

# Characteristics and Organisation of the Organism

## Mark Scheme 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Organisation of the Organism
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 2

**Time Allowed:** 64 minutes

**Score:** /53

**Percentage:** /100

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Question		Marks	Additional Guidance
<b>1 (a)</b>	nucleus: <b>1</b> controls (activities in) the cell/AW; <b>2</b> contains, chromosomes/genes/alleles/genetic information/DNA; <b>3</b> controls how cells, develop/divide/reproduce/grow;  cell membrane: <b>4</b> forms a barrier/separates a cell from surroundings; <b>5</b> allows/controls, movement of (named) substance(s), across/in/out; <b>6</b> keeps contents of cell inside/keeps cytoplasm intact/AW;	<b>max 4</b>	I 'brain' of cell/'tells cell what to do' <b>MP1 A</b> ref to making proteins <b>A</b> makes ribosomes  e.g. O <sub>2</sub> /CO <sub>2</sub> /nutrients I ref to shape/'covers cell'/protects cell
<b>(b)</b>	a group of cells, same type/do the same function;	<b>1</b>	cells are in the same place = group
<b>(c)</b>	<b>1</b> mucus traps, particles/any example; <b>2</b> mucus protects lining; <b>3</b> (cilia) beat/create wave motion/wafting; <b>4</b> move, mucus/fluid away; <b>5</b> reduce risk of/stop, (named) pathogens entering lungs;	<b>max 3</b>	e.g. dust/bacteria/spores/virus I 'collects' particles
		<b>[Total: 8]</b>	

Question		Marks	Additional Guidance												
2 (a)	<b>A</b> – (waxy) cuticle; <b>B</b> – palisade mesophyll/palisade layer/palisade cell; <b>C</b> – (lower) epidermis/epidermal layer; <b>D</b> – stoma/stomata/guard cell(s); <b>E</b> – air/gas, space;	5	<b>I</b> outer layer/AW <b>R</b> mesophyll/palisade unqualified  <b>R</b> (spongy) mesophyll												
(b)	<table><tr><td>function</td><td>letter from Fig. 1.2</td></tr><tr><td>controls movement of substances into and out of the cell</td><td><b>G</b></td></tr><tr><td>creates a pressure to maintain the shape of the cell</td><td><b>K</b></td></tr><tr><td>produces sugars using light as a source of energy</td><td><b>L</b></td></tr><tr><td>withstands the internal pressure of the cell</td><td><b>J</b></td></tr><tr><td>controls all the activities of the cell</td><td><b>F</b></td></tr></table>	function	letter from Fig. 1.2	controls movement of substances into and out of the cell	<b>G</b>	creates a pressure to maintain the shape of the cell	<b>K</b>	produces sugars using light as a source of energy	<b>L</b>	withstands the internal pressure of the cell	<b>J</b>	controls all the activities of the cell	<b>F</b>	5	
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Question		Marks	Guidance for Examiners
2 (c) (i)	volume of, oxygen / gas, increases (with time); levels off / reaches a plateau / AW; increases rapidly at start and then slows down; use of data;	max 3	I 'reaction stops'  e.g. levels off at 6.2 cm <sup>3</sup> of oxygen at 90 seconds data quotes must have units
(ii)	substrate / hydrogen peroxide / reactant / AW, fits into enzyme; active site; shape is, complementary / AW; any reference to lock and key; product(s) / oxygen and water, formed and leaves the enzyme; AVP;	max 3	A answers in the context of catalase I 'speeds up the reaction' R if shape is the same  A product and enzyme separate e.g. enzyme can work again / enzyme not used up / enzyme is not changed during reaction / lowers activation energy
		[Total: 16]	

Question				Marks	Additional Guidance
3 (a)	structural feature	animal cell	plant cell	max 4	mark nucleus and next 3 answers    R chlorophyll
	cell wall	x	✓		
	nucleus	✓	✓;		
	(cell) membrane	✓	✓;		
	cytoplasm	✓	✓;		
	chloroplast	x	✓;		
	(large) vacuole	x	✓;		
	vacuolar sap	x	✓;		
	vacuolar membrane / tonoplast	x	✓;		
	nuclear membrane	✓	✓;		
	nucleolus	✓	✓;		

3 (b)	water moves (in) by <u>osmosis</u> ; down a water <u>potential</u> gradient / from high water <u>potential</u> to low water <u>potential</u> ; through partially permeable membrane; (both cells / vacuole) enlarge / swell / increase in volume; <u>animal</u> cell bursts; <u>plant</u> cell becomes turgid / AW;	max 4	I water concentration  A semi / selectively  A cell wall prevents bursting
(c) (i)	phloem;	1	
(ii)	(transport of sucrose out of the leaves) is low(er) in, <b>B</b> / magnesium-deficient plants; <b>ORA</b> any data quote about <b>B</b> ;  (sucrose concentration in the leaves) is high(er) in, <b>B</b> / magnesium-deficient plants; <b>ORA</b> any data quote about <b>B</b> ;	4	assume "it" refers to B  A – B = 2.4 – 2.6, A is 3 – 4 times more  B > 100, A – B = approx 90, A approx 10 times more
(iii)	max 2 for symptoms yellowing leaves / chlorosis / necrosis; less / stunted, growth; more sugar in leaves;  max 2 for explanation plants that are deficient in magnesium make, less / no, chlorophyll; less photosynthesis; less (named) sugar available to plant (due to reduce photosynthesis / reduced sucrose transport);	max 3	I stunted roots   A magnesium is part of chlorophyll  I energy / food (for sugar)
		[Total: 16]	

Question		Answers	Marks	Additional Guidance
4	(a)	body divided into/segmented three parts / head, thorax and abdomen (one pair of) antennae / feelers wings three pairs / 6 legs compound eyes	[max 3]	<b>R</b> segmented body unqualified <i>do not accept arthropod features</i>
	(b)	<u>arthropod</u> / Arthropoda	[1]	<b>must have</b> arthr so accept arthropod but reject anthropod
	(c)	chromosome nucleus mitochondria chloroplast plasmid nucleolus		Note: Apply list rule
	(d)	<p><b>1</b> two groups: 1 – 6 and 11 &amp; 12 migrate to New Zealand</p> <p><b>2</b> 1 – 6, New Caledonia / indirect / migration A</p> <p><b>3</b> 11&amp;12, direct (Australia) / migration B</p> <p><b>4</b> correct example of (evolutionary) relationship / DNA similarity, e.g. 13 &amp; 14 most distantly related from others / 9 &amp; 10 most closely related to each other</p> <p><b>5</b> ref to, clade(s) / cladogram</p>	[max 3]	

4	(e)	<p>1 adapt to environment / conditions in new places are different</p> <p>2 competition between individuals</p> <p>3 struggle for existence</p> <p>4 ref to variation</p> <p>5 survival of fittest / those that are better adapted</p> <p>6 survive</p> <p>7 reproduce, pass on their alleles; <b>A</b> genes <b>I</b> traits</p> <p>8 mutations / changes in DNA</p> <p>9 change in the gene pool / AW</p> <p>changes to physical / behaviour (of species), e.g. mating behaviour</p>	<p><b>A</b> conditions on different islands are different</p> <p>Mpt 9 <b>R</b> changes of individuals</p> <p>[max 4]</p>
[Total: 13]			