

Paper I (Theory)

Sample paper I

Section A

1. D
2. A
3. C
4. B
5. D
6. C
7. C
8. D
9. A
10. C
11. C
12. B
13. C
14. B
15. A
16. B
17. C
18. B
19. B
20. D
21. B
22. B
23. A
24. C
25. C
26. B
27. A
28. D
29. B
30. C

Section B

31. Newton (N); Pascal (Pa)
32.
 - (a) Move the learner immediately to an area with fresh air.
 - (b) Safety goggles; laboratory coat; gloves
33. Pressure difference due to gravity.
- 34.

- (a) Salt lowers the freezing point of water, causing the ice to melt at temperatures below 0°C.
- (b) Homogeneous mixture: uniform composition throughout. For example, salt solution.
Heterogeneous mixture: non-uniform composition. For example, sand and water.

35. Density = $\frac{\text{Mass}}{\text{Volume}}$
 $= 45 \text{ g} \div 15 \text{ cm}^3$
 $= 3 \text{ g/cm}^3$

- 36.
- (a) Element: a substance made of only one type of atom. Compound: a substance formed when two or more different elements chemically combine in a fixed ratio.
 - (b) Electron
 - (c) Carbon + oxygen $\rightarrow$ carbon (IV) oxide

- 37.
- (a) Chloroplast
 - (b) Chlorophyll absorbs light energy needed for photosynthesis.
 - (c) Plant cells have a rigid cell wall, while animal cells do not have a cell wall.

- 38.
- (a) Water absorption by root hairs; opening and closing of stomata; maintenance of cell turgidity
 - (b) The cells lose water and become plasmolysed.

39. Cooling the body by evaporation of sweat from the skin surface.

- 40.
- (a) Development of breasts
 - (b) Deepening of the voice

41. $v = f\lambda$
 $= 4 \times 0.9$
 $= 3.6 \text{ m/s}$

42. Elastic potential energy $\rightarrow$ Kinetic energy

Sample paper 2

Section A

1. C
2. C
3. C
4. A
5. C
6. D
7. C
8. B
9. A
10. C
11. D
12. D

- 13. C
- 14. A
- 15. C
- 16. B
- 17. B
- 18. B
- 19. B
- 20. C
- 21. C
- 22. D
- 23. D
- 24. C
- 25. B
- 26. D
- 27. D
- 28. A
- 29. D
- 30. B

Section B

31.

- (a) Melting
- (b) Evaporation
- (c) Refrigeration of water; drying wet clothes
- (d) Physical change

32.

- (a) Malleability
- (b) Pure gold is soft and can be easily scratched or deformed.
- (c) Alloys make gold harder and more durable while retaining desirable properties such as shine and resistance to corrosion.

33.

- (a) To distribute heat evenly and prevent direct heating of the evaporating dish.
- (b) Evaporation
- (c) The liquid is lost as vapour and cannot be recovered.
- (d) Salt solution

34.

- (a) E - epidermis; H – sweat duct
- (b) Cooling the body; regulating body temperature through evaporation.

35. Magnification = $\frac{\text{Image size}}{\text{Actual size}}$

$$\begin{aligned} &= 4 \text{ cm} \div 200 \text{ cm} \\ &= \times 0.02 \end{aligned}$$

- 36.
- (a) Naked flame
 - (b) Class B
 - (c) Safely shut off the supply of the flammable liquid if possible. Use a foam, dry powder or carbon (IV) oxide fire extinguisher to cut off the oxygen supply. Keep flammable liquids away from heat and flames to prevent fires. Store flammable liquids in approved, properly labelled containers and keep them in a cool, well-ventilated place.
37. Refer to page 42 Figure 6.
- 38.
- (a) Biotic: Fish, aquatic plants; Abiotic: Water temperature, dissolved oxygen
 - (b) Biotic factors are living components of an ecosystem. Abiotic factors are non-living components of an ecosystem.
 - (c) Increased temperature can reduce dissolved oxygen in the water, which may stress or harm fish and other aquatic organisms.
- 39.
- (a) Electric shock; electrical burns
 - (b) Use proper insulation and protective equipment; keep people away from exposed high-voltage conductors and use warning signs/barriers.

