an area of $0.4\,\text{m}^2$. What is the pressure exerted?

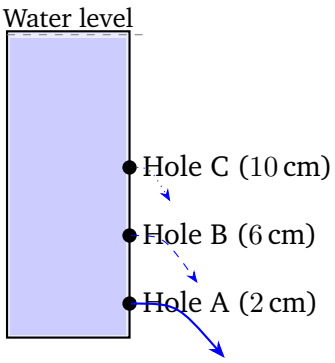
(A) $0.003\,\text{Pa}$

(B) $48\,\text{Pa}$

(C) $120\,\text{Pa}$

(D) $300\,\text{Pa}$

Q5. A plastic bottle has three holes drilled at heights of $2\,\text{cm}$, $6\,\text{cm}$, and $10\,\text{cm}$ from the bottom and is filled with water. Which hole shoots water the *farthest* horizontally, and why?



(A) Hole C at 10 cm from the bottom, because it has the highest water column above it

(B) Hole A at 2 cm from the bottom, because it has the greatest depth below the water surface

(C) All three holes shoot water equally far because pressure is uniform throughout

(D) Hole B at 6 cm from the bottom, because it is at the midpoint

Q6. A heavy box is resting on the floor. Which statement about friction is **correct**?

(A) Static friction is greater than kinetic (sliding) friction for the same surfaces

(B) Kinetic friction is always greater than static friction

(C) Static friction and kinetic friction are always equal

(D) Friction is independent of the nature of surfaces in contact

Q7. An astronaut on the Moon fires a gun. A fellow astronaut standing 50 m away (also on the Moon's surface, in vacuum) will:

(A) Hear a very loud sound because there is no air resistance

(B) Hear a faint echo from the lunar rocks

(C) Hear *no* sound at all because sound cannot travel through vacuum

(D) Hear the sound with a delay of several seconds

Q8. The *pitch* of a sound is determined by its:

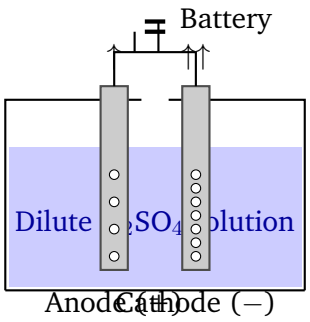
(A) Amplitude of vibration

(B) Frequency of vibration

(C) Speed of propagation

(D) Wavelength in air at sea level

Q9. During the electrolysis of water using carbon electrodes and dilute sulphuric acid, which gases are collected at the **anode** and **cathode** respectively?



(A) Hydrogen at anode; Oxygen at cathode

(B) Oxygen at both electrodes

(C) Hydrogen at both electrodes

(D) Oxygen at anode; Hydrogen at cathode

Q10. A lightning conductor is fixed to the top of a tall building with its lower end buried deep in the ground. How does it protect the building from lightning?

(A) It provides a low-resistance conducting path to the ground, so lightning charge flows safely into the Earth without passing through the building

(B) It repels the lightning bolt by generating an opposite charge

(C) It absorbs and stores the electrical energy of lightning inside the metal rod

(D) It raises the temperature of the surrounding air to deflect lightning

Q11. The minimum temperature at which a substance catches fire and begins to burn on its own is called its:

(A) Boiling point

(B) Flash point

(C) Ignition temperature

(D) Critical temperature

Q12. Coal was formed from the remains of ancient forests buried under layers of earth millions of years ago. This process involved high temperature and pressure over geological time. What term describes this conversion?

(A) Fractional distillation

(B) Carbonisation

(C) Electrolysis

(D) Hydrogenation

Q13. Which combination of physical properties is **characteristic of metals**?

(A) Brittle, dull, poor conductor of heat

(B) Soft, non-lustrous, poor conductor of electricity

(C) Gaseous at room temperature, non-malleable

(D) Malleable, ductile, lustrous, and good conductors of electricity

Q14. When zinc granules are added to dilute hydrochloric acid, which gas is produced and how can you confirm its identity?

