

WJEC (Wales) Biology GCSE
Topic 1.1 Cells and Movement
Across Membranes
Questions by Topic - Mark
Scheme

1.	Question	Marking details	Marks Available								
	(a)	<p>A <u>Cytoplasm</u>;</p> <p>B <u>Cell</u> membrane;</p>	2								
	(b)	<p>(i)</p> <table border="1" data-bbox="406 492 1181 1321"> <thead> <tr> <th data-bbox="406 492 790 548">Part of algal cell</th> <th data-bbox="790 492 1181 548">Function</th> </tr> </thead> <tbody> <tr> <td data-bbox="406 548 790 817">nucleus</td> <td data-bbox="790 548 1181 817"> <u>Controls</u> cells (activities)/ <u>holds</u> or <u>contains</u> {chromosomes/ DNA/ genes/ genetic information} ; </td> </tr> <tr> <td data-bbox="406 817 790 940">Chloroplast;</td> <td data-bbox="790 817 1181 940">photosynthesis</td> </tr> <tr> <td data-bbox="406 940 790 1321">Cell wall</td> <td data-bbox="790 940 1181 1321"> Shape/ support/ <u>rigid</u> structure/ stops cell expansion; NOT protection/ structure unqualified/ keeps it strong/ gives stability </td> </tr> </tbody> </table>	Part of algal cell	Function	nucleus	<u>Controls</u> cells (activities)/ <u>holds</u> or <u>contains</u> {chromosomes/ DNA/ genes/ genetic information} ;	Chloroplast;	photosynthesis	Cell wall	Shape/ support/ <u>rigid</u> structure/ stops cell expansion; NOT protection/ structure unqualified/ keeps it strong/ gives stability	3
Part of algal cell	Function										
nucleus	<u>Controls</u> cells (activities)/ <u>holds</u> or <u>contains</u> {chromosomes/ DNA/ genes/ genetic information} ;										
Chloroplast;	photosynthesis										
Cell wall	Shape/ support/ <u>rigid</u> structure/ stops cell expansion; NOT protection/ structure unqualified/ keeps it strong/ gives stability										
	(ii)	1 chloroplast/ cell wall;	2								

2.	Question	Marking details	Marks Available
	(a)	(i) A line drawn outside cell membrane; Nucleus, vacuole & chloroplasts (not dots) (all needed) correctly drawn; Must be able to distinguish the three different organelles	2
		(ii) <u>{Controls/regulates/selects}</u> {the movement of substances /what} into <u>and</u> out of cell; <i>NOT protect cell/maintain shape</i>	1
	(b)	(i) I Into the cell ✓; II Into the cell ✓; III Cell B ✓;	3
		(ii) Diffusion;	1
	Question 2 Total		[7]

3.	Question		Marking details	Marks Available						
				AO1	AO2	AO3	Total	Maths	Prac	
	(a)		Microscope/ light microscope	1			1			1
	(d)		Contains {chromosomes/DNA/ genetic information/ genes}/ controls (activities of) cell	1			1			1
			Question total	2	2	1	5	2		3

4.	Question		Marking details	Marks available						
				AO1	AO2	AO3	Total	Maths	Prac	
	(a)	(i)	A = Cell membrane (1) B= Vacuole (1)	2			2			
		(ii)	Chloroplast , X (1) Respiration/ releases energy/ produces ATP/ provides energy (1) NOT anaerobic respiration/ produces energy Accept respire Nucleus ✓ (1)	3			3			
	(b)	(ii)	X 100		1		1	1		1

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept	
5.	(a)	(i)	1 1 1	Cell wall; Cytoplasm; Vacuole;	Cell sap		
		(ii)	1	{Allow/ control/ lets/ enables } entry and exit of molecules/substances/ particles/ 'things';	Controls what goes in and out (of the cell)	protection	
		(b)	(i)	1	A and C;		
	(ii)	1	cytoplasm/nucleus/cell membrane;				
Total Mark		6					

