

APOLLO

Membranes and membrane transport

HL

Biology

First assessment 2025

10 questions | mark schemes

Mark-scheme answers

Biology HL | Paper 1A | May 2025 TZ2 | Q14 | 1 marks

14. A

Biology HL | Paper 1A | May 2025 TZ2 | Q15 | 1 marks

15. B

Biology HL | Paper 1A | May 2025 TZ3 | Q14 | 1 marks

14. A

9.	a	a. (membranes divide the cell into) <u>organelles</u>; b. nucleus/chloroplast/mitochondrion is double membraned/has inner and outer membrane; c. enzymes/substrates can be concentrated (in the small volume); d. different/incompatible functions/processes in different organelles (so harm prevented); e. hydrolytic/digestive enzymes held inside lysosomes/phagocytic vacuoles; f. pH/conditions can be optimized for (each) function/process; g. small spaces/volumes for proton gradient/concentration gradient (to develop quickly); h. (post- transcriptional) modification of mRNA in nucleus (before it reaches the ribosome); i. vesicles for transport/transfers; j. nuclear membrane/envelope protects DNA/chromosomes (from the cytoplasm);	Do not award marks describing the functions of the plasma membrane.	4 max
9.	b	a. diffusion/facilitated diffusion is passive movement/does not require ATP; b. diffusion/facilitated diffusion is movement from a higher to lower concentration; c. <u>simple diffusion</u> does not require channels/(membrane) proteins / is movement between phospholipid molecules; d. small/hydrophobic substances/oxygen/CO₂ pass across the membrane by simple diffusion; e. <u>facilitated diffusion</u> is movement through/assisted by channel proteins; f. (facilitated) diffusion/diffusion through channel proteins for polar molecules/ions/charged particles; g. <u>voltage-gating</u> allows channels to open and close / <u>voltage-gated</u> Na⁺/K⁺ channels; h. <u>aquaporins</u> for osmosis/water movement/diffusion of water across the membrane; i. <u>active transport</u> is movement across the membrane using ATP/energy; j. active transport by protein pumps (in the membrane) / active transport by Na⁺/K⁺ pump; k. active transport is (usually) movement (from lower) to higher concentration; l. endocytosis/phagocytosis takes materials in and exocytosis removes materials from the cell; m. formation of vesicles/vacuoles to take materials into the cell (by endocytosis); n. fusion of vesicles/vacuoles with plasma membrane to release materials (by exocytosis);		7 max

– 18 –

2225 – 6021

Question	Answers	Notes	Total
9. c	a. depolarization is due to movement/diffusion of sodium <u>ions</u> into the axon; b. by facilitated diffusion/through sodium channels (that have opened); c. repolarization is due to movement/diffusion of potassium (ions) out of axon; d. by facilitated diffusion/through potassium channels (that have opened); e. sodium/potassium channels are voltage-gated; f. <u>sodium-potassium pumps</u> generate concentration gradients/resting potential/higher sodium outside and higher potassium inside; g. <u>phospholipid bilayer</u> is impermeable to ions/allows concentration gradients of ions to be established;		4 max

Question	Answers	Notes	Total
10 a	a. used as a source/(temporary) store of energy / is the energy currency of the cell; b. releases energy when converted to ADP/when a phosphate is removed; c. amount of energy released can be used/sufficient for (many metabolic) tasks; d. active transport/another valid example; e. ATP to ADP conversion is reversible / ATP can be regenerated from ADP; f. can be produced in different ways/using energy from different sources/by aerobic or anaerobic respiration; g. stable within cell so does not release energy prematurely/before needed; h. small molecule/soluble so can move easily/quickly (through the cell); i. cannot diffuse through membranes so is not lost from cell/to the environment;	h. The idea of ATP being small/soluble must be there along with its moveability.	3 max

– 19 –

2225 – 6021

Question	Answers	Notes	Total
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Mark-scheme answers

Biology HL | Paper 1A | Nov 2025 TZ1 | Q4 | 1 marks

4. C

Biology HL | Paper 1A | Nov 2025 TZ1 | Q14 | 1 marks

14. B

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

4. A

Biology HL | Paper 1A | Nov 2025 TZ3 | Q15 | 1 marks

15. C

Biology HL | Paper 1A | Specimen 2025 | Q15 | 1 marks

15. A

Biology HL | Paper 1A | Specimen 2025 | Q17 | 1 marks

17. C