Sample paper 3

Section A

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

- 24. D
- 25. B
- 26. C
- 27. A
- 28. A
- 29. C
- 30. B

Section B

- 31.
- (a) Proton – (+1)
Neutron – (neutral)
Electron – (-1)
 - (b) Atom X: 11 protons, 12 neutrons and 11 electrons, arranged 2, 8, 1.
 - (c) 11
 - (d) 23
 - (e) 2.8.1
- 32.
- (a) Fractional distillation
 - (b) To provide a large surface area for condensation and evaporation, allowing better separation of the liquids.
 - (c) The liquid with the lowest boiling point.
 - (d) Condenser
 - (e) Separation of crude oil into useful fractions
- 33.
- (a) Total magnification = eyepiece lens magnification × objective lens magnification
 - (b) Actual size = $\frac{\text{Image size}}{\text{Magnification}}$

$$= \frac{12 \text{ cm}}{300}$$

$$= 0.04 \text{ cm}$$
 - (c) Plant cells have a cell wall, while animal cells do not.
Plant cells have chloroplasts, while animal cells do not.
Plant cells usually have a large vacuole, while animal cells have no vacuoles.
- 34.
- (a) 11 electrons
 - (b) Sodium
 - (c) Sodium compounds are used in manufacturing soap and detergents.
Sodium chloride is used as table salt/preservative.
Sodium compounds are used in water treatment.
- 35.
- (a) An indicator
 - (b) It changes colour in acidic and alkaline solutions, allowing the two to be distinguished. For example, red cabbage indicator turns reddish/pink in acids and yellow in strong bases.
- 36.
- (a) Pressure = $\frac{\text{Force}}{\text{Area}}$

$$\begin{aligned}\text{Area} \\ &= 600 \div 0.3 \\ &= 2000 \text{ Pa}\end{aligned}$$

(b) Increasing the contact area reduces the pressure exerted on the ground.

37. Using the mirror formula: $1/f = 1/u + 1/v$

$u = 60 \text{ cm}$ and $v = 120 \text{ cm}$

$$1/f = 1/60 + 1/120$$

Therefore, $f = 40 \text{ cm}$.

38.

(a) Copper

(b) Good conductor of electricity; Ductile, so it can be drawn into thin wires.

39.

(a) Light energy; Carbon (IV) oxide; Water; Chlorophyll

(b) Light-dependent stage.

Sample paper 4

Section A

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

29. A

30. B

Section B

31. Do not rush into the laboratory instead walk calmly and quietly.

Follow the instructions given while carrying out experiments in the laboratory.

Do not eat, drink or taste anything in the laboratory.

Always ensure that the laboratory windows are open to allow for air circulation.

Know the location of safety equipment such as the fire extinguisher and how to use them.

Always tie long hair at the back, avoid hanging tie, wear closed shoes and personal protective equipment.

Do not smell a gas directly from a gas jar. Instead, waft it towards your nose with your hand.

When heating liquids, ensure that the mouth of the apparatus you are using is facing away from you and other learners.

Dispose of the laboratory waste appropriately.

In case of an accident, report immediately to the teacher or laboratory technician.

Always ensure that the room is well organised and that the floor and working area are clean and dry.

Always put out flames and ensure all gas taps are closed after use and switch off sockets that are not in use.

32.

(a) Homogeneous mixture: A mixture in which the components are evenly distributed and not easily seen, therefore appears as single phase. Heterogeneous mixture: A mixture in which the components are not evenly distributed and can be easily seen.

(b) Solute: It is a solid substance that dissolves into a liquid solvent. Solvent: It is the liquid which dissolves a solid solute

(c) An element is a pure substance that cannot be broken down into a simpler substance by any chemical means. A compound is a pure substance made up of two or more elements that are chemically combined and can be broken down by simpler means.

