

CBSE CLASS X
Science (086)**ANSWER KEY***AI-generated question paper***Code: I3941T****Questions: 19****Maximum Marks: 38****Generated: 2026-06-25 17:25****SELECTIONS USED**

Subject	Science
Lessons	5 Life Processes
Level of understanding	Initial understanding
Question selection	Curated chapter coverage (~3 questions per section)
Model	claude-sonnet-4-6

Composition — Difficulty: 9 straightforward · 9 medium · 1 deep | Types: 9 Short · 8 Very short · 1 Long · 1 MCQ

Q1. medium initial-understanding § Introduction**[3]**

Even when an organism appears to be completely still, certain processes must keep going on inside its body. Name any two such processes and state why they cannot be stopped as long as the organism is alive.

◆ **Life Processes**

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Model Answer

Two processes that must continue as long as an organism is alive:

1. **Nutrition** – It is the process of taking in food (energy source) from outside the body. It cannot be stopped because the body constantly needs energy to repair and maintain its living structures. Without nutrition, cells would have no raw material or energy source.
1. **Respiration** – It is the process of breaking down food molecules using oxygen to release energy. It cannot be stopped because this energy is required continuously to carry out all molecular movements that maintain the ordered, living structure of the organism. If respiration stops, cells break down and the organism dies.

Source: Life Processes, Section 5.1

Explanation

- The question tests whether you understand **why** life processes are non-stop, not just what they are.
- The key idea from the passage: living structures constantly break down due to the environment, so energy is always needed to repair and maintain them — that's why nutrition and respiration can never pause.
- Other valid answers include **excretion** (waste removal is continuous) or **transportation**, but nutrition and respiration are the most directly supported by the passage.
- For 3 marks: name two processes (1 mark each) + reason why they can't stop (1 mark for the explanation). Keep it concise.

Q2. straightforward initial-understanding § 5.1 WHAT ARE LIFE PROCESSES?

[2]

Why do living organisms need a continuous supply of energy even when they are not performing any visible activity such as moving or growing?

◆ Life Processes

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Model Answer

Even when not visibly active (like sleeping), living organisms must continuously maintain their internal ordered structures. The environment constantly tends to break down these organised structures, so molecular movements are needed to repair and maintain them. This requires energy, which the organism must obtain from food through life processes like nutrition and respiration.

Source: Chapter 5, Section 5.1 – What are Life Processes?

Explanation

The examiner expects two key points:

1. **Why energy is needed** – maintenance of ordered internal structures (preventing breakdown/damage), not just visible activity.
2. **Source of energy** – obtained from food (outside the body).

Avoid saying only "for growth and movement" – the question specifically asks about when the organism is *not* visibly active. The concept of **molecular movement for maintenance** is the scoring idea here.

Q3. medium initial-understanding § 5.2 NUTRITION

[3]

Bile juice does not contain any digestive enzymes, yet it plays a crucial role in the digestion of fats. Explain how.

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Model Answer

Bile juice is secreted by the liver and acts on fats in the small intestine. Fats are present in the intestine as large globules, making it difficult for enzymes to act on them. Bile salts break these large globules into smaller globules – a process called **emulsification**. This increases the surface area available for the pancreatic enzyme **lipase** to act efficiently, thereby aiding in the complete digestion of fats into fatty acids and glycerol.

Source: Life Processes, Section 5.2.4

Explanation

The key concept here is **emulsification**, not direct enzymatic action. Examiners expect students to:

1. State that bile is secreted by the liver.
2. Explain that fats exist as **large globules** in the intestine.
3. Use the term **emulsification** – bile salts break large fat globules into smaller ones.
4. Link it to increased surface area for **lipase** to act.

Do not say bile "digests" fats – it only prepares them for enzymatic digestion. This distinction is important for full marks.

Q4. straightforward initial-understanding § 5.2.1 Autotrophic Nutrition

[1]

Name the raw materials required for photosynthesis and the main product stored by the plant as an energy reserve.

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Model Answer

Raw materials for photosynthesis: **carbon dioxide, water, sunlight, and chlorophyll**. The main product stored as an energy reserve is **starch**.

Source: Chapter 5, Section 5.2.1 Autotrophic Nutrition

Explanation

The passage states that CO₂ and water are converted into carbohydrates in the presence of sunlight and chlorophyll. Unused carbohydrates are stored as **starch** — the examiner expects this specific term, not just "carbohydrates." Sunlight and chlorophyll are enabling factors often also listed as raw materials in CBSE answers for this question.

Q5. straightforward initial-understanding § 5.2.3 How do Organisms obtain their Nutrition?

[1]

Fungi such as bread moulds and mushrooms cannot take in solid food the way animals do. How do they obtain nutrition from the food source around them?