(A) Hydrogen gas; it burns with a *pop* sound when a burning splint is brought near

(B) Oxygen gas; it relights a glowing splint

(C) Carbon dioxide gas; it turns lime water milky

(D) Chlorine gas; it bleaches a damp litmus paper

Q15. A plastic cup is accidentally placed near a hot stove and it melts. On cooling, it hardens again and can be remoulded. This plastic is best classified as a:

(A) Thermosetting plastic, because it can withstand heat

(B) Biodegradable plastic, because it changes shape

(C) Thermoplastic, because it softens on heating and can be reshaped

(D) Synthetic fibre, because it is derived from petroleum

Q16. Which statement **correctly** distinguishes the cell wall from the cell membrane?

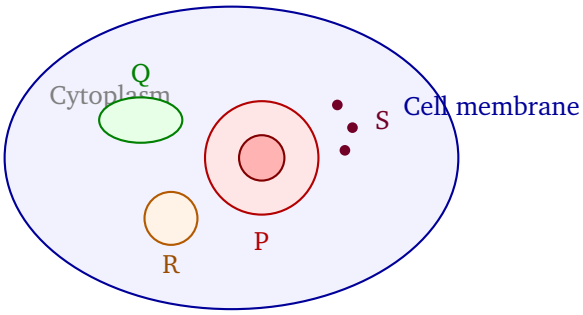
(A) Cell membrane is made of cellulose and is found in animal cells; cell wall is a thin, flexible layer

(B) Cell wall is a rigid outer layer made of cellulose found only in plant cells; cell membrane is a thin, flexible layer present in all cells

(C) Both cell wall and cell membrane are present in all living cells including animal cells

(D) Cell wall controls the passage of substances in and out of the cell; cell membrane provides structural rigidity

Q17. Study the diagram of a simple animal cell below. Which labelled organelle acts as the *control centre* of the cell, directing all its activities and containing genetic information?



(A) Q — Mitochondria

(B) R — Vacuole

(C) S — Ribosome

(D) P — Nucleus

Q18. Which of the following lists **all four** major types of microorganisms?

(A) Bacteria, Fungi, Protozoa, Algae

(B) Bacteria, Virus, Fungi, Insects

(C) Algae, Protozoa, Worms, Virus

(D) Bacteria, Algae, Lichens, Fungi

Q19. Which pair of diseases is caused by **viruses**?

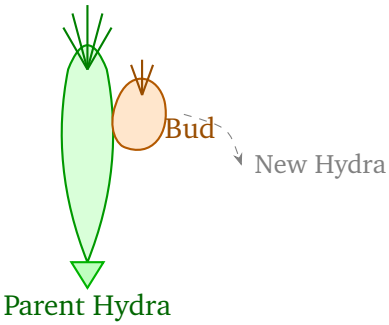
(A) Typhoid and Cholera

(B) Malaria and Sleeping sickness

(C) Influenza and Polio

(D) Tuberculosis and Pneumonia

Q20. The diagram below shows a *Hydra* reproducing asexually. Which **method of reproduction** is shown?



(A) Fragmentation

(B) Budding

(C) Binary fission

(D) Spore formation

Q21. A large protected area that includes the natural habitat of plants and animals along with the human communities living therein, designated to conserve biodiversity while allowing sustainable use, is called a:

(A) National Park

(B) Wildlife Sanctuary

(C) Reserved Forest

(D) Biosphere Reserve

Q22. Which statement **correctly** distinguishes chemical fertilizers from manure?

(A) Chemical fertilizers are manufactured in factories and supply specific nutrients rapidly, while manure is a natural organic substance that improves soil texture and water-holding capacity

(B) Manure is made in factories and supplies nitrogen in a concentrated form; fertilizers are natural and improve soil microbes

(C) Both fertilizers and manure are natural substances with identical effects on soil

(D) Chemical fertilizers improve soil humus content while manure supplies only phosphorus

Q23. Which of the following is a key difference between **stars** and **planets**?

(A) Planets emit their own light; stars only reflect light from other bodies

(B) All planets are larger in size than all stars

(C) Stars produce their own light and heat through nuclear reactions; planets do not produce their own light and are seen by reflected starlight

(D) Stars revolve around planets in fixed orbits

Q24. Which gas, released mainly by burning fossil fuels, traps heat in the Earth's atmosphere and is primarily responsible for enhancing the *greenhouse effect*?

