

Respiration: practice questions

10 questions • 33 marks • mark scheme at the back

For AQA GCSE Biology 8461 and Combined Science: Trilogy 8464. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 33

1 Which equation represents anaerobic respiration in yeast? [1 mark]

- A. ☐ glucose $\rightarrow$ lactic acid
- B. ☐ glucose $\rightarrow$ ethanol + carbon dioxide
- C. ☐ glucose + oxygen $\rightarrow$ carbon dioxide + water
- D. ☐ carbon dioxide + water $\rightarrow$ glucose + oxygen

2 Respiration is an exothermic reaction. (a) Explain what is meant by an exothermic reaction. (b) Give two uses of the energy transferred by respiration. [3 marks]

3 Compare aerobic respiration and anaerobic respiration in muscle cells. [4 marks]

4 Yeast cells can respire anaerobically. (a) Name this process. (b) State the two products. (c) Give one industry that uses it. [3 marks]

5 During exercise, the heart rate, breathing rate and breath volume all increase. Explain why this happens. **[3 marks]**

[illegible]

6 An athlete's muscles respire anaerobically during a long period of vigorous exercise. **[3 marks]**
Explain why this happens and describe the effect on the muscles.

[illegible]

7 **Higher tier** **[3 marks]**

After the exercise, the athlete continues to breathe heavily. Explain what happens to the lactic acid and what is meant by the term oxygen debt.

[illegible]

8 Explain how the body responds to a period of long, vigorous exercise and why the muscles become tired. **[6 marks]**

[illegible]

9 (a) What is meant by metabolism? (b) Name the molecules that join to form a lipid. **[3 marks]**

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10 (a) Describe how plant cells make proteins from glucose. (b) What is produced when excess protein is broken down in the body? (c) Name two carbohydrates that are made from glucose in metabolism. **[4 marks]**

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Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

B B (1)

2. [3]

- (a) energy is transferred to the surroundings / environment (1)
- (b) any two from: chemical reactions to build larger molecules / movement / keeping warm (1 each)
- second correct use (1)

3. [4]

- aerobic respiration needs oxygen but anaerobic respiration does not (1)
- aerobic respiration produces carbon dioxide and water (1)
- anaerobic respiration produces lactic acid (1)
- aerobic respiration transfers more energy / anaerobic transfers much less energy because glucose is not completely oxidised (1)

4. [3]

- (a) fermentation (1)
- (b) ethanol and carbon dioxide (1) both needed; allow alcohol for ethanol
- (c) bread making / alcoholic drinks / brewing (1)

5. [3]

- muscles need more energy / respire faster during exercise (1)
- so need more oxygen (and glucose) (1)
- so these changes supply the muscles with more oxygenated blood (1)

6. [3]

- insufficient oxygen is supplied to the muscles (1)
- lactic acid builds up (1)
- muscles become fatigued / stop contracting efficiently (1)

7. [3] **Higher tier**

- lactic acid is carried in the blood to the liver (1)
- where it is converted back into glucose (1)
- oxygen debt is the extra oxygen needed after exercise to react with the accumulated lactic acid / remove lactic acid from the cells (1)

8. [6]

Level 3 5-6	A clear and logical explanation that links the increased demand for energy to the changes in heart rate, breathing rate and breath volume, and explains anaerobic respiration, lactic acid and fatigue.
Level 2 3-4	Some explanation linking energy demand to at least two of the changes, and some mention of anaerobic respiration or lactic acid. Links may be incomplete.
Level 1 1-2	A few relevant statements, for example that the heart rate or breathing rate increases, with little or no explanation.

Indicative content

- muscles need more energy for contraction, so respire faster
- heart rate, breathing rate and breath volume increase
- this supplies muscles with more oxygenated blood / more oxygen and glucose
- if insufficient oxygen is supplied, muscles respire anaerobically
- glucose is incompletely oxidised, so lactic acid builds up
- this creates an oxygen debt
- long periods of vigorous activity cause muscle fatigue so muscles stop contracting efficiently

9. [3]

- (a) the sum of all the reactions in a cell or the body (1)
- (b) glycerol (1)
- (three molecules of) fatty acids (1)

10. [4]

- (a) glucose and nitrate ions are used to form amino acids (1)
- amino acids are then used to synthesise proteins (1)
- (b) urea (1) for excretion
- (c) any two from: starch / glycogen / cellulose (1 for two correct)