

APOLLO

Cell respiration

SL

Biology

First assessment 2025

7 questions | mark schemes

Mark-scheme answers

Biology SL | Paper 1A | May 2025 TZ2 | Q4 | 1 marks

4. C

Biology SL | Paper 1A | May 2025 TZ3 | Q6 | 1 marks

6. C

7.	a	a. compact/less storage space needed due to coiling and branching; b. insoluble/poorly soluble due to larger molecular size; c. relative ease of adding/condensation of monosaccharides/glucose to store energy; d. relative ease of removing/hydrolysis of monosaccharides/glucose to mobilize energy;		3 max
7.	b	a. photosynthesis (in plants) transforms sunlight to chemical energy in carbon compounds/glucose; b. herbivores/ primary consumers obtain energy by eating plants/producers; c. energy is passed along the food chain by feeding; d. energy is lost by organisms through cell respiration/movement/maintaining body temperature/ named process (as heat); e. approximately 10 % of energy passes to the next trophic level; f. energy available for higher trophic levels is limited (by energy loss); g. number of trophic levels / lengths of food chains is limited (by energy loss); h. decomposers gain energy by breaking down dead organisms;		4 max

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2225 – 6018

Question		Answers	Notes	Total
7.	c	The need for energy a. life processes/active transport/metabolism/movement require energy; b. ATP provides energy for cell processes; c. energy need to break bonds in a substrate during enzyme reactions; d. energy is required to synthesize ATP from ADP OR energy is released when ATP is hydrolysed; Release of energy e. cell respiration produces ATP using energy stored in carbon compounds/glucose/fatty acids; f. aerobic respiration occurs in mitochondria; g. aerobic respiration requires oxygen; h. aerobic respiration provides more ATP/energy than anaerobic respiration; i. cells use mainly glucose and/or fatty acids as a fuel/substrate for respiration; j. in aerobic respiration carbon dioxide and water are waste products OR fuel/glucose + O₂ → CO₂ + H₂O (+ energy/ATP); k. anaerobic respiration (in humans) yields lactic acid as a waste product OR fuel/glucose → lactic acid (+ energy/ATP);	Correct equation can gain marking points g. and j. Equation does not need to be balanced.	8 max

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2225 – 6018

Question	Answers	Notes	Total
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Mark-scheme answers

Biology SL | Paper 1A | Nov 2025 TZ3 | Q4 | 1 marks

4. C

3.	a	oximeter/oxygen meter/probe/sensor OR respirometer;	<i>Do not accept spirometer.</i> <i>Do not accept respiration measurer and respirator.</i> <i>Do not accept oxygen detector.</i> <i>Do not accept carbon dioxide meter/probe/sensor.</i>	1
3.	b	CO ₂ /carbon dioxide / pH/acidity/acid;	<i>Ignore oxygen.</i> <i>Do not accept carbon alone.</i>	1
3.	c	(-) 6 (°C);	<i>Units not required for the mark.</i>	1

Question		Answers	Notes	Total
3.	d	a. <i>A. limbata</i> /Pacific species/ <i>A. aurita</i> /Atlantic species because respiration rate increases (at higher temperature); b. (which results in) more energy/ATP (for growth/reproduction/cell division);	<i>a. It must refer to an increase in respiration rate, not a comparison of respiration rates in the two species.</i> <i>Do not accept references to maximum respiration at higher temperatures/stated higher temperature if no increase in respiration rate mentioned.</i> <i>Do not accept answers referring to a positive correlation without naming the correlated variables.</i>	2 max

Question		Answers	Notes	Total
3.	e	a. (it is) active transport; b. protein pump/carrier used OR Na⁺- K⁺/sodium-potassium pump used; c. (3) Na⁺/sodium (ions) moved out and (2) K⁺/potassium (ions) in OR (3) Na⁺/sodium (ions) and (2) K⁺/potassium (ions) moved against their concentration gradients / OWTTE; d. membrane is polarized / outside (of the axon) is positive, whereas inside is negative OR resting potential is -70 mV;	<i>Ignore reference to action potential, depolarization and repolarization.</i> <i>b. Do not accept membrane channels.</i> <i>b. Do not accept proteins alone.</i> <i>c. Both ions and both directions required for the mark.</i> <i>c. Ignore reference to diffusion/channels if the ions and directions are correct.</i> <i>d. Allow answers in the range of –80 mV to –50 mV. The correct unit is required if a value is stated.</i>	2 max

Question	Answers	Notes	Total
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4.	a	a. active transport (across membranes); b. synthesis of proteins/polysaccharides/nucleic acids/macromolecules OR (any) condensation reactions / anabolic reactions; c. movement of the cell/muscle contraction OR movement of chromosomes/cell components;	<i>Accept more precise examples of active transport, synthesis or movement such as sodium potassium pump, DNA synthesis, photosynthesis, glycolysis, protein synthesis.</i> <i>Accept the first two answers given in a list.</i>	2 max
4.	b	a. (ATP) is synthesized during (cell) respiration; b. anaerobic makes less ATP than aerobic; c. (ATP) is produced from carbon compounds/glucose; d. glucose + oxygen produces carbon dioxide + water + ATP; e. glucose changing to lactic acid (produces ATP); f. (ATP) is produced in mitochondria OR (ATP) is produced in the cytoplasm by anaerobic respiration;	<i>b. Accept vice versa.</i>	3 max

Question	Answers	Notes	Total
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Mark-scheme answers

Biology SL | Paper 1A | Specimen 2025 | Q6 | 1 marks

6. D