(A) Oxygen (O_2)

(B) Carbon dioxide (CO_2)

(C) Nitrogen (N_2)

(D) Argon (Ar)

Q25. During puberty in boys, which of the following is **NOT** a secondary sexual characteristic?

(A) Growth of facial and body hair

(B) Voice becomes deeper (voice box enlarges)

(C) Shoulders broaden and muscles develop

(D) Onset of menstruation

Detailed Solutions

Q1.

Solution

Concept — Laws of Reflection (Light): The angle of incidence is always equal to the angle of reflection, both measured from the *normal* to the reflecting surface.

Step 1 — Find the angle of incidence: The ray makes 35 with the mirror *surface*. The normal is perpendicular to the mirror, so the angle between the ray and the normal is $90 - 35 = 55$.

Step 2 — Apply law of reflection: Angle of reflection $=$ Angle of incidence $= 55$.

Why other options are wrong:

- (A) 35 is the angle with the mirror surface, not with the normal.
- (C) 70 and (D) 90 have no basis in the law of reflection.

Final Answer: Angle of reflection $= 55 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q1

Q2.

Solution

Concept — Uses of Curved Mirrors: A *convex* mirror has a wider field of view and always forms a virtual, erect, diminished image, making it ideal as a rear-view mirror. A *concave* mirror converges light and is used as a reflector in torches, headlights, and solar furnaces.

Why other options are wrong:

- (A) Wrong: concave mirrors are NOT used as rear-view mirrors.
- (B) Wrong: concave (not convex) mirrors are used as reflectors in torches.
- (D) Wrong: periscopes use plane mirrors, not curved mirrors.

Final Answer: Convex mirror $\rightarrow$ rear-view mirror $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q2

Q3.

Solution

Concept — Dispersion (Light): When white light passes through a prism, it splits into VIBGYOR (Violet, Indigo, Blue, Green, Yellow, Orange, Red). Violet is deviated the most; Red is deviated the least. The standard acronym VIBGYOR lists colours from most deviated (Violet) to least deviated (Red).

Key point: Option (A) gives the sequence V, I, B, G, Y, O, R which is the standard VIBGYOR mnemonic taught in Class 8 NCERT Science as the order of the spectrum. Option (B) gives the reverse (ROYGBIV). Options (C) and (D) are scrambled.

Why other options are wrong:

- (B) ROYGBIV is the reverse of the standard VIBGYOR mnemonic.
- (C) and (D) are randomly scrambled sequences.

Final Answer: VIBGYOR is the standard spectrum sequence $\Rightarrow$ A

Answer: (A) Go Back to Q3

Q4.

Solution

Concept — Pressure Formula: Pressure is defined as force per unit area:

$$P = \frac{F}{A}$$

Step 1 — Substitute values:

$$P = \frac{120\,\text{N}}{0.4\,\text{m}^2} = 300\,\text{Pa}$$

Why other options are wrong:

- (A) $0.003\,\text{Pa}$: inverts the formula (A/F).
- (B) $48\,\text{Pa}$: incorrect arithmetic.
- (C) $120\,\text{Pa}$: simply copies the force value without dividing by area.

Final Answer: $P = 300\,\text{Pa} \Rightarrow$ D

Answer: (D) Go Back to Q4

Q5.

Solution

Concept — Pressure in Liquids Increases with Depth: Liquid pressure at a point is $P = h\rho g$, where h is the depth below the free surface. Greater depth $\Rightarrow$ greater pressure $\Rightarrow$ faster stream.

Step 1 — Identify depths: The water level is at the top (≈ 4.5 cm above bottom, say). Hole A at 2 cm from the bottom is the deepest below the water surface. Hole C at 10 cm from the bottom is the shallowest.

Step 2 — Conclusion: Hole A, being deepest below the surface, has the highest water pressure and hence shoots water the farthest.

