Step-by-Step Solutions & Marking Scheme

CBSE Class 8 Science (Curiosity) — Chapter 2: The Invisible Living World: Beyond Our Naked Eye

Quick answer key — Section A: 1-(b) 2-(b) 3-(b) 4-(c) 5-(b) 6-(b) 7-(A) 8-(C)

SECTION A — Multiple Choice Questions

1. Father of Microbiology → **(b) Antonie van Leeuwenhoek**

Step 1: Robert Hooke (1665) saw cork under a microscope and named the small spaces "cells", but he did not describe living microbes.

Step 2: Leeuwenhoek made better lenses in the 1660s and was the first to clearly see bacteria and blood cells. Hence (b).

Marking: 1 mark for the correct option.

2. Fig. 1 → **(b) Q – regulates all the activities and the growth of the cell**

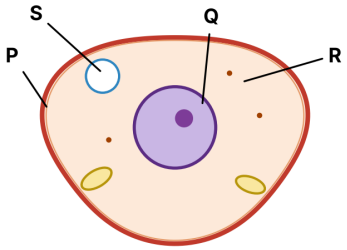


Fig. 1

Step 1: Identify the parts: P = cell membrane (outer boundary), Q = nucleus (round, central), R = cytoplasm, S = small vacuole.

Step 2: The nucleus regulates all activities and growth → (b).

Step 3: Why others are wrong: (a) the cell membrane encloses the contents and controls entry/exit; (c) rigidity comes from the cell wall, which is absent in this animal cell; (d) photosynthesis needs chloroplasts, which are absent.

Marking: 1 mark for the correct option.

3. Fig. 2 → **(b) Yeast was added to bowl P; the carbon dioxide bubbles it released made the dough rise.**

Step 1: Bowl P has risen above the dashed line and shows bubbles; bowl Q is unchanged. So yeast is in P.

Step 2: Yeast respires and breaks down sugar to release energy; carbon dioxide (not oxygen) is released, forming bubbles that make the dough fluffy. A small amount of alcohol is also formed.

Step 3: Yeast grows well in warm conditions, so warmth helps rather than stops it. Without yeast, warmth alone does not make dough rise → (b).

Marking: 1 mark for the correct option.

4. (c) have a nucleoid instead of a well-defined nucleus

Bacteria have a cell membrane and cytoplasm, but no well-defined nucleus or nuclear membrane. They have a nucleoid region instead.

Marking: 1 mark.

5. (b) Yeast, mould

Yeast is a unicellular fungus; mould is a multicellular fungus. Bacteria are not fungi (so (c) is wrong), and Amoeba is a protozoan (so (d) is wrong).

Marking: 1 mark.

6. (b) Methane

Bacteria living in an oxygen-free environment decompose plant and animal waste and release biogas — carbon dioxide plus a high proportion of methane.

Marking: 1 mark.

7. Assertion–Reason → **(A)**

Step 1: Assertion: pickles and murabbas stay fresh — true.

Step 2: Reason: salt/sugar in high concentration (with spices) acts as a preservative and stops microorganisms growing — true.

Step 3: The reason directly explains the assertion → (A).

Marking: 1 mark.

8. Assertion–Reason → **(C) A is true but R is false.**

Step 1: Assertion: fungi have no chloroplasts, so they cannot make food by photosynthesis — true.

Step 2: Reason: cells of fungi *do* have a cell wall (in addition to the cell membrane) — so the reason is false.

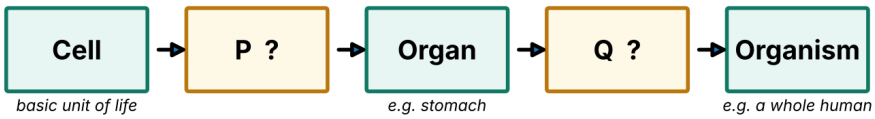
Step 3: A true, R false → (C).

Marking: 1 mark.