6.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)		<p><i>Indicative content</i></p> <ul style="list-style-type: none"> • {rub/ swab/ scrape/ wipe/ swipe} (inside of) <u>cheek</u> (put/ place = neutral) • with the cotton wool bud • put onto slide (can apply to cells or methylene blue) • use of dropper/ drop of/ pipette • methylene (blue)/ stain • lower/ place/ put cover slip • using mounted needle • remove air bubbles <p>5–6 marks Detailed description of the entire investigation <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.</i></p> <p>3–4 marks Outline general description of the investigation <i>There is a line of reasoning which is partially coherent, largely relevant, and with some structure.</i></p> <p>1–2 marks Simple description <i>There is a basic line of reasoning which is not coherent, largely irrelevant, and with very little structure.</i></p> <p>0 marks <i>No attempt made or no response worthy of credit</i></p>		6		6		6
	(b)		clear outline (cell membrane) with nucleus reject double outline/ any plant organelles e.g. vacuole ignore labels/ multiple cells/ shape	1			1		1
			Question 6 total	1	6	0	7	0	7

7.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
7.	(a)		use x10 objective lens (1) (explanation the magnification) = eyepiece x objective/ owtte(1) NOT 10 x 10 unqualified		2		2		2
	(b)		to bring object into <u>focus</u>		1		1		1
	(c)	(i)	efficient	1					
		(ii)	tissue	1			1		
	(d)		(organs are structures made up of several) <u>tissues</u> performing one or more {functions/ jobs/ roles/ tasks}	1			1		
			Question 7 total	3	3	0	6	0	3

8.	Question	Marking details	Marks Available
	(a) (ii)	Chloroplast; Photosynthesis;	2

9.	Question			Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
9	(a)			High (power)/ x40		1		1	1	1
	(b)			drop(s) of iodine/ iodine solution(1) onto {cells/onion} (1) (Lower) coverslip (1)	3			3		3
	(c)	(i)	I	79/ 80mm		1		1		1
			II	If 79 answer = 3950 (2) If 80 answer = 4000 (2) 79 or 80/0.02, but incorrect answer =1 Ecf from (I) e.g. 76 = 3800 (2)		2		2	2	2
		(ii)		Cell wall/ vacuole	1			1		
	(d)			Able to see structures in much greater detail/ owtte references to being able to see at higher magnification.	1			1		1
				Question 9 Total	5	4	0	9	3	8

10.	Question			Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
10	(a)	(i)		40 NOT 4 cm		1		1	1	1
		(ii)		40/400 = 0.1 Ecf from (i)		1		1	1	1
	(b)			vacuole	1			1		
	(c)			mitochondrion/a (1) cell membrane (1) photosynthesis (1) nucleus (1)	1 1 1 1			1 1 1 1		
				Question 10 Total	5	2	0	7	2	2

11.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	1	Movement of {molecules/ particles} from a high concentration to a low concentration/down a concentration gradient;			Semi permeable membrane
(b) (i)	1	starch <u>molecules</u> are too big to pass through the (pores) in the {Visking tubing/ membrane}/ {holes/ pores} in the {visking tubing/ membrane} are too small for the starch <u>molecules</u> to pass through;	Reverse argument		

12.

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
(a)	movement of {substances/ gas/ molecules/ particles} {down a concentration gradient/ or description of} NOT concentrations move from high to low/ ref to SPM	1			1		

13.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	1	Active {transport/ uptake};			
(c)	3	Water passes from where <u>it</u> is in high concentration to where <u>it</u> is in low concentration / Water passes from where solute concentration is low to where solute concentration is high ; Via a semi permeable membrane (or other correct description of membrane i.e. semi/ partially) ; Indication of where the higher concentration of water/ solute is;		SPM	

14.		Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)						
	(ii)	1	Does not gain or lose {water/ volume} in this range/ stays the same in these concentration/ no net movement of water;				
(b)		2	Any two from: <ul style="list-style-type: none"> pH; Temperature; Volume of solution; 				Ph/ ph Heat
(c)		4	<ul style="list-style-type: none"> Water passes out; by osmosis; from the cell where water is in higher concentration to sea water where it is in lower concentration; Via semi-permeable membrane; 				

15.		Question	Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
15	(a)		It allows {smaller/ small} molecules to pass through	1			1		
	(b)	(i)	Diffusion (through the pores) Accept osmosis	1			1		
		(ii)	(Molecule) B (1) it can {pass/ fit through} through <u>pores</u> / A is too big to fit through <u>pores</u> / <u>pores</u> are too small for A to fit through(1)		2		2		
	(c)	(i)	Iodine is <u>small</u> (molecule) (1) (Diffuses) into visking tubing (1) (reacts with) starch which is present (to give blue black colour) (1)	1					2
				1	1		3		
		(ii)	Starch is a large (molecule) (1) Cannot {pass out (through the membrane)/ fit (through pores)} (1)		2		2		2
	(d)		Oxygen/glucose	1			1		
			Question 15 Total	5	5	0	10	0	4