Why other options are wrong:

- (A) Hole C is at 10 cm from the bottom — it has the *least* depth below the surface, least pressure.
- (C) Pressure varies with depth; it is not uniform throughout.
- (D) Being at the midpoint has no special significance for pressure.

Final Answer: Hole A at 2 cm from bottom has greatest depth $\Rightarrow$ shoots farthest $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q5

Q6.

Solution

Concept — Static vs Kinetic Friction: Static friction acts on a body at rest and prevents it from moving. It is always greater than kinetic (sliding) friction for the same pair of surfaces. This is why it takes more force to start sliding a heavy object than to keep it moving.

Why other options are wrong:

- (B) Incorrect: kinetic friction is *less* than static friction.
- (C) Incorrect: they are not equal.
- (D) Incorrect: friction depends on the nature (roughness) of the surfaces in contact.

Final Answer: Static friction $>$ Kinetic friction $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q6

Q7.

Solution

Concept — Sound Needs a Medium: Sound is a mechanical wave that requires a material medium (solid, liquid, or gas) for propagation. The Moon has no atmosphere; its surface environment is a vacuum. No medium $\Rightarrow$ no sound transmission.

Why other options are wrong:

- (A) Absence of air resistance is irrelevant; sound cannot travel without a medium at all.
- (B) Sound cannot travel through the vacuum between the rocks to reach the other astronaut.
- (D) Even with a delay, sound cannot travel in vacuum regardless of the time elapsed.

Final Answer: No sound is heard because vacuum has no medium for sound transmission $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q7

Q8.

Solution

Concept — Characteristics of Sound:

- **Pitch** depends on *frequency*: higher frequency $\Rightarrow$ higher pitch (shriller sound).
- **Loudness** depends on *amplitude*: greater amplitude $\Rightarrow$ louder sound.
- Speed and wavelength are properties of propagation, not pitch per se.

Why other options are wrong:

- (A) Amplitude determines *loudness*, not pitch.
- (C) Speed of sound in a given medium is nearly constant and does not determine pitch.
- (D) Wavelength and frequency are related by $v = f\lambda$, but pitch is directly defined by frequency.

Final Answer: Pitch is determined by frequency of vibration $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q8

Q9.

Solution

Concept — Electrolysis of Water: When water (acidified with dilute H_2SO_4) is electrolysed:

$$2H_2O \rightarrow 2H_2 \uparrow \text{ (cathode)} + O_2 \uparrow \text{ (anode)}$$

Hydrogen is produced at the **cathode** ($-$ electrode) because H^+ ions are attracted to the negative terminal. Oxygen is produced at the **anode** ($+$ electrode) from OH^- ions.

Memory tip: "HON" — Hydrogen at Negative (cathode); Oxygen at aNnode (anode).

Volumes: Volume of hydrogen produced is *twice* that of oxygen (2:1 ratio), as seen by larger bubbles at cathode in the diagram.

Why other options are wrong:

- (A) Reverses the products at each electrode.
- (B) Oxygen at both electrodes is chemically impossible here.
- (C) Hydrogen at both electrodes is also impossible.

Final Answer: Oxygen at anode; Hydrogen at cathode $\Rightarrow$ D

Answer: (D) Go Back to Q9

Q10.

Solution

Concept — Lightning Conductor: A lightning conductor is a thick copper rod fitted along the outside of a tall building from the roof to deep into the ground. When lightning strikes, it takes the path of least resistance — through the copper rod — directly into the Earth, thus protecting the building and its occupants.

Why other options are wrong:

- (B) It does not repel lightning; it provides a safe discharge path.
- (C) It does not store energy; it dissipates electrical charge into the Earth.
- (D) Temperature change is not the mechanism of protection from lightning.

Final Answer: Provides a low-resistance conducting path to Earth $\Rightarrow$ A

Answer: (A) Go Back to Q10

Q11.

Solution

Concept — Ignition Temperature: The *ignition temperature* (also called kindling temperature) is the minimum temperature to which a substance must be heated before it starts burning on its own in the presence of oxygen, without any external flame. Every combustible substance has a characteristic ignition temperature.