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Model Answer

Fungi secrete digestive enzymes onto the food source, break it down outside their body into simpler substances, and then absorb these nutrients. This is called **saprotrophic** (extracellular) nutrition.

Source: Chapter 5, Section 5.2.2 – Heterotrophic Nutrition

Explanation

The key phrase from the textbook is: "*Some organisms break down the food material outside the body and then absorb it*" — fungi are the given example. Examiners expect the two steps: **external digestion** (secreting enzymes outside) and **absorption**. Mentioning the term "saprotrophic" can fetch full credit. Avoid writing about internal digestion — that applies to animals, not fungi.

Q6. medium initial-understanding § 5.2.4 Nutrition in Human Beings

[3]

What is the role of bile juice in the digestion of fats in the small intestine?

◆ Life Processes

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Model Answer

Bile juice is secreted by the liver and released into the small intestine. It performs two important roles in fat digestion:

1. **Neutralisation:** The food arriving from the stomach is acidic. Bile makes it alkaline so that pancreatic enzymes can function properly.
1. **Emulsification:** Fats exist in the intestine as large globules, making enzyme action difficult. Bile salts break these large globules into smaller ones (emulsification), increasing the surface area and improving the efficiency of the enzyme **lipase** (from pancreatic juice), which then digests the emulsified fats into fatty acids and glycerol.

Source: *Life Processes, Section 5.2.4 – Nutrition in Human Beings*

Explanation

Examiners look for **two distinct functions** of bile: neutralisation of acidic chyme AND emulsification of fats. Many students mention only emulsification and lose a mark. Use the word "**emulsification**" and compare it to the action of soap on dirt (as the textbook does) if you want to impress, but it is not compulsory. Always name lipase as the enzyme that acts *after* bile prepares the fats.

Q7. straightforward initial-understanding § 5.2.4 Nutrition in Human Beings

[1]

Why does the small intestine of a herbivore tend to be longer than that of a carnivore?

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Model Answer

Herbivores eat grass which contains cellulose that is difficult to digest, so a longer small intestine is needed. Meat is easier to digest, so carnivores require a shorter small intestine.

Source: Chapter 5, Section 5.2.4

Explanation

The textbook directly states this fact. The key reason is **cellulose digestion** — mention it explicitly. Examiners look for the contrast: herbivore (cellulose, harder to digest → longer) vs. carnivore (meat, easier to digest → shorter). One line is sufficient for 1 mark.

Q8. deep initial-understanding § 5.2.4 Nutrition in Human Beings

[5]

Describe how a protein in food is digested as it passes through the human alimentary canal. Name the organs and enzymes involved at each stage, and explain how the products of protein digestion are absorbed into the bloodstream.

◆ Life Processes

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Model Answer

Mouth: Food is chewed and mixed with saliva. Salivary amylase acts on starch; proteins are not digested here.

Stomach: Gastric glands secrete hydrochloric acid (creates acidic medium) and the enzyme **pepsin**. Pepsin partially digests proteins into peptides. Mucus protects the stomach lining.

Small intestine: The pancreas secretes **trypsin**, which further digests proteins/peptides. The intestinal glands secrete intestinal juice whose enzymes finally break down proteins completely into **amino acids**.

Absorption: The inner lining of the small intestine has numerous finger-like projections called **villi**, which greatly increase the surface area for absorption. Villi are richly supplied with blood vessels; amino acids are absorbed directly into the blood capillaries and transported to all cells of the body.

Source: Life Processes, Section 5.2.4

Explanation

- Examiners expect a **stage-by-stage** account: mouth → stomach → small intestine → absorption.
- Name both **organ** and **enzyme** at each stage — pepsin (stomach), trypsin (pancreas/small intestine), intestinal enzymes → amino acids.
- HCl's role (activating pepsin / providing acidic medium) is a common 1-mark point — include it.
- For absorption, mention **villi**, **blood vessels**, and the end-product (**amino acids**) — all three are typically needed for full marks.
- Do not confuse trypsin (pancreatic) with pepsin (gastric); examiners penalise mixing these up.

Q9. straightforward initial-understanding § 5.3 RESPIRATION

[1]

Where in the cell does the first step of glucose breakdown occur, and what molecule is produced at the end of this step?

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Model Answer

The first step of glucose breakdown (glycolysis) occurs in the **cytoplasm** of the cell, and the molecule produced at the end of this step is **pyruvate** (pyruvic acid).

Explanation

Examiners expect two pieces of information here: the **location** (cytoplasm) and the **end product** (pyruvate/pyruvic acid). Both are needed for the 1 mark. Glycolysis is the term for this process, but naming it is not strictly required for a 1-mark answer. Note that the source passages reference glucose breakdown and ATP production, consistent with this answer.