SECTION B — Short Answer Questions

9. Levels of organisation (Fig. 3)

Fig. 3: Levels of organisation in a multicellular organism



(a) The order is Cell → Tissue → Organ → Organ system → Organism.

- P = **Tissue** (a group of similar cells)
- Q = **Organ system** (several organs working together).

(b) The stomach is made of different tissues (muscle tissue, lining tissue) working together → it is an **organ**.

Marking: (a) ½ + ½; (b) 1.

10. Root nodules (Fig. 4)

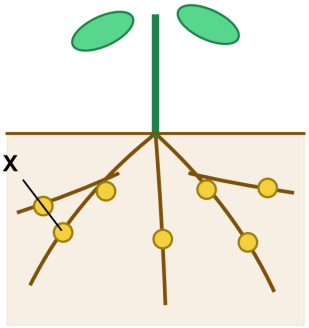


Fig. 4: Root of a pea plant

(a) X = **root nodules**; the bacterium living in them is **Rhizobium**.

(b) Rhizobium traps nitrogen from the air and makes it usable for the plant. Growing legumes in rotation naturally increases nitrogen in the soil and keeps it healthy for the next crop, reducing the need for chemical fertilisers.

Marking: (a) ½ + ½; (b) 1 (nitrogen trapping + soil fertility).

11. Curd formation

(a) The bacterium is **Lactobacillus**. It feeds on lactose (milk sugar), multiplies and produces **lactic acid**, which turns the milk to curd and makes it sour.

(b) These bacteria grow well in warm conditions. In cold milk, they multiply very slowly, so the milk does not ferment into curd.

Marking: (a) ½ + ½; (b) 1.

SECTION C — Long Answer Questions

12. Microorganisms (Fig. 5)

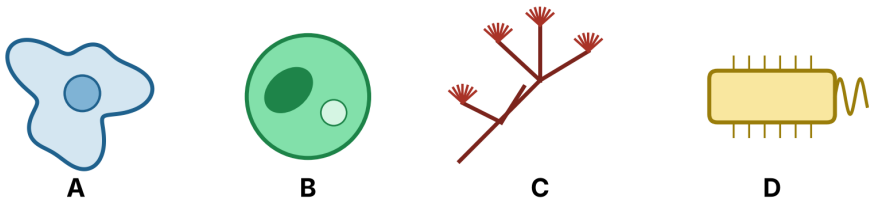


Fig. 5: Four microorganisms as seen under a microscope (not to scale)

(i) A = a single cell that keeps changing shape → **Amoeba**, a **protozoan**. C = branched filaments with brush-like tips, without chlorophyll → a **fungus** (mould).

(ii) B can make its own food because it is green — it contains chlorophyll (a green pigment) and makes food by photosynthesis. It is an alga. A, C and D have no chlorophyll.

(iii) D (bacterium) has no well-defined nucleus and no nuclear membrane; the corresponding region is called the **nucleoid**.

(iv) Fungi (and some bacteria) act on fallen leaves and dead plants and animals, breaking them down into simpler, nutrient-rich substances; this recycles nutrients to the soil and cleans the environment.

Marking: 1 mark for each part (i)–(iv); in (i) ½ mark each for A and C; in (ii) ½ for B + ½ for reason.

13. Types of cells (Fig. 6)

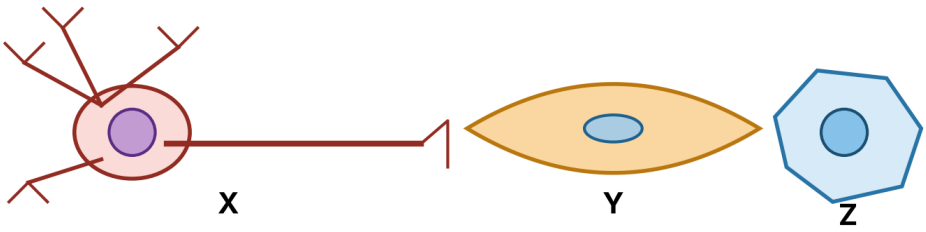


Fig. 6: Three types of animal cells

(i) X = **nerve cell (neuron)**; Y = **muscle cell**.

