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**

Question		Marks	Additional Guidance
1 (a)	nucleus: **1** controls (activities in) the cell / AW; **2** contains, chromosomes / genes / alleles / genetic information / DNA; **3** controls how cells, develop / divide / reproduce / grow; **4** cell membrane: **5** forms a barrier / separates a cell from surroundings; **6** allows / controls, movement of (named) substance(s), across / in / out; keeps contents of cell inside / keeps cytoplasm intact / AW;	**max 4**	**I** 'brain' of cell / 'tells cell what to do' **MP1 A** ref to making proteins **A** makes ribosomes e.g. O_2 / CO_2 / nutrients **I** ref to shape / 'covers cell' / protects cell
(b)	a group of cells, same type / do the same function;	**1**	cells are in the same place = group
(c)	**1** mucus traps, particles / any example; **2** mucus protects lining; **3** (cilia) beat / create wave motion / wafting; **4** move, mucus / fluid away; **5** reduce risk of / stop, (named) pathogens entering lungs;	**max 3**	e.g. dust / bacteria / spores / virus **I** 'collects' particles
		[Total: 8]	

<table>
<tr><th>Question</th><th></th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>2 (a)</td><td>A – (waxy) cuticle;
B – palisade mesophyll / palisade layer / palisade cell;
C – (lower) epidermis / epidermal layer;
D – stoma / stomata / guard cell(s);
E – air / gas, space;</td><td>5</td><td>I outer layer / AW
R mesophyll / palisade unqualified

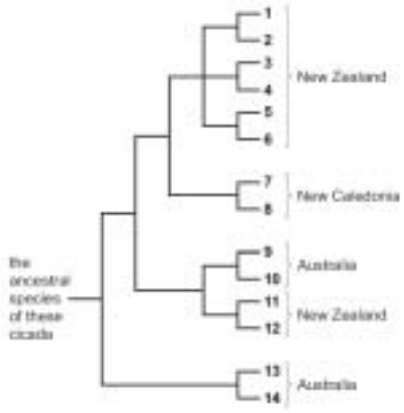
R (spongy) mesophyll</td></tr>
<tr><td>(b)</td><td>
<table>
<tr><th>function</th><th>letter from Fig. 1.2</th></tr>
<tr><td>controls movement of substances into and out of the cell</td><td>G</td></tr>
<tr><td>creates a pressure to maintain the shape of the cell</td><td>K</td></tr>
<tr><td>produces sugars using light as a source of energy</td><td>L</td></tr>
<tr><td>withstands the internal pressure of the cell</td><td>J</td></tr>
<tr><td>controls all the activities of the cell</td><td>F</td></tr>
</table>
</td><td>5</td><td></td></tr>
</table>

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^3 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]	

<table>
<tr><th>Question</th><th></th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>3 (a)</td><td>
<table>
<tr><th>structural feature</th><th>animal cell</th><th>plant cell</th></tr>
<tr><td>cell wall</td><td>×</td><td>✓</td></tr>
<tr><td>nucleus</td><td>✓</td><td>✓;</td></tr>
<tr><td>(cell) membrane</td><td>✓</td><td>✓;</td></tr>
<tr><td>cytoplasm</td><td>✓</td><td>✓;</td></tr>
<tr><td>chloroplast</td><td>×</td><td>✓;</td></tr>
<tr><td>(large) vacuole</td><td>×</td><td>✓;</td></tr>
<tr><td>vacuolar sap</td><td>×</td><td>✓;</td></tr>
<tr><td>vacuolar membrane / tonoplast</td><td>×</td><td>✓;</td></tr>
<tr><td>nuclear membrane</td><td>✓</td><td>✓;</td></tr>
<tr><td>nucleolus</td><td>✓</td><td>✓;</td></tr>
</table>
</td><td>max 4</td><td>mark nucleus and next 3 answers

R chlorophyll</td></tr>
</table>

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** / magnesium-deficient plants; **ORA** any data quote about **B**; (sucrose concentration in the leaves) is high(er) in, **B** / magnesium-deficient plants; **ORA** any data quote about **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		E	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]	**R** segmented body unqualified *do not accept arthropod features*
	(b)		arthropod / Arthropoda	[1]	**must have** arthr so accept arthropod but reject anthropod
	(c)		chromosome nucleus mitochondria chloroplast plasmid nucleolus		Note: Apply list rule
	(d)	**1** **2** **3** **4** **5**	two groups: 1 – 6 and 11 & 12 migrate to New Zealand 1 – 6, New Caledonia / indirect / migration A 11&12, direct (Australia) / migration B correct example of (evolutionary) relationship / DNA similarity, e.g. 13 & 14 most distantly related from others / 9 & 10 most closely related to each other ref to, clade(s) / cladogram	[max 3]	

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