33.

(a) A

(b) It has definite shape, chloroplast, and large vacuole.

(c) Total magnification = Eyepiece lens magnification $\times$ Objective lens magnification

(d) $\times 400$ means the image is 400 times larger than the actual object.

34.

(a)

Water sample	Observation	Conclusion
Sample F	Lather formed immediately	Soft water

Sample G	Scum formed and very little lather	Hard water
Sample H	Lather formed quickly	Soft water
Sample J	Thick scum formed	Hard water
Rain water	Lather formed but slowly	Soft water
Well water	No lather, heavy scum formed	Hard water

(b) Observation, measuring, comparison, recording, conclusion

(c) Boiling, using chemicals and distillation

35.

(a) L- 1.5, H- 1.6, W- 0.5

(b)

$$\begin{aligned} \text{i. Average mass} &= \frac{1200 + 1220 + 12100}{3} \\ &= 1210 \text{ g} \end{aligned}$$

$$\begin{aligned} \text{ii. } &\frac{1210}{1000} \\ &= 1.21 \text{ kg} \end{aligned}$$

(c) Weight = Mass $\times$ gravitational pull

$$= 1.21 \times 10 = 12.1$$

$$= 12.1 \text{ N}$$

(d) Area and Pressure

i. Area = Length $\times$ Width

$$1.5 \times 0.5 = 0.75 \text{ cm}^2$$

ii. Pressure = $\frac{\text{Weight}}{\text{Area}}$

$$\begin{aligned} \text{Area} &= \frac{0.75}{10000} \\ &= 0.0075 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} P &= \frac{12.1}{0.0075} \\ &= 1613.3 \text{ N/m}^2 \end{aligned}$$

36.

(a) Sedimentation – the heavier mud particles settle at the bottom due to gravity.

(b) Suspended solid particles (remaining mud).

(c) Distillation.

37.

(a) Diffusion.

(b) Ink particles move from a region of high concentration to a region of low concentration until they are evenly distributed throughout the water.

(c) Faster.

(d) Warm water gives the particles more kinetic energy, so they move faster.

38. The rays reflected are parallel. The rays are directed forward in a straight beam.

Sample paper 5

Section A

1. D
2. A
3. C
4. D
5. C
6. C
7. B
8. A
9. A
10. A
11. A
12. D
13. B
14. A
15. A
16. D
17. B
18. D
19. C
20. B
21. D
22. B
23. D
24. D
25. D
26. D
27. B
28. B
29. A
30. B

Section B

31. The following are characteristics of a physical change.

- The change is reversible.
- No new substance is formed.
- There is no change in mass.
- No heat is gained or lost.

Chemical change has the following characteristics.

- It is irreversible.
- One or more new substances are formed.
- There is a change in mass.
- It is accompanied by heat change.

32.

(a) A- Nucleus, B- Electrons

- (b) Non metal
 - (c) Chlorine
 - (d) 2.8.7
 - (e) Chlorine is unstable because its outermost shell has 7 electrons and needs 1 more electron to achieve a stable arrangement of 2.8.8.
33. To check the ingredients or materials used to make the product. To check the expiry date and ensure the product is safe to use. To check the instructions and safety precautions for proper use. To check the quantity/weight of the product. To identify possible allergens or harmful substances.
- 34.
- (a) Water is not suitable because oil does not dissolve in water. Therefore, water cannot effectively extract the oil from the nuts.
 - (b) Ethanol.
- 35.
- (a) T- Petiole, R- Midrib, V- Apex
 - (b) Petiole: Attaches the leaf blade to the stem and transports water and dissolved mineral salts to the leaf.
Midrib: Supports the leaf blade and contains vascular tissues that transport water and food.
Apex: The tip of the leaf that helps the leaf shed excess water.
36. Produces food for plants. Releases oxygen into the atmosphere for respiration by living organisms. Removes carbon (IV) oxide from the atmosphere, helping to maintain the balance of gases.
- 37.
- (a) A- Oviduct, C- uterus, D- vagina, E- vulva
 - (b) A
- 38.
- (a) Bulb
 - (b) Bulbs arranged in parallel
 - (c) Each bulb has its own path for the flow of electric current. Each bulb receives the full supply voltage. If one bulb goes off or is removed, the other bulbs remain lit. The bulbs can operate independently of one another. Adding more bulbs does not normally make the other bulbs dimmer, assuming an ideal voltage source.
- 39.
- (a) P and R have unlike magnetic poles because they attract. Q and S have unlike magnetic poles because they attract. Also, since Q and R repel, Q and R have like magnetic poles.
 - (b) Used in loudspeakers and headphones. Used in electric motors and generators. Used in fridge doors.
- 40.
- (a) Class E
 - (b) Dry powder and carbon (IV) oxide fire extinguishers.