(ii) The nerve cell is very long and has branches. This lets it reach different parts of the body and pass messages quickly.

(iii) Y is thin, flexible and spindle-shaped. Groups of such cells in the food pipe contract and relax in a wave-like manner and push the food down towards the stomach.

(iv) Z is a **cheek cell**. It forms the inner lining of the cheek (mouth) and gives a protective covering.

Marking: 1 mark for each part; in (i) ½ each.

14. Plant cell vs animal cell

(a) Any three differences (1 mark each):

- **Cell wall:** present in plant cells; absent in animal cells.
- **Chloroplasts (plastids):** present in green parts of plant cells (for photosynthesis); absent in animal cells.
- **Vacuole:** plant cells have one large vacuole; animal cells have no vacuole or only small ones.
- **Arrangement/rigidity:** the cell wall gives plant cells rigidity and strength, so they are firm and packed closely.

(b) The three basic parts common to both are the **cell membrane, cytoplasm and nucleus**.

Marking: (a) 3 × 1; (b) 1 (all three parts needed; ½ if only two).

15. Onion peel mount

(i) Safranin is a red stain; it gives the cells a pink colour so that they can be seen clearly under the microscope.

(ii) Glycerin prevents the cells from drying and improves the clarity of the view.

(iii) Lowering the coverslip slowly with a needle prevents air bubbles from getting trapped.

(iv) Blotting paper removes the extra glycerin around the edges of the coverslip.

Marking: 1 mark for each correct purpose.

SECTION D — Case-Based / Practical Questions

16. Yeast experiment (Fig. 7)

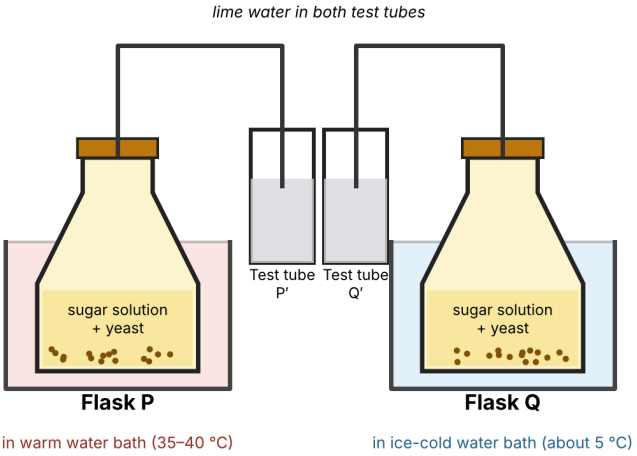


Fig. 7: Experimental set-up

(i) The gas is **carbon dioxide**. Lime water turning milky shows that carbon dioxide has been released.

(ii) Yeast grows and respires well only in warm conditions. At the low temperature in flask Q, yeast is much less active, so very little carbon dioxide forms.

(iii) A small amount of **alcohol** (this is why the dough smells slightly different).

(iv) Any two: bread, cakes, pastries.

(v) The lime water would stay clear. Without yeast, there is no organism to break down the sugar, so no carbon dioxide is released.

Marking: 1 mark for each part.

17. Compost pit and biogas

(i) Manure (compost).

(ii) Fungi and bacteria present in the soil.

(iii) Decomposition.

(iv) Manure formation needs an optimal temperature and appropriate moisture. If the pit dries up, the microbes become inactive and decomposition slows down or stops.

(v) Methane (the main part of biogas). The microbes that produce it live and work in an oxygen-free environment, so air must be kept out.

Marking: 1 mark for each part.

Section	A	B	C	D	Total
Marks	8	6	16	10	40

Note: any other correct and relevant answer should be accepted and awarded full marks.