

PRACTICE PAPER 01 (2026-27)

CHAPTER 05: LIFE PROCESSES (STEP-BY-STEP SOLUTIONS)

SUBJECT: SCIENCE

MAX. MARKS : 40

CLASS : X

DURATION : 1½ hrs

General Instructions:

- (i) All questions are compulsory.
- (ii) This question paper contains **20** questions divided into five Sections A, B, C, D and E.
- (iii) **Section A** comprises 10 MCQs and Assertion-Reason questions of **1 mark** each. **Section B** comprises 4 Very Short Answer questions of **2 marks** each. **Section C** comprises 3 Short Answer questions of **3 marks** each. **Section D** comprises 1 Long Answer question of **5 marks**. **Section E** comprises 2 Case Study Based questions of **4 marks** each.
- (iv) There is no overall choice. Internal choice is provided in Section E.
- (v) Use of calculators is not permitted.

SECTION - A

Questions 1 to 10 carry 1 mark each.

1. Which one of the following is **not** required by a plant for photosynthesis?

- | | |
|--------------------|------------|
| (a) Carbon dioxide | (b) Water |
| (c) Chlorophyll | (d) Oxygen |

Solution:

Ans: (d) Oxygen

- Photosynthesis needs CO₂, water, sunlight and chlorophyll. Oxygen is a **by-product**, not a requirement.

2. Amoeba takes in its food with the help of

- (a) cilia covering the whole cell
- (b) a specific spot on the cell called mouth
- (c) temporary finger-like extensions of the cell surface
- (d) villi

Solution:

Ans: (c) temporary finger-like extensions of the cell surface

- These extensions fuse over the food particle forming a **food vacuole**. (Paramecium uses cilia to move food to a specific spot.)

3. Which of the following correctly pairs an enzyme with the food it acts upon?

- | | |
|-----------------------|-------------------------------|
| (a) Pepsin – Starch | (b) Salivary amylase – Starch |
| (c) Lipase – Proteins | (d) Trypsin – Fats |

Solution:

Ans: (b) Salivary amylase – Starch

- Salivary amylase breaks starch into simple sugar. Pepsin and trypsin digest proteins; lipase digests emulsified fats.

4. Which statement about bile juice is correct?

- (a) It is secreted by the pancreas.
- (b) It contains enzymes that digest proteins.
- (c) It makes the food alkaline and emulsifies fats.
- (d) It is stored in the stomach.

Solution:

Ans: (c) It makes the food alkaline and emulsifies fats.

- Bile, from the liver, makes the acidic food from the stomach alkaline for pancreatic enzymes, and its salts break large fat globules into smaller ones (emulsification).

5. In yeast, during fermentation, pyruvate is converted into

- (a) lactic acid
- (b) carbon dioxide and water
- (c) ethanol and carbon dioxide
- (d) glucose

Solution:

Ans: (c) ethanol and carbon dioxide

- This occurs in the absence of oxygen (anaerobic respiration).

6. The respiratory pigment in human beings and its location are

- (a) chlorophyll – plasma
- (b) haemoglobin – red blood corpuscles
- (c) haemoglobin – white blood corpuscles
- (d) haemoglobin – platelets

Solution:

Ans: (b) haemoglobin – red blood corpuscles

- Haemoglobin has a very high affinity for oxygen and is present in RBCs.

7. Which chamber of the human heart pumps oxygen-rich blood to the rest of the body?

- (a) Right atrium
- (b) Right ventricle
- (c) Left atrium
- (d) Left ventricle

Solution:

Ans: (d) Left ventricle

- Oxygen-rich blood from the lungs → left atrium → left ventricle, which contracts to pump it to the body.

8. Translocation of food in plants takes place through

- (a) xylem vessels
- (b) tracheids
- (c) sieve tubes with companion cells
- (d) root hairs

Solution:

Ans: (c) sieve tubes with companion cells

- Translocation of soluble products of photosynthesis occurs in the phloem, in sieve tubes with the help of companion cells, both upward and downward.

In the following questions 9 and 10, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
- (c) (A) is true but (R) is false.
- (d) (A) is false but (R) is true.

9. Assertion (A): The rate of breathing in aquatic organisms is much faster than in terrestrial organisms.

Reason (R): The amount of dissolved oxygen in water is fairly low compared to the amount of oxygen in air.

Solution:

Ans: (a)

- Both true; because less oxygen is available in water, aquatic animals must breathe faster to get enough.

10. Assertion (A): Arteries have thick, elastic walls.

Reason (R): Veins have valves that ensure blood flows in only one direction.

Solution:

Ans: (b)

- Both statements are true, but arteries have thick walls because blood leaves the heart under **high pressure** – not because of valves in veins. So R does not explain A.

SECTION - B

Questions 11 to 14 carry 2 marks each.

11. A potted plant with variegated leaves (green and white patches) is kept in a dark room for three days and then in sunlight for six hours. A leaf is boiled in water, then in alcohol, and tested with iodine solution.

- (a) Why was the plant kept in the dark for three days? Why was the leaf boiled in alcohol?
- (b) What is observed after the iodine test, and what does it prove?