Sample paper 6
Section A

1. C
2. C
3. C
4. C
5. C
6. D
7. C
8. A
9. D
10. D
11. A
12. A
13. A
14. C
15. D
16. A
17. A
18. A
19. A
20. B
21. C
22. B
23. A
24. A
25. B
26. B
27. A
28. C
29. A
30. C

Section B

31.
 - (a) Observation, recording, manipulation, communication.
 - (b) They observed and identified activities that were polluting the air and soil.
They photographed/recorded the pollution they observed.
They collected waste and cleaned the environment by handling and removing pollutants.
They shared, presented their findings and results clearly using photographs.
32.
 - (a) Solid, liquid, gas
 - (b) In the liquid state, particles are closely packed but irregularly arranged, with small spaces between them.
 - (c) Solid particles: Are closely packed together. Vibrate about fixed positions.
Gas particles: Are far apart. Move freely and randomly at high speed.
- 33.

- (a) Plastic ruler, Sisal thread
- (b) Conductors are materials that allow electric current to pass through them. Non-conductors are materials that do not allow electric current to pass through them.
- (c) Do not touch electrical appliances or wires with wet hands. Do not insert objects into electrical sockets. Switch off the power supply before repairing or handling electrical appliances.

34.

- (a) A – Palisade mesophyll, B - xylem, C - phloem, D- spongy mesophyll
- (b) The xylem transports water to the leaves for photosynthesis while the phloem transports manufactured food from the leaves to the other parts of the plant.

35.

- (a) A - Testis, B- scrotum, C – prostate gland, D- penis
- (b) B

36. Growth in height and body size. Growth of pubic and underarm hair. Development of reproductive organs. Boys develop broader shoulders and deeper voices. Girls develop wider hips and breasts.

37. Speed, $v = 320 \text{ m/s}$
 Wavelength, $f = v/\lambda$
 $320/0.60$
 $= 533.3 \text{ Hz}$

Sample paper 7

Section A

- 1. D
- 2. C
- 3. C
- 4. C
- 5. C
- 6. A
- 7. C
- 8. A
- 9. D
- 10. D
- 11. C
- 12. C
- 13. C
- 14. C
- 15. C
- 16. A
- 17. B
- 18. C
- 19. C
- 20. C
- 21. A

- 22. B
- 23. C
- 24. C
- 25. B
- 26. B
- 27. B
- 28. B
- 29. A
- 30. C

Section B

31. Have a bitter taste. Turn red litmus paper blue. Have a pH of above 7. Solutions of bases in water conduct electricity. They have slippery feel when touched.

32.

- (a) Colour – Most metals have a shiny grey appearance when polished. Copper is red-brown in colour. Sodium has a bright shiny appearance when freshly cut but quickly tarnishes (turn dull), this is because it reacts with oxygen in the air to form a coating of sodium oxide.

State of metals – Most metals exist as solids at room temperature. Mercury is the only metal that exists in liquid state at room temperature and no metal exist in gaseous state at room temperature.

Ductility – Is the ability of a metal to be stretched and drawn into wires without breaking. This property of metals is applied when making copper and aluminium wires. Gold is also a ductile metal, that is why it is used in making rings and necklaces.

