

Respiration: practice questions

7 questions • 21 marks • mark scheme at the back

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Name

Total / 21

1 Which two processes both use energy released by respiration? [1 mark]

- A. ☐ protein synthesis and photosynthesis
- B. ☐ muscle contraction and active transport
- C. ☐ diffusion and osmosis
- D. ☐ evaporation and transpiration

2 A student investigates the effect of temperature on respiration in yeast. The yeast is mixed with glucose solution and kept in water baths at different temperatures. Describe how the student could measure the rate of respiration, and state two variables that should be controlled. [4 marks]

3 Define aerobic respiration and write the word equation for it. [3 marks]

4 **Supplement** Which is the balanced chemical equation for aerobic respiration? [1 mark]

- A. ☐ $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- B. ☐ $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$
- C. ☐ $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$
- D. ☐ $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

- 5** Yeast and human muscle cells can both respire anaerobically. (a) State what is meant by anaerobic respiration. [2] (b) State the word equation for anaerobic respiration in yeast. [1] (c) State the product of anaerobic respiration in muscles during vigorous exercise. [1] (d) State how the energy released per glucose molecule differs from that in aerobic respiration. [1] **[5 marks]**

- 6** **Supplement** **[2 marks]**
State the balanced chemical equation for anaerobic respiration in yeast, and give the number of carbon dioxide molecules produced from one glucose molecule.

- 7** **Supplement** **[5 marks]**
After a sprint, an athlete continues to breathe deeply and fast and their heart rate stays high. (a) State what builds up in the athlete's muscles and blood during the sprint, causing an oxygen debt. [1] (b) Outline how the oxygen debt is removed after the sprint. [4]

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. [4]

- count the bubbles of carbon dioxide (1) allow measure the volume of gas collected in a measuring cylinder / gas syringe
- in a fixed time / per minute (1) allow calculate rate = bubbles or volume ÷ time
- control: volume / concentration of glucose solution (1)
- control: mass of yeast / pH / time allowed to reach temperature (1) allow volume of yeast suspension; reject temperature
- Max 4

3. [3]

- chemical reactions in cells (1)
- that use oxygen to break down nutrient molecules to release energy (1)
- glucose + oxygen → carbon dioxide + water (1)

4. [1] **Supplement**

B B (1)

5. [5]

- chemical reactions in cells that break down nutrient molecules to release energy (1)
- without using oxygen (1)
- glucose → alcohol + carbon dioxide (1) allow ethanol for alcohol
- lactic acid (1)
- much less energy released (per glucose molecule) (1)

6. [2] **Supplement**

- $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$ (1)
- 2 (carbon dioxide molecules) (1)

7. [5] **Supplement**

- lactic acid (1)
- fast heart rate continues to transport lactic acid in the blood (1)
- from the muscles to the liver (1)
- deeper and faster breathing supplies oxygen (1)
- for aerobic respiration of the lactic acid in the liver (1) reject converted back to glucose; reject broken down in the muscles