Why other options are wrong:

- (A) Boiling point is the temperature at which a liquid converts to vapour; unrelated to combustion.
- (B) Flash point is the temperature at which a substance gives off enough vapour to ignite *momentarily* with a flame but does not sustain burning independently.
- (D) Critical temperature is a thermodynamics concept (above which a gas cannot be liquefied); not related to combustion.

Final Answer: Minimum temperature for self-sustaining combustion = Ignition temperature $\Rightarrow$ C

Answer: (C) Go Back to Q11

Q12.

Solution

Concept — Formation of Coal (Carbonisation): Ancient forests were buried under layers of sediment. Over millions of years, heat and pressure converted the dead plant matter progressively into peat, lignite, bituminous coal, and finally anthracite. This slow conversion of plant matter into coal under heat and pressure is called *carbonisation*.

Why other options are wrong:

- (A) Fractional distillation is the industrial separation of petroleum into fractions; it is not the natural coal-formation process.
- (C) Electrolysis is an electrochemical process; it has nothing to do with fossil fuel formation.
- (D) Hydrogenation is a chemical reaction (adding H_2) used industrially; unrelated to coal formation.

Final Answer: Conversion of dead plant matter into coal = Carbonisation $\Rightarrow$ B

Answer: (B) Go Back to Q12

Q13.

Solution

Concept — Physical Properties of Metals: Metals are generally:

- **Malleable**: can be beaten into thin sheets (e.g., gold foil, aluminium foil).
- **Ductile**: can be drawn into thin wires (e.g., copper wires, aluminium wires).
- **Lustrous**: have a characteristic metallic shine (e.g., silver, gold).
- **Good conductors** of heat and electricity (e.g., copper, aluminium).

Why other options are wrong:

- (A) Brittle, dull, poor conductor of heat — these are typical properties of *non-metals* (e.g., sulphur, phosphorus).
- (B) Soft, non-lustrous, poor conductor of electricity — also non-metal properties.
- (C) Gaseous at room temperature, non-malleable — only non-metallic elements like chlorine, nitrogen are gases at room temperature.

Final Answer: Malleable, ductile, lustrous, good conductors = properties of metals $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q13

Q14.

Solution

Concept — Metal + Dilute Acid $\rightarrow$ Salt + Hydrogen:

$$\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2 \uparrow$$

The gas produced is hydrogen (H_2). It is identified by the *pop test*: when a burning splint is held at the mouth of a test tube containing hydrogen, it burns with a characteristic pop sound.

Why other options are wrong:

- (B) Oxygen relights a *glowing* splint; it is not produced by metal + acid reaction.
- (C) CO_2 turns lime water milky; it is produced when carbonates react with acid, not metals.
- (D) Chlorine bleaches damp litmus paper; it is not produced by this reaction.

Final Answer: Hydrogen gas burns with a pop sound $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q14

Q15.

Solution

Concept — Thermoplastics vs Thermosetting Plastics:

- **Thermoplastics**: Soften on heating and can be remoulded repeatedly. Examples: PVC, polythene, polystyrene.
- **Thermosetting plastics**: Harden permanently on first moulding and cannot be softened on reheating. Examples: Bakelite, melamine.

Key clue in the question: The cup *melts and can be remoulded* — this is the defining property of a *thermoplastic*.

Why other options are wrong:

- (A) A thermosetting plastic would NOT melt and be remoulded after first moulding.
- (B) Biodegradable refers to decomposition by microorganisms, not heat behaviour.
- (D) Synthetic fibres (like nylon, polyester) are thread-like; they are different from bulk plastics.

Final Answer: Melts and can be reshaped $\Rightarrow$ Thermoplastic $\Rightarrow$ C

Answer: (C) Go Back to Q15

Q16.

Solution

Concept — Cell Wall vs Cell Membrane:

- **Cell wall**: Rigid, made of cellulose; found only in plant cells (also in fungi and bacteria, but not in animal cells). It provides structural support and shape to the cell.
- **Cell membrane** (plasma membrane): Thin, flexible, selectively permeable; present in *all* living cells including animal cells. It regulates the entry and exit of substances.