Malleability – is the ability of a material to be hammered or pressed into different shapes without breaking or cracking. Gold, iron, aluminium, copper, silver and lead are examples of malleable metals.

Thermal and electrical conductivity – Metals are good conductors of both heat and electricity.

- (b) Aluminium – used to make cooking pots and pans.

Copper – used to make electrical wires.

Gold – used to make jewellery.

Silver – used to make jewellery and medals.

Magnesium – used in making lightweight alloys and in some applications such as flares and fireworks.

33.

- (a) A- Starch grain; E- stroma

- (b) (i)C (ii)E

34.

- (a) Melting phase and vaporisation phase respectively.

- (b) Impurities lower the melting point of substances. For example, mixing salt with ice decreases the melting point of ice. On the other hand, impurities increase the boiling point of a substance.

35. 2.8.1

- 36.
- (a) The leaf was boiled to kill the living cells hence prevent any chemical processes that can interfere with the results from taking place. It also breaks the starch grains thus exposing the starch to iodine solution.
 - (b) When starch is present in a leaf, a blue-black colour is observed when iodine solution is added.
37. Irregular period, irregular bleeding, cramps, headache, missing periods
- 38.
- (a) A - Stigma, B- style, C - embryo sac, D - male gametes in pollen tube
 - (b) One male gamete fuses with the egg cell to form a zygote. The zygote develops into the embryo. The other male gamete fuses with the two polar nuclei to form the primary endosperm nucleus
Embryo sac degenerates/its contents are used during seed development.
- 39.
- (a) A- Bulbs arranged in series; B- Bulbs arranged in parallel
 - (b) Each bulb receives the full supply voltage, so it can operate at its intended brightness. If one bulb goes off or is removed, the others remain lit. Each bulb can be switched on or off independently. Adding or removing one bulb does not normally affect the operation of the others.
- 40.
- (a) Mechanical energy → Electrical energy.
 - (b) Chemical energy → Electrical energy → Light energy + Sound energy.
- 41.
- (a) Pressure is a force that acts perpendicularly per unit area.
 - (b) Pressure, $P = \frac{\text{Force, } F}{\text{Area, } A}$
- 42.
- (a) They require a medium to travel through. They are longitudinal waves.
 - (b) Frequency.

Sample paper 8

Section A

1. C
2. B
3. D
4. D
5. B
6. B
7. C
8. C
9. C
10. C
11. C
12. C
13. B
14. B

15. C
16. B
17. B
18. B
19. B
20. C
21. B
22. C
23. C
24. B
25. B
26. B
27. D
28. B
29. B
30. B

Section B

31. Manipulative skill - This is the ability to handle and control science apparatus, materials, substances and specimens carefully and correctly. It also involves the proper cleaning and storage of laboratory equipment.

Observation - This is the skill of studying an object carefully and paying attention to its properties, such as colour, smell, taste, sound, texture, volume, weight and shape. We make observations using our five senses: sight, smell, taste, hearing and touch.

Measuring skill - This involves the use of standard or non-standard instruments to quantify physical properties such as temperature, length, mass, time, electric current, area, volume and density. The measurements are presented using relevant units of measurements.

Classification - This involves putting objects or organisms into groups or categories based on their similarities or differences.

Prediction skill - This is the ability to suggest a possible outcome of an investigation based on prior knowledge and available information acquired through observations.

Communication - This is the ability to share, present and report scientific findings and results clearly using report writing, tables, charts or diagrams.

Making conclusion - This is the final decision or judgement that is made after making an observation and linking it with what is already known.

32.

(a) Measures approximate volumes of liquids.

(b) Place the measuring cylinder on a flat, level surface and pour the liquid into it.

Keep your eye level at the bottom of the meniscus and read the volume at the 50 cm³ mark

33.

Substance	pH value	Classification
hydrochloric acid	1	Strongly acidic
Milk	6.5	Weakly acidic

pure water	7	Neutral
sodium bicarbonate	8.3	Weakly basic
bleach	13	Strongly basic

34.