Solution:

(a) Keeping it in the dark makes the plant use up **all its stored starch** (destarching), so any starch found later was made during the experiment. [½] Boiling in alcohol **removes chlorophyll**, making the colour change with iodine easy to see. [½]

(b) Only the parts that were **green** turn **blue-black**; the white patches do not. This proves that **chlorophyll is essential for photosynthesis**. [1]

12. (a) Why do herbivores such as cows have a longer small intestine than carnivores such as tigers?

- (b) How is the small intestine designed to absorb digested food?

Solution:

(a) Herbivores eat grass, and a longer small intestine allows the **cellulose** to be digested. Meat is easier to digest, so carnivores have a shorter one. [1]

(b) Its inner lining has numerous finger-like projections called **villi**, which **increase the surface area** for absorption; the villi are **richly supplied with blood vessels** that carry absorbed food to every cell. [1]

13. (a) What is the role of the rings of cartilage present in the throat?

- (b) Why do the lungs always contain a residual volume of air during the breathing cycle?

Solution:

(a) They ensure that the **air passage does not collapse**, so air can flow freely to the lungs. [1]

(b) The residual air ensures there is **sufficient time for oxygen to be absorbed** from the inhaled air and for **carbon dioxide to be released**. [1]

14. Plants do not have special excretory organs. List four ways in which plants get rid of their waste products.

Solution:

Any four [$\frac{1}{2}$ each]:

- Excess **water** is lost by **transpiration**; oxygen and CO_2 are exchanged through stomata.
- Many wastes are stored in **cellular vacuoles**.
- Wastes are stored in **leaves that fall off**.
- Wastes are stored as **resins and gums**, especially in old xylem.
- Some wastes are **excreted into the soil** around them.

SECTION - C

Questions 15 to 17 carry 3 marks each.

15. (a) What is transpiration? State two of its functions.
(b) How is water moved upward in the xylem of a tall tree during the day and at night?

Solution:

(a) Loss of water in the form of **vapour** from the aerial parts of the plant (mainly through stomata) is transpiration. [$\frac{1}{2}$]

Functions: (i) helps in **absorption and upward movement** of water and dissolved minerals from roots to leaves; (ii) helps in **temperature regulation**. [$\frac{1}{2} + \frac{1}{2}$]

(b) Day: stomata are open; evaporation from leaf cells creates a **suction (transpiration pull)** that draws water up from root xylem – the major driving force. [1]

Night: **root pressure** is more important – root cells actively take up ions, water moves in from the soil and is pushed up as a column. [$\frac{1}{2}$]

16. (a) What is lymph? How is it formed?
(b) How does lymph differ from blood plasma?
(c) State two functions of lymph.

Solution:

(a) Lymph (tissue fluid) is a fluid involved in transportation. Some plasma, proteins and blood cells **escape through the pores in capillary walls** into the intercellular spaces to form lymph. [1]

(b) It is similar to plasma but **colourless** and contains **less protein**. [1]

(c) (i) Carries **digested and absorbed fat** from the intestine. (ii) **Drains excess fluid** from the extracellular spaces back into the blood. [$\frac{1}{2} + \frac{1}{2}$]

17. The gastric glands are present in the wall of the stomach.
(a) Name the three substances they release and state the role of each.
(b) How is the exit of food from the stomach regulated?

Solution:

(a) • Hydrochloric acid – creates an acidic medium that helps the enzyme pepsin act (and kills germs entering with food). [$\frac{1}{2} + \frac{1}{2}$]

• **Pepsin** – a protein-digesting enzyme. [$\frac{1}{2}$]

• **Mucus** – protects the inner lining of the stomach from the acid. [$\frac{1}{2}$]

(b) A **sphincter muscle** regulates the exit and releases food into the small intestine in **small amounts**. [1]

SECTION - D

Question 18 carries 5 marks.

- 18.** (a) Trace the path of blood through the four chambers of the human heart, starting from the blood returning from the lungs.
(b) What is double circulation? Why is separation of oxygenated and deoxygenated blood necessary in birds and mammals?
(c) Why do ventricles have thicker muscular walls than atria? What is the role of valves in the heart?
(d) How is circulation in fishes different?

Solution:

(a) Step 1: Oxygen-rich blood from the lungs enters the **left atrium** (it relaxes while collecting). Step 2: Left atrium contracts; blood moves to the **left ventricle**. Step 3: Left ventricle contracts and pumps blood to the **body**.

Step 4: De-oxygenated blood from the body enters the **right atrium**. Step 5: It contracts and blood passes to the **right ventricle**. Step 6: Right ventricle pumps it to the **lungs** for oxygenation. [2]

(b) Blood passes **through the heart twice** during each cycle of passage through the body - once to the lungs and once to the body. [$\frac{1}{2}$]

Separation prevents mixing and allows a **highly efficient supply of oxygen**, needed by birds and mammals, which have high energy needs to **maintain body temperature**. [$\frac{1}{2}$]

(c) Ventricles have to **pump blood into various organs** (over longer distances), so they need thicker muscular walls. [$\frac{1}{2}$] Valves ensure blood **does not flow backwards** when atria or ventricles contract. [$\frac{1}{2}$]

(d) Fishes have a **two-chambered heart**. Blood is pumped to the gills, oxygenated there and passes directly to the body, so it goes through the heart **only once** per cycle (single circulation). [1]

SECTION - E (Case Study Based Questions)

Questions 19 and 20 carry 4 marks each.