Q10. medium initial-understanding § 5.3 RESPIRATION

[3]

Distinguish between aerobic and anaerobic respiration in terms of: (i) where each occurs in the cell, (ii) the end products formed from pyruvate, and (iii) the relative amount of energy released.

◆ Life Processes

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Model Answer

| Feature | Aerobic Respiration | Anaerobic Respiration |

| ---|---|---|

| (i) Location in cell | Pyruvate breakdown occurs in the **mitochondria** | Pyruvate breakdown occurs in the **cytoplasm** |

| (ii) End products from pyruvate | CO₂ and water | Ethanol + CO₂ (in yeast); Lactic acid (in muscle cells) |

| (iii) Energy released | **Much greater** amount of energy released | **Much lesser** amount of energy released |

Source: Life Processes, Section 5.3 Respiration

Explanation

- Examiners look for all **three** points clearly distinguished for both types — missing any one costs a mark.
- A table format is ideal here; it shows the contrast clearly and saves words.
- Key detail: **two** anaerobic pathways exist — yeast (ethanol + CO₂) and muscle cells (lactic acid). Mentioning both strengthens the answer but either alone is acceptable.
- The location point is a favourite MCQ and short-answer target: cytoplasm = first step (common to both); mitochondria = aerobic continuation; cytoplasm = anaerobic continuation.

Q11. straightforward initial-understanding § 5.3 RESPIRATION

[1]

During intense physical exercise, muscle cells may temporarily switch from aerobic to anaerobic respiration. What substance accumulates in the muscles as a result, and what sensation does this cause?

◆ Life Processes

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Model Answer

Lactic acid accumulates in muscle cells during anaerobic respiration. Its build-up causes **muscle cramps**.

Source: Life Processes, Section 5.3 Respiration

Explanation

The textbook explicitly states: *"the pyruvate is converted into lactic acid... This build-up of lactic acid in our muscles during sudden activity causes cramps."* For 1 mark, simply name the substance (lactic acid) and the sensation (cramps). No further detail is needed.

Q12. medium initial-understanding § 5.3 RESPIRATION

[1]

Aquatic organisms breathe much faster than terrestrial organisms of comparable size. What is the biological reason for this difference?

◆ Life Processes

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Model Answer

The amount of oxygen dissolved in water is much lower than in air, so aquatic organisms must breathe faster to get sufficient oxygen for their body processes.

Explanation

The examiner expects one specific biological reason: low dissolved oxygen content in water forces aquatic organisms to process more water rapidly. This is directly linked to the concept of respiration and oxygen availability covered in Chapter 6 (Life Processes). Keep the answer to one crisp line for 1 mark.

Q13. straightforward initial-understanding § 5.4 TRANSPORTATION

[1]

What is the role of haemoglobin in the transport of oxygen in human beings?

◆ Life Processes

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Model Answer

Haemoglobin, present in red blood corpuscles, binds with oxygen in the lungs and carries it to all body cells/tissues for cellular respiration.

Source: Life Processes, Section 5.4.1

Explanation

The examiner looks for two key points: (1) haemoglobin is found in RBCs, and (2) its function is to carry/transport oxygen to body cells. The passage states "Oxygen is carried by the red blood corpuscles" — mentioning haemoglobin's binding property with oxygen earns full credit. Do not confuse with plasma, which transports CO₂ and food.

Q14. medium initial-understanding § 5.4 TRANSPORTATION

[2]

Why do arteries have thick, elastic walls while veins do not?

◆ Life Processes

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Model Answer

Arteries carry blood **away from the heart** under **high pressure** (generated by ventricular contraction). Therefore, they need **thick, elastic walls** to withstand and accommodate this pressure without bursting.

Veins carry blood **back to the heart** and the blood is **no longer under high pressure**. Hence, thick walls are not needed. Instead, veins have **valves** to ensure blood flows only in one direction.

Source: Chapter 5, Section 5.4.1 – The tubes – blood vessels

Explanation

- Examiners expect **two contrasting points**: one for arteries (high pressure → thick elastic walls) and one for veins (low pressure → no thick walls, but valves present).
- Mentioning **valves in veins** is a bonus point that shows thorough understanding.
- Keep the cause-effect link clear: *because* the blood is under high/low pressure, *therefore* the wall structure is as it is.

Q15. medium initial-understanding § 5.4 TRANSPORTATION

[3]

Name the chambers of the heart that oxygenated blood passes through after returning from the lungs, before it is pumped to the rest of the body.

◆ Life Processes

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Model Answer

After returning from the lungs, oxygenated blood passes through the following chambers of the heart:

1. **Left Atrium** – Oxygen-rich blood from the lungs first enters the left atrium (the thin-walled upper chamber on the left). The left atrium relaxes while collecting this blood.
1. **Left Ventricle** – As the left atrium contracts, blood is transferred to the left ventricle (the lower chamber). Being muscular, the left ventricle then contracts and pumps the oxygenated blood out to the rest of the body.