- (a) Because it contained impurities.
- (b) Cooking: Adding salt to water slightly raises its boiling point, although the effect is small. Distillation: The difference in boiling points can be used to separate liquids from dissolved substances or from other liquids.
- (c) Refer to page 25 Figure 6

35.

(a)

Substance	Blood entering kidney (renal artery)	Blood leaving kidney (renal vein)
Urea	high	Low
oxygen	high	Low
glucose	high	low (reabsorbed)

- (b) Sweat evaporates from the surface of the skin, taking heat energy from the body. This removes heat and cools the body, helping maintain a normal body temperature.

36.

- (a) Grass
- (b) Frog.
- (c) The lion population would decrease. There would be less food/prey available for the lions. This would lead to increased competition, starvation or migration of lions to areas with more prey.

37. It converts atmospheric nitrogen into usable nitrogen compounds, such as nitrates, that plants can absorb. It replenishes nitrogen in the soil, which is needed for making proteins and other substances required for plant growth.

38.

- (a) Draw image of series bulb arrangement.
- (b) The other bulb would go off because the bulbs are connected in series. If one bulb breaks, the circuit becomes open, so current can no longer flow through the circuit.

39.

- (a) Frequency (f) – This is the number of complete oscillations made by a wave in one second. It is measured in hertz (Hz). A wave with a high frequency has more oscillations per second than a wave with a low frequency. Wavelength (λ) – The

- distance between any two successive particles which are at the same point in their paths and are moving in the same direction. It is measured in metres (m).
- (b) Sound waves require a medium such as air, water or a solid to travel, whereas light waves can travel through a vacuum. Sound waves are mechanical waves, whereas light waves are electromagnetic waves.

Sample paper 9

Section A

1. C
2. C
3. A
4. C
5. C
6. A
7. C
8. A
9. C
10. C
11. B
12. C
13. B
14. D
15. D
16. C
17. D
18. C
19. B
20. B
21. D
22. C
23. B
24. B
25. B
26. C
27. B
28. B
29. C
30. C

Section B

31. The food is churned and mixed with gastric juice. Proteins are digested by pepsin into smaller soluble substances.

32. Chemical change - a new substance, sodium chloride, is formed.

33.

- (a) Copper (II) sulphide
- (b) A black solid is formed.
- (c) Chemical change - a new substance with different properties is formed.

34.

- (a) Borehole and ocean water - formed white scum and no lather with soap.
- (b) Boiling the water.
- (c) Advantage: Provides calcium and magnesium ions that are beneficial for bones and teeth. Disadvantage: Forms scale in pipes and appliances such as kettles & discolours clothes.

35.

- (a) A – upper epidermis, B – spongy mesophyll cells, C – palisade mesophyll cells, D – lower epidermis, E – Guard cells, F – Stoma
- (b) Allows carbon (IV) oxide to enter the leaf for photosynthesis. Allows oxygen to leave the leaf.
- (c) The spongy mesophyll cells are loosely arranged and have intercellular air spaces between them. This provides enough space for storage of air. It also enhances the diffusion of carbon (IV) oxide into the cells and oxygen out of the cells to the atmosphere.

36.

Feature	Sexual reproduction	Asexual reproduction
Number of parents	Two	One
Genetic variation	Produces genetic variation	Produces genetically identical offspring.

37. Interdependence of organisms is the dependence of organisms on one another for resources or survival. Example: Lions depend on zebras for food.

38.

- (a) Reducing sugar
- (b) Provides energy for body activities.

39. Nutrient recycling returns essential nutrients to the environment so they can be reused by organisms. Example: Nitrogen cycle.

40.

