

Transport and exchange surfaces: practice questions

6 questions · 18 marks · mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 18

1 Which substance is a waste product that is carried in the blood to the kidneys? [1 mark]

- A. ☐ Urea
- B. ☐ Oxygen
- C. ☐ Glucose
- D. ☐ Mineral ions

2 Describe the need to transport (a) dissolved food molecules into cells and (b) urea out of cells. [4 marks]

3 A cube-shaped piece of tissue has sides of 4 cm. Calculate the surface area : volume ratio. Give your answer in the form x : 1. [3 marks]

Answer =

Mark scheme

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

1. [1]

A A (urea)

2. [4]

- (a) dissolved food molecules such as glucose are used in respiration (1) allow amino acids used for growth or to make proteins
- (a) to release energy (1)
- (b) urea is a waste product (1)
- (b) it must be removed from the body / carried to the kidneys and excreted in urine (1) allow urea is toxic if it builds up
- Max 4

3. [3]

- surface area = $6 \times 4 \times 4 = 96 \text{ cm}^2$ (1)
- volume = $4 \times 4 \times 4 = 64 \text{ cm}^3$ (1)
- $96 : 64 = 1.5 : 1$ (1) allow 3 : 2

4. [3]

- single-celled organism has a large surface area : volume ratio (1)
- short diffusion distance, so substances can diffuse across the surface fast enough (1)
- a human has a small surface area : volume ratio / cells are deep inside the body (1)
- so diffusion is too slow / diffusion distance too long to supply all the cells (1)
- Max 3

5. [1]

B B (the walls are one cell thick)

6. [6]

Level 3 5-6	A detailed, well-linked explanation covering several adaptations of the alveoli and the capillaries. Each feature is linked to its effect on diffusion, and the direction of movement of both gases is stated or implied.
Level 2 3-4	Some adaptations are explained with links to diffusion, but the explanation may be incomplete or some links may be missing.
Level 1 1-2	Adaptations are stated with little or no explanation of how they affect diffusion.

Indicative content

- oxygen diffuses from the air in the alveoli into the blood, and carbon dioxide diffuses from the blood into the alveoli
- millions of alveoli give a large surface area
- alveolus walls and capillary walls are one cell thick, so there is a short diffusion distance
- a rich network of capillaries / good blood supply carries oxygen away and brings carbon dioxide, keeping a steep concentration gradient
- ventilation brings fresh air in and removes air containing carbon dioxide, maintaining the concentration gradient
- moist lining so gases dissolve