16.		Question	Marking details	Marks Available
			<ul style="list-style-type: none"> Active transport/uptake; 	1
			<ul style="list-style-type: none"> Requires <u>both</u> oxygen and glucose; 	1
			<ul style="list-style-type: none"> For respiration/release of energy; 	1
			<ul style="list-style-type: none"> Rate of uptake of glucose follows rate of uptake of cadmium/Rate of uptake of cadmium follows rate of uptake of glucose/the more the rate of uptake the more glucose is used; 	1
			Question 16 Total	[4]

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		2	Any two (x1) from: Active {transport/ uptake} takes place; Against concentration gradient/ OWTTE; using {energy/respiration/ATP};			
(b)	(i)	3	Increases uptake; Enzymes involved (in respiration); Increased kinetic energy/ more successful collisions; MUST RELATE TO ENZYMES increases rate of enzyme activity = 2 marks			
	(ii)	2	Decrease in uptake; stops {respiration/ enzyme action};			
Total Mark		7				

Question	Marking details	Marks Available
(a)	(i) (Rate of) uptake of iodine decreased; to zero; No effect on uptake of water;	3
	(ii) (Process of) {active transport/ active uptake}; Requires energy; Energy release from respiration is stopped (by chemical);	3
(b)	Osmosis;	1
Question 18 Total		[7]

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)	1	90			90%
	(ii)	3	Active transport; Molecules/salts move into cells against a concentration gradient/from low to high concentration; using energy/respiration;			

20.	Question	Marking details	Marks Available
	(b)	(i) Osmosis;	1
		(ii) Water passed in; From where it was in high concentration to low concentration/ down a gradient; Via a semi/ selectively/ partially permeable membrane;	3
	(c)	Active transport;	1

21.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)		Water would pass out of the eel (1) from where it is in high concentration (in the eel) to where it is in low concentration (in the sea) (1) Through the semi permeable membrane(1) movement of salt/ solution will negate the spm mark	1 1	1		3		
	(b)	(i)	Active transport (1) Oxygen (1) Glucose/ ATP (1)	2	1		1		
			Question total	4	2	0	6	0	0

22.

Question	Marking details	Marks Available
(a)	(i) Protein; Chemical;	2
(b)	(i) I linear scale; must include number at origin and encompass all readings II plots;; +/- ½ small square -1 if line taken back to origin III line;	1 2 1
	(ii) I Increase then decrease; Optimum pH7.5 (from data/ graph) ; II Correct readings from their graph = 1 mark Correct answer from their graph = 1 mark If answer correct but no calculation = 2 marks	2 2
	(iii) Temperature affects enzyme activity; Accept reference to varying more than one variable not being a fair test	1

23.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a) i	2	both substrate molecules having entered the enzyme; an attempt to make them connect;			
ii	1	Lock and Key;		Enzyme substrate complex	
iii	2	(Boiling) alters the shape of the {enzyme/active site}/ denatures enzyme; so the molecules do not <u>fit</u> into enzyme/ active site;			
(b)	3	1 mark for each correct row;;; <div style="text-align: center; margin: 10px 0;"> </div> NB only allow marks if some cavities shaded			
Total Mark	8				

24.	Question		Marking details	Marks Available
	(a)		<ul style="list-style-type: none"> • Osmosis; • Movement of water into potato; • From where water is in high concentration to low concentration/ down concentration gradient; • Via semi permeable membrane; <i>3rd marking point linked to 2nd marking point</i>	4
	(c)		{Rate of/ volume} water passing in equals {Rate of/volume} of water passing out/no net {movement/flow} of water; NOT concentration of water is the same inside and outside the potato/dynamic equilibrium	1

