

Characteristics and Classification of Living Organisms

Mark Scheme 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Characteristics and Classification of Living Organisms
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 2

Time Allowed: 69 minutes

Score: /57

Percentage: /100

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	Answers	Marks	Guidance for Examiners																														
1 (a)	<table><tr><th>group of vertebrates</th><th>scaly skin</th><th>external ear (pinna)</th><th>feathers</th><th>mammary glands</th></tr><tr><td>birds</td><td>✓</td><td>x</td><td>✓</td><td>x</td></tr><tr><td>bony fish</td><td>✓</td><td>x</td><td>x</td><td>x ;</td></tr><tr><td>amphibians</td><td>x</td><td>x</td><td>x</td><td>x ;</td></tr><tr><td>reptiles</td><td>✓</td><td>x</td><td>x</td><td>x ;</td></tr><tr><td>mammals</td><td>x</td><td>✓</td><td>x</td><td>✓ ;</td></tr></table>	group of vertebrates	scaly skin	external ear (pinna)	feathers	mammary glands	birds	✓	x	✓	x	bony fish	✓	x	x	x ;	amphibians	x	x	x	x ;	reptiles	✓	x	x	x ;	mammals	x	✓	x	✓ ;	[4]	
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mammals	x	✓	x	✓ ;																													
(b)	<ul style="list-style-type: none">• either fruit is soft or seeds, are hard / thick / have a hard / thick / protective covering or testa ;• no enzymes to digest, testa / seed coat / seed ;	[2]	I refs to teeth																														

	Answers	Marks	Guidance for Examiners
1 (c)	1 wind (dispersal) ; 2 'hairs' / wing(s), on seed / fruit, to aid dispersal ; 3 self– (dispersal) ; 4 explosive, pods / fruits ; 5 water (dispersal) ; 6 float / buoyant ;	[max 2]	A parachute / light I fur I pollination
(d)	oxygen ; warmth / warm temperature ; water ;	[max 2]	A suitable quoted warm temp, 15–30°C I humidity
(e)	1 (cassowaries are large birds) so need large, territory / habitat / feeding area / lots of space ; 2 cannot fly so cannot move easily from one area to another ; 3 need many trees to produce enough fruit ; 4 cassowaries are dependent on many (tree) species ; 5 need suitable nesting areas ;	[max 3]	
	[Total: 13]		

Question		E Answers	Marks	Additional Guidance
2	(a)	<u>arth</u> ropods/ <u>Arth</u> ropoda ;	[1]	R 'anthropod'
	(b)	<p>A – spiny/oval, carapace/AW ; jagged edge of carapace ; claws same length ; eyes on (short) stalks ;</p> <p>B – long/coiled/soft , abdomen ; abdomen not under carapace ; (long) antennae ; multiple, appendages/mouth parts ; <u>shorter</u> back (walking) legs ; uneven length of, chelipeds/claws/pincer ; hair on claws ; eyes on stalks ;</p> <p>C – uneven length of, chelipeds/claws/pincers ; square/rectangular, carapace ; eyes on (long) stalks ;</p> <p>D – rounded/flattened/less hairy, back/hind (walking) legs ; <u>longer/wider</u> back (walking) legs (compared to other legs) ; jagged edge on claws ; jagged/pointed edge, of carapace ; short antennae ; no eye stalks ; claws same length ;</p>	[4]	<p>A descriptions of carapace/back/'shell' ignore <u>exoskeleton</u> for carapace</p> <p>ignore 'tail' for abdomen ignore segmented abdomen</p> <p>ignore clamp ignore fur for hair</p> <p>A <u>larger/bigger</u> as BOD (for hind legs)</p>

Question			Answers	Marks	Additional Guidance
2	(c)	(i)	mass ; size of a named suitable feature ; length of named suitable feature ; width of named suitable feature; number of hairs ; number of spikes/roughness ; thickness of a suitable named feature ; hardness of a suitable named feature ; depth of colour ;	[max 1]	<i>features qualified in (c)(ii) may be credited in (c)(i)</i> R number of anything absolute (e.g. legs) R shape unqualified R colour unqualified R fur ignore comparing species rather than individuals
		(ii)	balance/weighing machine/scales ; use of ruler described ; calipers ; any other suitable method for the feature given in (i) ;	[max 1]	ignore measure unqualified No ECF from (c)(i)
2	(d)	1 2 3 4, 5 6 7	population remains the same if birth rate = death rate/ref to carrying capacity ; death rate must be high ; many young crabs do not survive to, adulthood/breed ; example of cause of high death rate ;; lack of/competition for, food ; ref to <u>limiting factor</u> (s) ;	[max 3]	<i>examples of MP4 and MP5</i> eaten by predators competition with other crabs (of the same species/other species) competition with other non-crab species (infectious) disease effect of abiotic factor (e.g. dehydration) indirect effect of man, e.g. pollution/habitat destruction genetic disease/genetic 'fault' fishing/crabbing