- (a) $\text{Pressure} = \text{density} \times \text{gravitational field strength} \times \text{depth}$
 $1000 \times 10 \times 3$
 $= 30\,000 \text{ Pa}$
- (b) A siphon transfers liquid from a higher container to a lower one by using gravity and pressure differences. A syringe uses a piston inside a barrel to move liquids. Drinking

straw – When you suck on a straw, you create lower pressure inside it compared to the higher atmospheric pressure outside. Bicycle pump. Hydraulic braking system of a car

41.

Position of object	Nature of image	Use of this property
At infinity	Highly diminished, inverted, real	Car headlights
Between focal point and mirror	Magnified, upright, virtual	Shaving or makeup mirror

42. Transverse waves – In transverse waves, the particles vibrate perpendicular to the direction in which the wave is travelling. Longitudinal waves – In longitudinal waves, the particles vibrate parallel to the direction in which the wave is travelling.

Sample paper 10

Section A

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

- 24. B
- 25. B
- 26. C
- 27. B
- 28. D
- 29. B
- 30. A

Section B

- 31.
 - (a) Natural acid-base indicator
 - (b) Cut the red cabbage leaves into small pieces using the knife.
Place the pieces in a mortar and crush them using the pestle.
Add a small amount of ethanol and continue grinding to extract the coloured substances.
Pour the mixture into a beaker and filter it to obtain the red cabbage indicator solution.
- 32.
 - (a) Revolving nosepiece
 - (b) Holds the objective lenses in position and allows the user to switch from one objective lens to another.
 - (c) Clean the lenses with lens paper after use and keep the microscope covered when not in use.
- 33.
 - (a) Osmosis
 - (b) Water moved from the beaker into tubing A through the partially permeable membrane because the solution outside had a higher water concentration than the 2% sugar solution inside. The tubing therefore swelled.
 - (c) There was no net movement of water because the sugar concentration was the same inside and outside (5%). The solutions were isotonic.
 - (d) Water moved from the beaker into tubing C? No — because the 10% sugar solution inside had a lower water concentration than the 5% solution outside, water moved into the tubing. Wait, that would make it larger, not smaller.
- 34.
 - (a) Diastema
 - (b) It provides space for the tongue to move and manipulate food during feeding.
- 35. The covered part remains yellow-brown, showing that no starch was formed.
- 36.
 - (a) They repel.
 - (b) The magnetic field lines will curve away from the region between the north poles. They will move from N to S outside each magnet.

$$\begin{aligned}
 37. \text{ Pressure} &= \frac{\text{Weight}}{\text{Area}} \\
 &= \frac{200}{0.5} \\
 &= 400 \text{ Pa}
 \end{aligned}$$

38.

$$\begin{aligned}
 1/f &= 1/u + 1/v \\
 1/f &= 1/150 + 1/300 \\
 &= 3/300 \\
 &= 100 \text{ cm} / 1 \text{ m}
 \end{aligned}$$

39.

- (a) A - mouth, B - oesophagus, C - stomach, D - pancreas, E – ileum/small intestine
- (b) Stomach: Produces hydrochloric acid – kills harmful microorganisms and provides an acidic pH for pepsin to work. Ileum: Produces intestinal juice – contains enzymes that complete the digestion of carbohydrates and proteins into soluble end products that can be absorbed.

40.

- (a) Plant cells have a cell wall, while animal cells do not.
- (b) Total magnification = Eyepiece lens magnification × Objective lens magnification
- (c) Some organelles are too small to be resolved clearly by a light microscope.