19. Study the flow chart showing how glucose is broken down by different pathways in various organisms, and answer the questions.

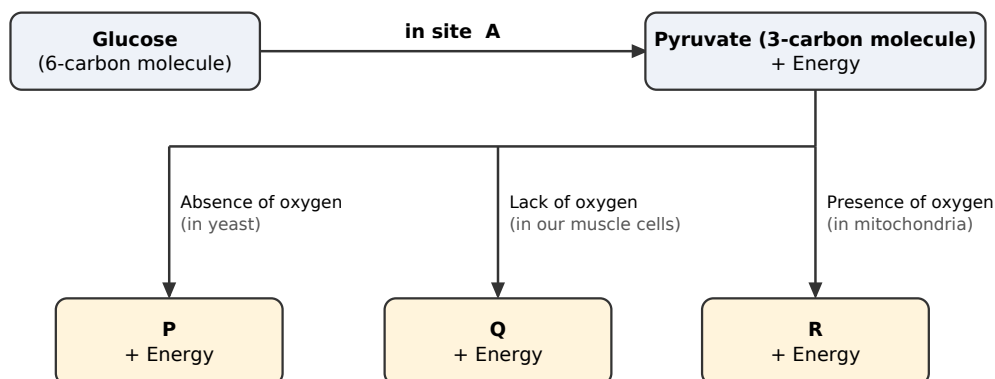


Figure: Break-down of glucose by various pathways

- (a) Name the site A where glucose is broken down into pyruvate, and the products P formed in yeast. **(1)**
- (b) Identify Q. Why do we sometimes get muscle cramps after sudden heavy exercise? **(1)**
- (c) Name the products R and this type of respiration. Which pathway releases the most energy, and in what form is this energy stored for use by the cell? **(2)**

OR

- (c) Give two differences between aerobic and anaerobic respiration, and name one organism that uses the anaerobic mode. **(2)**

Solution:

(a) A = **cytoplasm**. P = **ethanol + carbon dioxide** (fermentation). [$\frac{1}{2} + \frac{1}{2}$]

(b) Q = **lactic acid**. When muscle cells lack oxygen during sudden activity, pyruvate is converted into lactic acid; its **build-up causes cramps**. [$\frac{1}{2} + \frac{1}{2}$]

(c) R = **carbon dioxide + water**; this is **aerobic respiration** (in mitochondria). [1]

Aerobic respiration releases **a lot more energy** than anaerobic pathways. The energy is used to make **ATP** (from ADP and inorganic phosphate) – the energy currency of the cell. [1]

OR

(c) **Aerobic:** needs oxygen; pyruvate broken in mitochondria to CO_2 + water; much more energy released.

Anaerobic: occurs without oxygen; in cytoplasm; gives ethanol + CO_2 (or lactic acid); less energy. [$\frac{1}{2} \times 2 = 1$]

Example: **yeast**. [1]

20. Read the passage and answer the questions that follow.

Each human kidney contains large numbers of filtration units packed close together. In each unit, a cluster of thin-walled blood capillaries is associated with a cup-shaped end of a coiled tube that collects the filtrate. In a healthy adult, about 180 L of initial filtrate is formed daily, but only a litre or two of urine is actually excreted. When the kidneys fail due to infection, injury or restricted blood flow, poisonous wastes accumulate in the body, and the patient may be put on an artificial kidney (haemodialysis).

- (a) Name the filtration unit of the kidney and the cup-shaped structure that collects the filtrate. **(1)**
- (b) Why is the volume of urine excreted so much smaller than the volume of initial filtrate? **(1)**
- (c) Explain how an artificial kidney works. State one way in which it differs from a natural kidney. **(2)**

OR

- (c) On what factors does the amount of water re-absorbed in the kidney depend? Trace the path of urine from the kidney until it leaves the body. **(2)**

Solution:

(a) Filtration unit: **nephron**; cup-shaped structure: **Bowman's capsule**. [$\frac{1}{2} + \frac{1}{2}$]

(b) Useful substances – **glucose, amino acids, salts and a major amount of water** – are **selectively re-absorbed** as the filtrate flows along the tubule. [1]

(c) It has many tubes with a **semi-permeable lining** suspended in a tank of **dialysing fluid**, which has the same osmotic pressure as blood but no nitrogenous wastes. The patient's blood passes through the tubes; **wastes diffuse into the dialysing fluid** and purified blood is pumped back. [1]

Difference: there is **no re-absorption** in an artificial kidney. [1]

OR

(c) It depends on **how much excess water** there is in the body and **how much dissolved waste** has to be excreted. [1]

Path: kidney → **ureter** → **urinary bladder** (stored) → **urethra** → outside. [1]

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