2	(e)	<p>1 stops/reduces, blood loss/bleeding ;</p> <p>2 reduce (bacterial) infection/bacteria killed in wound ;</p> <p>3 (clotting) prevents entry of pathogens ;</p> <p>4 more <u>red</u> blood cells, trapped in mesh/fibrin (forming a clot/scab) ;</p> <p>5 promotes healing ;</p> <p>6 (in an emergency) may need wound to be sealed quickly ;</p> <p>7 less chance of allergies ;</p>	<p>[max 3]</p>	<p>ignore bandages help quicker clotting</p> <p>R <u>viral</u> infections</p>
			[Total: 13]	

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Question		E	Answers	Marks	Additional Guidance																								
3	(a)		segmented body / segmentation ; jointed, limbs / legs ; exoskeleton / outer skeleton ;	3																									
	(b)	5 / 6 RIGHT = 4 4 RIGHT = 3 3 RIGHT = 2 1 / 2 RIGHT = 1 0 RIGHT = 0	<table><tr><td><i>Abaliella dicranotarsalis</i></td><td>E</td></tr><tr><td>go to 2</td><td></td></tr><tr><td>go to 3</td><td></td></tr><tr><td>go to 4</td><td></td></tr><tr><td><i>Tegenaria domestica</i></td><td>A</td></tr><tr><td><i>Odielus spinosus</i></td><td>G</td></tr><tr><td><i>Chelifer tuberculatus</i></td><td>D</td></tr><tr><td>go to 5</td><td></td></tr><tr><td><i>Poecilotheria regalis</i></td><td>F</td></tr><tr><td>go to 6</td><td></td></tr><tr><td><i>Tyroglyphus longior</i></td><td>C</td></tr><tr><td><i>Ixodes hexagonus</i></td><td>B</td></tr></table>	<i>Abaliella dicranotarsalis</i>	E	go to 2		go to 3		go to 4		<i>Tegenaria domestica</i>	A	<i>Odielus spinosus</i>	G	<i>Chelifer tuberculatus</i>	D	go to 5		<i>Poecilotheria regalis</i>	F	go to 6		<i>Tyroglyphus longior</i>	C	<i>Ixodes hexagonus</i>	B	4	
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4 (a) (i)	<i>either</i> insects 1 and 2, are in the same <u>genus</u> / have the same <u>generic</u> name ; (both have) <i>Vespula</i> ; <i>or</i> insect 3 is in a different <u>genus</u> ; (its name is) <i>Callicera</i> ;	[max 2]	ignore any references to the species
(ii)	<i>insects 1 and 2</i> have two pairs of wings ; have antennae that are, long(er) / same shape / thick ; have small(er) eyes ; have stripes / have a pattern / have similar markings ; any correct reference to size ; e.g. 'they have similar size' AVP ; e.g. similar shape of abdomen	[max 2]	R any feature of 1 and 2 that is said to be 'similar' unless qualified A four wings R two wings A 'feelers' / bent shape R stripes on thorax R similar shape unqualified
(b)	predators / other animals, mistake it for, <i>Vespula</i> / <i>V. flavopilosa</i> ; predators / other animals, recognise, warning appearance / stripes / AW ; 'fear of' painful sting / frightened of being stung ; do not eat it / avoid it / do not attack it / do not go near it ;	[max 2]	
(c) 1 2 3 4 5 6 7 8	<u>mutation</u> ; gives stripes ; (some) stripey insects were not, eaten / killed (by, predators / other animals) ; survived ; to, breed / reproduce / mate ; pass on the allele(s) for stripes (to next generation) ; A gene(s) non-stripey insects, did not survive / became extinct / died out ; (natural) selection ; A ref. to selected for / selected against	[max 5]	R camouflage
[Total: 11]			

Question	Expected Answers	Marks	Additional Guidance
5 (b) (i)	<i>Glycine</i> ;	[1]	R <i>Glycine max</i>
(ii)	network / AW, of veins / one (large) central vein ; broad leaves ; two, cotyledons / seed leaves ; flower parts in multiples of, 4 / 5 ; central / main, root ; vascular bundles regularly arranged ; has (true) secondary growth ;	[max 2]	A reverse arguments I large leaves R parts A 'not in 3s' A vascular bundles not irregularly arranged
[Total: 13]			