Why other options are wrong:

- (A) Reverses the descriptions entirely; cell wall is NOT found in animal cells.
- (C) Cell wall is absent in animal cells — not present in all cells.
- (D) Reverses the functions; the cell membrane controls passage of substances, the cell wall provides rigidity.

Final Answer: Cell wall (cellulose, plant cells only) vs cell membrane (flexible, all cells) $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q16

Q17.

Solution

Concept — The Nucleus (Control Centre of the Cell): The nucleus contains the genetic material (DNA/chromosomes) and directs all cell activities including growth, metabolism, and reproduction. In the diagram, label **P** points to the large organelle with an inner nucleolus (shown as a smaller filled circle inside) — this is the nucleus.

Identification of all labels:

- **P** — Nucleus (large oval with inner nucleolus): control centre, contains DNA.
- **Q** — Mitochondria (small oval): powerhouse of the cell, produces ATP.
- **R** — Vacuole (small circle): stores water, food, or waste products.
- **S** — Ribosomes (tiny dots): site of protein synthesis.

Why other options are wrong:

- (A) Q (Mitochondria) produces energy, not the control centre.
- (B) R (Vacuole) stores substances; not the control centre.
- (C) S (Ribosome) synthesises proteins; not the control centre.

Final Answer: P = Nucleus = control centre of the cell $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q17

Q18.

Solution

Concept — Types of Microorganisms: The four major groups of microorganisms studied in Class 8 NCERT Science are:

(a) **Bacteria** — single-celled prokaryotes; cause diseases like typhoid, cholera.
(b) **Fungi** — moulds and yeast (eukaryotes); cause ringworm, athlete's foot.
(c) **Protozoa** — Amoeba, Paramecium; single-celled eukaryotes; cause malaria, dysentery.
(d) **Algae** — Spirogyra, Chlamydomonas; photosynthetic microorganisms.

Why other options are wrong:

- (B) Insects are macroscopic organisms, not microorganisms.
- (C) Worms (helminths) are macroscopic; not in the four major groups of microorganisms.
- (D) Lichens are symbiotic associations of fungi and algae, not a separate type of microorganism.

Final Answer: Bacteria, Fungi, Protozoa, Algae $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q18

Q19.

Solution

Concept — Viral Diseases: Viruses cause diseases such as influenza (flu), polio, common cold, dengue, measles, and chickenpox. Bacteria cause typhoid, cholera, tuberculosis, and pneumonia. Protozoa cause malaria (Plasmodium) and sleeping sickness (Trypanosoma).

Step 1 — Analyse each option:

- (A) Typhoid & Cholera: both caused by bacteria (*Salmonella typhi* and *Vibrio cholerae*).
- (B) Malaria & Sleeping sickness: both caused by protozoa (*Plasmodium* and *Trypanosoma*).
- **(C) Influenza & Polio: both caused by viruses.** ✓
- (D) Tuberculosis & Pneumonia: caused by bacteria (*Mycobacterium tuberculosis* and *Streptococcus pneumoniae*).

Final Answer: Influenza and Polio are viral diseases $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q19

Q20.

Solution

Concept — Budding in Hydra: Budding is a form of asexual reproduction in which a small outgrowth (bud) develops on the body of the parent organism. In Hydra, the bud grows its own tentacles, detaches from the parent, and develops into a new independent organism. The new organism is genetically identical to the parent (a clone).

Why other options are wrong:

- (A) Fragmentation: the body breaks into pieces, each growing into a new organism (e.g., Planaria, Spirogyra).
- (C) Binary fission: a single cell divides into two equal halves (e.g., Amoeba, Paramecium, bacteria).
- (D) Spore formation: tiny spores are released and germinate into new organisms (e.g., bread mould, ferns).

Final Answer: The diagram shows budding in Hydra $\Rightarrow$ B

Answer: (B) Go Back to Q20

Q21.

Solution

Concept — Biosphere Reserve: A *biosphere reserve* is a large protected ecosystem designated (often by UNESCO under the Man and Biosphere Programme) to conserve biodiversity and promote sustainable development. It has three zones: (i) Core zone (strictly protected), (ii) Buffer zone, and (iii) Transition/manipulation zone where human activities are allowed sustainably. Importantly, human communities can live within the biosphere reserve.