Thus, oxygenated blood passes through **two chambers** – the left atrium and the left ventricle – before being distributed to the body.

Source: Chapter 5, Section 5.4.1 – Transportation in Human Beings

Explanation

- Examiners expect you to name **both chambers in order**: left atrium → left ventricle.
- Mentioning the action (relaxes/contracts) for each chamber adds accuracy and earns full marks.
- A common mistake is naming the right-side chambers – remember, the **right side** deals with **deoxygenated** blood going **to** the lungs; the **left side** brings oxygenated blood **back from** the lungs and sends it **to the body**.
- For 3 marks, expect 1 mark for each chamber named and 1 mark for the correct sequence/explanation of flow.

Q16. straightforward initial-understanding § 5.4 TRANSPORTATION

[1]

Which of the following correctly describes the function of lymph?

- ((A)) It carries oxygen from the lungs to body tissues.
- ((B)) It returns excess tissue fluid and large proteins back to the bloodstream.
- ((C)) It transports digested sugars from the intestine to the liver via the heart.
- ((D)) It pumps blood through the capillaries under high pressure.

A It carries oxygen from the lungs directly to body tissues.

B It carries digested fats from the intestine and drains excess fluid from intercellular spaces back into the blood.

C It pumps blood under high pressure to all organs of the body.

D It produces platelets that help in clotting of blood.

◆ Life Processes

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Model Answer

Answer: B

Lymph carries digested and absorbed fat from the intestine and drains excess fluid from extracellular spaces back into the blood.

Source: Life Processes, Section 5.4.1 (Lymph)

Explanation

The textbook explicitly states: "*Lymph carries digested and absorbed fat from intestine and drains excess fluid from extra cellular space back into the blood.*" Options A, C, and D describe functions of blood/heart, not lymph. Examiner expects both functions of lymph to justify the choice.

Q17. medium initial-understanding § 5.4 TRANSPORTATION

[3]

How does water move from the soil into the root xylem, and what force drives its upward movement through the plant during the day?

◆ Life Processes

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Model Answer

Water moves from soil into root xylem by **osmosis**. The soil water has a higher water concentration than root hair cells, so water enters by osmosis. As water moves inward cell by cell, it eventually reaches the xylem.

During the day, **transpiration** from leaves creates a suction pull (transpiration pull). As water evaporates from leaf cells into air spaces and exits through stomata, it creates a tension that pulls water upward through the continuous water column in xylem vessels from roots to leaves.

Source: Chapter 6, Life Processes (Transport in Plants)

Explanation

- The question has two parts: **how water enters xylem** (osmosis) and **what drives upward movement** (transpiration pull). Award approximately 1–1.5 marks each, with terminology worth a mark.
- Key terms examiners look for: **osmosis, root hair cells, transpiration pull / suction force, xylem, stomata**.
- Note: these passages provided don't directly cover transport in plants — this topic belongs to the *Life Processes* chapter. Answer is based on standard CBSE Class 10 syllabus content for that chapter. Don't panic if source passages seem off-topic; answer from your subject knowledge as directed.

Q18. straightforward initial-understanding § 5.5 EXCRETION

[1]

What is the basic filtration unit of the kidney? Name the tiny cup-shaped structure in which its capillary network is enclosed.

◆ Life Processes

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Model Answer

The basic filtration unit of the kidney is the **nephron**. The tiny cup-shaped structure enclosing its capillary cluster is the **Bowman's capsule**.

Source: Life Processes, Section 5.5.1

Explanation

The question has two parts in one line — name the filtration unit (nephron) and name the cup-shaped structure (Bowman's capsule). Both must be mentioned for full credit. The examiner expects exact terminology; avoid vague descriptions.

Q19. medium initial-understanding § 5.5 EXCRETION

[2]

Plants do not have kidneys, yet they are able to remove waste products from their bodies. Describe any two strategies plants use to get rid of excretory wastes.

◆ Life Processes

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Model Answer

Plants use the following strategies to excrete waste products:

1. **Storage in vacuoles and leaves:** Waste products are stored in cellular vacuoles or in leaves. When leaves fall off, these wastes are removed from the plant body.
2. **Storage as resins and gums:** Waste products are stored as resins and gums, especially in old xylem. Plants also excrete some waste substances into the surrounding soil.

Source: *Life Processes, Section 5.5.2 – Excretion in Plants*

Explanation

- The question asks for **any two** strategies — pick two distinct ones and name them clearly.
- Examiners expect the key terms: **vacuoles, falling leaves, resins and gums/old xylem, and soil excretion** — use at least two of these.
- Transpiration (removing excess water) is also valid as a third point, but stick to two as asked.
- Avoid vague answers like "plants store waste" without stating *where* or *how*.

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