

Mark Scheme

Combined Science GCSE

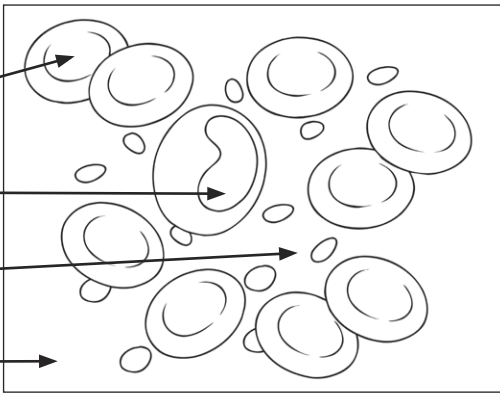
Exchange and Transport in Animals Test

(Levels 4-9)

	Answer	Marks
1. (a)	alveoli	(1)
1. (b)	respiratory	(1)
1. (c)	• thin membrane/lining • water inside lining • large surface area • close proximity to blood supply	(2)
1. (d)	Gas A is oxygen/O ₂ . Gas B is carbon dioxide/CO ₂ . Reject carbon oxide or carbon monoxide/CO	(2)
1. (e)	For full marks, each statement must include a description of the structure and the linked explanation of adaptation to function. Award marks in pairs. 3 adaptations from: • large surface area – to allow for greater amount of gas exchange/faster rate of diffusion (2) • thin membrane – short distance for faster diffusion (2) • water inside the lining/alveoli – facilitates dissolving of gases to increase rate of diffusion (2) • close proximity to blood stream/supply – for increased diffusion/gas exchange (2)	(6)

(Total for Question 1 = 12 marks)

	Answer	Marks
2. (a)		(4)

2. (b)	 Red blood cells (erythrocytes) White blood cells (leukocytes) Platelets (thromocytes) Blood plasma	(4)
2. (c)	For full marks, each statement must include a description of the structure and the linked explanation of adaptation to function. Award marks in pairs. 2 adaptations from: • small size – to pass through narrow capillaries (2) • flattened concave shape – to increase surface area (2) • contains haemoglobin – to absorb O₂ (2) • no nucleus – to increase space for haemoglobin (2)	(4)

(Total for Question 2 = 12 marks)

	Answer	Marks
3. (a)	Shape A	(1)
3. (b)	Award 1 mark for correct calculation of surface area. (sum of $h \times w$ of each face) $(1.5 \times 6) \times 2 = 18$ $(1.5 \times 2) \times 2 = 6$ $(6 \times 2) \times 2 = 24$ $18 + 6 + 24 = 48 \text{ cm}^2$ Award 1 mark for correct calculation of volume ($d \times h \times w$) $1.5 \times 2 \times 6 = 18 \text{ cm}^3$ Award 1 mark for correct unsimplified ratio 48:18 Award full marks for simplified ratio, regardless of working 8:3	(4)

(Total for Question 3 = 5 marks)

	Answer	Marks
4. (a)	For full marks, each statement must include a description of the structure and the linked explanation of adaptation to function. Award marks in pairs. 2 descriptions from: • (arteries) have thick outer walls/thick layer of muscular and elastic fibres – to carry blood at high pressure (2) • (veins) have thin outer walls/thin layer of muscular and elastic fibres – to carry blood at lower pressure (2) • (veins) have one-way valves – to keep blood moving in one direction (2)	(4)
4. (b)	For full marks, each statement must include a description of the structure and the linked explanation of adaptation to function. Award marks in pairs. 3 adaptations from: • double pump/circulation system – increases efficiency of oxygen transport to the body (2) • valve – prevents backward flow into the atrium from the artery (2) • valve – prevents backward flow into the ventricle from the artery (2) • left ventricle has a thicker muscular wall – exerts more pressure than the right ventricle (2) • ventricles have thicker walls than atria – exert more pressure (2) Accept converse statements for the final two points.	(6)
4. (c)	Award max. 1 mark for correct rearrangement of the equation but failure to convert units. $5.5 \div 75$ $5500 \div 75 = 73.33\text{ml}$	(2)

(Total for Question 4 = 12 marks)

	Answer	Marks
5. (a)	glucose + oxygen → carbon dioxide + water + [energy] Products can be accepted in either order. Reject symbols in place of words.	(3)
5. (b)	releases	(1)
5. (c)	Exothermic	(1)
5. (d)	Difference from: • (aerobic respiration) uses oxygen • (aerobic respiration) produces carbon dioxide • (anaerobic respiration) produces lactic acid • (anaerobic respiration) releases less energy/(aerobic respiration) releases more energy Similarity from: • release energy • use glucose/break down glucose • exothermic reaction	(2)
5. (e)	carbon dioxide production temperature change	(2)

(Total for Question 5 = 9 marks)