Sample paper II

Section A

1. A
2. B
3. C
4. B
5. C
6. D
7. A
8. B
9. B
10. B
11. B
12. D
13. A
14. C
15. A
16. D
17. A
18. C
19. A
20. B

- 21. C
- 22. B
- 23. D
- 24. C
- 25. C
- 26. C
- 27. B
- 28. A
- 29. A
- 30. D

Section B

- 31.
 - (a) Thermometer
 - (b) Stopwatch
 - (c) Wear safety gear; use a test-tube holder or tong when handling hot apparatus.
- 32.
 - (a) Corrosive
 - (b) Concentration (0.1 mol/dm^3); hazard (corrosive).
 - (c) To prevent spills, evaporation or contamination.
 - (d) To prevent the chemical from being mistaken for another substance and to ensure its hazards are known.
- 33.
 - (a) Magnetism
 - (b) Pass a magnet over the mixture to attract and remove the iron filings. Repeat until all the iron filings have been removed.
 - (c) Sodium chloride dissolves in water while sand does not. The sand can therefore be separated from the sodium chloride solution by filtration.
 - (d) Crystallisation
- 34.
 - (a) Distilled water
 - (b) Soap solution
 - (c) It is strongly acidic (pH 3).
 - (d) An alkaline substance, such as lime.
 - (e) It helps determine whether a substance is acidic, neutral or alkaline and helps users choose appropriate and safe substances for different purposes.
- 35.
 - (a) Evaporation
 - (b) Sweat evaporates from the skin and takes heat energy from the body, reducing body temperature.
 - (c) Protection from injury/pathogens; excretion of excess salts.
- 36.

- (a) Wind energy
 - (b) Wind is intermittent and may not always be available.
 - (c) It can generate electricity when needed, provided fuel is available.
37. Convex mirror.
- 38.
- (a) Cover the fire with a fire blanket or use a suitable wet chemical fire extinguisher.
 - (b) Water sinks below the hot oil and rapidly turns to steam. The expanding steam can cause the burning oil to splash and spread the fire.
- 39.
- (a) Grass.
 - (b) The frog population would decrease because grasshoppers are a major food source for frogs.
40. Blackjack – Animals
Dandelion – Wind
Coconut – Water
Tomato – Animals
Guava – Animals

Sample paper 12

Section A

- 1. B
- 2. C
- 3. B
- 4. C
- 5. D
- 6. A
- 7. B
- 8. A
- 9. C
- 10. B
- 11. C
- 12. C
- 13. B
- 14. A
- 15. B
- 16. C
- 17. A
- 18. B
- 19. C
- 20. C
- 21. A

- 22. B
- 23. A
- 24. C
- 25. B
- 26. C
- 27. C
- 28. D
- 29. A
- 30. B

Section B

- 31.
 - (a) Good conductors of heat; malleable/ductile.
 - (b) Alloying improves the strength of aluminium.
 - (c) Scale forms when dissolved calcium and magnesium salts in hard water form insoluble deposits inside the pipes.
- 32.
 - (a) Algae → mosquito larvae → small fish → large fish
Or
Algae → mosquito larvae → frogs
 - (b) Organisms in a food web depend on one another for food. Removing one organism changes food availability and population sizes of other organisms.
- 33.
 - (a) The image is upright, virtual and magnified.
 - (b) The image becomes inverted and smaller (diminished) when the face is far from the mirror.
- 34.
 - (a) Waves are generated by a disturbance in a medium.
 - (b) Energy.
 - (c) The waves spread outwards and their amplitude decreases, so they become weaker.
- 35. Chemical energy → kinetic energy → electrical energy → light energy
- 36.
 - (a) Homogeneous.
 - (b) Fractional distillation.
 - (c) Ethanol and water have different boiling points. When heated, ethanol boils at a lower temperature and can be separated from the water.
- 37.
 - (a) Bring the same poles of the two bar magnets close together and observe whether they repel. Repeat with unlike poles and observe attraction.
 - (b) Place the magnets on the rollers so they can move freely and observe the direction of movement when like and unlike poles are brought together.
 - (c) Use a smooth surface to reduce friction, allowing the rollers and magnets to move freely and making attraction or repulsion easier to observe.

38.

Form of energy	Natural sources
Heat	Sun, centre of the Earth
Light	Sun, stars
Magnetic	Earth
Potential	Still water in a dam
chemical	Food, biomass fuel, fossil fuel

39.

- (a) It is colourless and odourless.
- (b) Heat the liquid and measure its boiling point using a thermometer. Pure water should boil at about 100°C at standard atmospheric pressure. A constant boiling point at about 100°C would indicate that it is pure water.