Key phrase in the question: "large protected area . . . including human communities . . . sustainable use" — this precisely defines a biosphere reserve.

Why other options are wrong:

- (A) National Park: no human habitation or resource extraction allowed inside.
- (B) Wildlife Sanctuary: focused on specific wildlife; restricted human activity; no permanent habitation generally.

- (C) Reserved Forest: managed for timber and forest produce; legal status is different from biosphere reserve.

Final Answer: Biosphere Reserve $\Rightarrow$ D

Answer: (D) Go Back to Q21

Q22.

Solution

Concept — Fertilizers vs Manure:

- **Chemical fertilizers**: Manufactured in factories (e.g., urea, DAP, ammonium sulphate); provide specific nutrients (N, P, K) in concentrated, rapidly available form; do not improve soil texture or add humus.
- **Manure**: Natural organic matter from decomposed animal waste and plant residue; improves soil texture, aeration, and water-holding capacity; releases nutrients slowly; adds humus.

Why other options are wrong:

- (B) Completely reverses the descriptions.
- (C) They are not identical at all; one is synthetic and concentrated, the other is organic and slow-release.
- (D) Chemical fertilizers do not improve humus; manure supplies multiple nutrients (N, P, K), not just phosphorus.

Final Answer: Fertilizers are factory-made, fast-acting; manure is organic, improves soil $\Rightarrow$ A

Answer: (A) Go Back to Q22

Q23.

Solution

Concept — Stars vs Planets:

- **Stars**: Self-luminous; produce their own light and heat through nuclear fusion reactions (hydrogen $\rightarrow$ helium) in their cores. They appear to twinkle due to atmospheric refraction.
- **Planets**: Non-luminous; they do not produce their own light. They are visible because they reflect the light from their parent star. They generally do

not twinkle because they appear as extended discs.

Why other options are wrong:

- (A) Completely wrong: it is stars (not planets) that emit their own light.
- (B) Stars are far, far larger than planets; the Sun alone is about 109 times the diameter of Earth.
- (D) Planets revolve around stars, not the other way around.

Final Answer: Stars produce own light via nuclear reactions; planets shine by reflected starlight $\Rightarrow$ C

Answer: (C) Go Back to Q23

Q24.

Solution

Concept — Greenhouse Effect and Global Warming: Certain gases in the atmosphere trap heat radiated from the Earth's surface, preventing it from escaping into space — this is the greenhouse effect. Carbon dioxide (CO_2) is the primary greenhouse gas that has increased significantly due to the burning of coal, oil, and natural gas, causing enhanced global warming.

Other greenhouse gases: Water vapour (H_2O), methane (CH_4), nitrous oxide (N_2O), and CFCs.

Why other options are wrong:

- (A) Oxygen (O_2) does not trap heat; it is used in respiration and combustion.
- (C) Nitrogen (N_2) makes up 78% of air but is not a greenhouse gas; it does not trap infrared radiation.
- (D) Argon (Ar) is an inert noble gas with no heat-trapping properties.

Final Answer: CO_2 is the primary greenhouse gas responsible for enhanced global warming $\Rightarrow$ B

Answer: (B) Go Back to Q24

Q25.

Solution

Concept — Secondary Sexual Characteristics in Boys: During puberty, boys develop the following secondary sexual characteristics:

- Growth of facial hair (beard, moustache) and body hair (underarms, pubic region). ✓
- Voice deepens due to enlargement of the larynx (voice box / Adam's apple). ✓
- Shoulders broaden and muscles develop. ✓
- Increased height, skin may become oily, acne may appear.

Menstruation is a secondary sexual characteristic of *girls*, not boys. It refers to the monthly shedding of the uterine lining and occurs only in females.

Why (A), (B), (C) are wrong as answers: All three are genuine secondary sexual characteristics in boys, so they cannot be the "NOT a characteristic" answer.

Final Answer: Menstruation is NOT a secondary sexual characteristic in boys $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q25

Answer Key

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