

Breathing and Exchange of Gases — 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 · Breathing and Exchange of Gases · 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)

- The double membrane covering the lungs is the
 - pleura
 - pericardium
 - peritoneum
 - meninges
- During expiration, the volume of the thoracic cavity
 - decreases
 - increases
 - stays the same
 - doubles
- The maximum volume of air a person can breathe out after a forced inspiration is the
 - vital capacity
 - tidal volume
 - residual volume
 - inspiratory reserve volume
- The partial pressure of oxygen is highest in the
 - alveoli
 - blood
 - tissues
 - cells
- The percentage of oxygen carried as oxyhaemoglobin is about
 - 97%
 - 50%
 - 20%
 - 70%
- The enzyme that speeds up the formation of bicarbonate in RBCs is
 - carbonic anhydrase
 - haemoglobin
 - catalase
 - amylase
- Breathing is mainly regulated by the level of
 - CO_2

- (B) O₂ only
 - (C) nitrogen
 - (D) water
8. A condition in which alveolar walls are damaged, reducing surface area, is
- (A) emphysema
 - (B) asthma
 - (C) bronchitis
 - (D) pleurisy
9. What is the epiglottis?
10. What is vital capacity?

Section B — Short Answer I (4 × 2 = 8 marks)

11. What happens to the diaphragm during inspiration?
12. Write the formula for vital capacity.
13. By which process does gas exchange occur?
14. Where is the respiratory centre located?

Section C — Short Answer II (4 × 3 = 12 marks)

15. State two features of alveoli that make them efficient for gas exchange.
16. State the pressure gradient that drives oxygen uptake.
17. What is the oxyhaemoglobin dissociation curve?
18. Distinguish between asthma and emphysema.

Section D — Long Answers (2 × 5 = 10 marks)

19. (a) Describe the respiratory volumes and capacities. (b) Describe the transport of carbon dioxide in the blood.
20. (a) Explain the exchange of gases with reference to partial pressures. (b) Describe the common respiratory disorders.

Answer Key (Marking Scheme)

- Q1 — (A) pleura. Q2 — (A) decreases. Q3 — (A) vital capacity. Q4 — (A) alveoli. Q5 — (A) 97%. Q6 — (A) carbonic anhydrase. Q7 — (A) CO₂. Q8 — (A) emphysema.
- Q9 — The epiglottis is the cartilaginous flap that prevents food from entering the trachea.
- Q10 — Vital capacity is the maximum air expired after maximum inspiration (= TV + IRV + ERV).
- Q11 — It contracts and flattens, increasing thoracic volume.
- Q12 — $VC = TV + IRV + ERV$.
- Q13 — Simple diffusion.
- Q14 — In the medulla oblongata.
- Q15 — Thin single-layer walls and a rich capillary network (large surface area).
- Q16 — The higher partial pressure of O₂ in the alveoli than in the blood.
- Q17 — The sigmoid curve relating haemoglobin O₂ saturation to the partial pressure of O₂.
- Q18 — Asthma: inflammation of bronchi/bronchioles causing difficulty in breathing; emphysema: damage to alveolar walls reducing surface area.

Q19 — (a) TV, IRV, ERV, RV, VC, TLC. (b) As bicarbonate (~70%), carbamino-haemoglobin (~23%) and dissolved in plasma (~7%).

Q20 — (a) O₂ diffuses from alveoli to blood; CO₂ from tissues to blood to alveoli, down partial-pressure gradients. (b) Asthma (bronchial inflammation) and emphysema (alveolar damage).