

Respiration in Plants — CBSE Pattern Test 2

Class 11 Biology · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 2 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Biology · Respiration in Plants · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.

(2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.

(3) For MCQ questions choose the single correct option; for VSA answers write a single line.

(4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

1. Respiration in plants differs from photosynthesis in that it
 - (A) releases energy
 - (B) stores energy
 - (C) needs light
 - (D) produces oxygen
2. In alcoholic fermentation, pyruvate is converted into
 - (A) ethanol and CO_2
 - (B) lactic acid
 - (C) citric acid
 - (D) acetyl-CoA
3. In lactic acid fermentation, pyruvate is converted into
 - (A) lactic acid
 - (B) ethanol
 - (C) CO_2
 - (D) citric acid
4. The number of CO_2 molecules released per turn of the Krebs cycle is
 - (A) 2
 - (B) 1
 - (C) 3
 - (D) 4
5. ATP synthesis using the proton gradient is called
 - (A) oxidative phosphorylation
 - (B) photophosphorylation
 - (C) glycolysis
 - (D) decarboxylation
6. NADH yields approximately
 - (A) 3 ATP
 - (B) 2 ATP
 - (C) 1 ATP
 - (D) 0 ATP
7. FADH_2 yields approximately
 - (A) 2 ATP

- (B) 3 ATP
 - (C) 1 ATP
 - (D) 4 ATP
8. The RQ for fats is
- (A) about 0.7
 - (B) about 1.0
 - (C) about 0.9
 - (D) about 1.3
9. What is fermentation?
10. Where does the Krebs cycle occur?

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. What is oxidative phosphorylation?
12. How many ATP are produced per NADH?
13. What is the final electron acceptor?
14. What is the RQ for carbohydrates?

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Why is glycolysis called the EMP pathway?
16. Why is the energy yield of fermentation low?
17. State the role of oxygen in the ETS.
18. Why is the RQ of organic acids more than 1?

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. (a) Explain oxidative phosphorylation and the role of ATP synthase. (b) Account for the ATP produced in each step of respiration.
20. (a) Describe fermentation with examples. (b) Explain the respiratory quotient with examples.

Answer Key (Marking Scheme)

- Q1 — (A) releases energy. Q2 — (A) ethanol and CO₂. Q3 — (A) lactic acid. Q4 — (A) 2. Q5 — (A) oxidative phosphorylation. Q6 — (A) 3 ATP. Q7 — (A) 2 ATP. Q8 — (A) about 0.7.
- Q9 — Fermentation is the anaerobic breakdown of pyruvate into ethanol or lactic acid.
- Q10 — In the mitochondrial matrix.
- Q11 — ATP synthesis driven by the proton gradient across the inner mitochondrial membrane.
- Q12 — About 3 ATP.
- Q13 — Oxygen.
- Q14 — 1.0.
- Q15 — After Embden, Meyerhof and Parnas, who described the pathway.
- Q16 — Because glucose is only partially oxidised, so only the 2 ATP of glycolysis are produced.
- Q17 — Oxygen is the final electron acceptor, forming water.
- Q18 — Organic acids are rich in oxygen and so require less external O₂, making CO₂/O₂ greater than 1.

Q19 — (a) Protons pumped into the intermembrane space return through ATP synthase, whose rotation synthesises ATP. (b) Glycolysis 2 ATP + 2 NADH; link 2 NADH; Krebs 2 ATP + 6 NADH + 2 FADH₂ → ~38 ATP.

Q20 — (a) Pyruvate → ethanol + CO₂ in yeast; pyruvate → lactic acid in muscle. (b) RQ = CO₂/O₂ = 1.0 for carbohydrate, ~0.7 for fat, > 1 for organic acid.