25.	Question			Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	25	(a)	(i)	Y		1		1		
			(ii)	maintain optimum pH (1) for (digestive) enzymes (1)	2			2		
			(iii)	Any one (x1) from: temperature/ volume/mass of food/ volume of enzymes/ concentration of enzymes/ time the food is in the gut			1	1		
			(iv)	{Fats/ lipids/ oils} {digested/ broken down} to fatty acids and glycerol	1			1		
		(b)		protease (1) proteins {digested/ broken down} to amino acids (1)			2	2		
		(c)		Any two (x1) from: 1. artificial gut gives reproducible results/ 2. easier to control [qualified -variables of artificial gut]/ 3. some factors cannot be controlled in a human/ check repeatability (1) 4. human trials are costly/ resource intensive/OWTTE (1) 5. human trials can be ethically disputable/ ethical issues/ / there are risks to humans/ OWTTE /ORA (1) 6. no need to find volunteers (1)		2		2		
				Question 25 Total	3	3	3	9	0	0

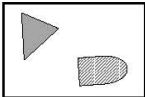
27.	Question	Marking details	Marks Available
	(a)	(i) Suitable scale properly labelled;	1
		(ii) Correct plots; ½ small square tolerance 1 error = 1 mark 2 errors = 0 No extrapolation	2
		(iii) Good quality line through the centre of the points with ruler;	1
	(b)	(i) <u>Rises</u> then <u>falls/ goes up</u> and then <u>goes down/</u> goes to maximum and then drops;	1
		(ii) Correct readings from graph shown in working; Ideally (51 – (Any reading between 23 and 24)) Consequent correct answer; (27/ 27.5/ 28) Accept ecf <i>If no working shown accept correct answer for 2 marks if consistent with graph</i>	1
	(c)	(i) 1 (cm ³) and 5 (cm ³); Fair test/ comparison;	1
		(ii) (Boiled) enzyme – <u>denatured/ destroyed</u> ; NOT 'killed'	1
	(d)	Fat;	1
Question 27 Total			[11]

28.	Question			Marking details	Marks available						
					AO1	AO2	AO3	Total	Maths	Prac	
	28	(a)		pH			1	1			1
		(b)	(i)	Scale correct with 0 or 10 at origin. Must cover more than half the grid	1			1	1		
			(ii)	All plots correct , (+/- 1 small square) (one error = 1 mark two/more errors =0)		2		2	2		
			(ii)	Quality of line		1		1	1		
		(c)	(i)	Increase (1) More (successful) collisions /OWTTE (1)		1	1	2			
			(ii)	Denaturation/ altering shape of {active site/ enzyme}/ enzyme destroyed	1			1			
			(iii)	I 40/Consistent with graph as drawn		1		1	1		
			II	Insufficient temperatures/no intermediate values (1) Increase number of temperatures tested (in 35°– 45° C range/ near optimum/ around 40) (1)			2	2			2
				Question 28 Total	2	5	4	11	5		3

29.	Question	Marking details	Marks Available
	(a)	<u>Enzyme –substrate complex</u> ;	1
	(b)	<u>Active site</u> is {changed/distorted/altere}d}/bonds in active site are broken; {Substrate/amino acid} cannot {fit/join/lock }; NOT match	2
	(c)	Temperature; pH; NOT PH/Ph Concentration of substrate; Concentration of enzyme; Reject amount/volume/mass	Max 2
Question 29 Total			[5]

30.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)		amino acids (1) lipids (1) Ignore: Fats fatty acids and glycerol (either order) (1)	3			3		
	(b)		A = 3 B = 2 C = 4 D = 1 all four correct (1)		1		1		
	(c)	(i)	{as temperature increases} {the rate/it} {rises/ increases} (1) to optimum/until 35 °C (1) NOT 6a.u. then falls (1)		3		3		
		(ii)	(shape of the) <u>active site</u> {destroyed/ changed/ deformed/ damaged} (1) <u>substrate</u> cannot {bind/ fit/ join/ attach/ connect} (1)	2			2		
			Question total	5	4	0	9	0	0

31.

Question	Marking details	Marks Available
(a)	(i) Enzyme works in {acid pH/ lower pH/ 4.5}/ (ORA); NOT low pH	1
	(ii) Enzyme denatured or destroyed;	1
	(iii) Low temperature; Meant few collisions between enzyme and {protein/ substrate} / takes {longer to make/ less} enzyme substrate complexes;	2
(b)	As below, ignore chemical bond if drawn;	
		
		1
(c)	Lock and key;	1
	Question Total	[6]