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

		Answers	Marks	Guidance for Examiners
1	(a)		[4]	
	(b)	• *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

Table for 1(a):

group of vertebrates	scaly skin	external ear (pinna)	feathers	mammary glands
birds	✓	✗	✓	✗
bony fish	✓	✗	✗	✗ ;
amphibians	✗	✗	✗	✗ ;
reptiles	✓	✗	✗	✗ ;
mammals	✗	✓	✗	✓ ;

		Answers		Marks	Guidance for Examiners
1	**(c)**	**1**	wind (dispersal) ;		**A** parachute / light **I** fur
		2	'hairs' / wing(s), on seed / fruit, to aid dispersal ;		
					I pollination
		3	self– (dispersal) ;		
		4	explosive, pods / fruits ;		
		5	water (dispersal) ;		
		6	float / buoyant ;		
				[max 2]	
	(d)		oxygen ;		**A** suitable quoted warm temp, 15–30°C
			warmth / warm temperature ;		**I** humidity
			water ;	**[max 2]**	
	(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)**		arthropods/<u>Arthropoda</u> ;	[1]	**R** 'anthropod'
	(b)		**A** – spiny/oval, carapace/AW ; jagged edge of carapace ; claws same length ; eyes on (short) stalks ; **B** – long/coiled/soft , abdomen ; abdomen not under carapace ; (long) antennae ; multiple, appendages/mouth parts ; shor<u>ter</u> back (walking) legs ; uneven length of, chelipeds/claws/pincer ; hair on claws ; eyes on stalks ; **C** – uneven length of, chelipeds/claws/pincers ; square/rectangular, carapace ; eyes on (long) stalks ; **D** – rounded/flattened/less hairy, back/hind (walking) legs ; long<u>er</u>/wid<u>er</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 ;	[4]	**A** descriptions of carapace/back/'shell' ***ignore*** <u>exoskeleton</u> for carapace ***ignore*** 'tail' for abdomen ***ignore*** segmented abdomen ***ignore*** clamp ***ignore*** fur for hair **A** larg<u>er</u>/bigg<u>er</u> as BOD (for hind legs)

Question			E 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]	*features qualified in **(c)(ii)** may be credited in **(c)(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]	*examples of* **MP4** *and* **MP5** 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)	1	stops/reduces, blood loss/bleeding ;		*ignore* bandages help quicker clotting
		2	reduce (bacterial) infection/bacteria killed in wound ;		
		3	(clotting) prevents entry of pathogens ;		**R** <u>viral</u> infections
		4	more <u>red</u> blood cells, trapped in mesh/fibrin (forming a clot/scab) ;		
		5	promotes healing ;		
		6	(in an emergency) may need wound to be sealed quickly ;		
		7	less chance of allergies ;	[max 3]	
			[Total: 13]		

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			

Abaliella dicranotarsalis	**E**
go to 2	
go to 3	
go to 4	
Tegenaria domestica	**A**
Odielus spinosus	**G**
Chelifer tuberculatus	**D**
go to 5	
Poecilotheria regalis	**F**
go to 6	
Tyroglyphus longior	**C**
Ixodes hexagonus	**B**

Marks: 4

[Total: 7]

Question	E	answers	Mark	Additional Guidance
4 (a (i)		*either* insects 1 and 2, are in the same <u>genus</u> / have the same <u>generic</u> name ; (both have) *Vespula* ; *or* insect 3 is in a different <u>genus</u> ; (its name is) *Callicera* ;	[max 2]	*ignore* any references to the species
(ii)		*insects 1 and 2* 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, *Vespula* / *V. flavopilosa* ; 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	E	Answers	Marks	Additional Guidance
5 (a (i)		**A** – pollen tube ; **B** – ovule ; **C** – egg cell / female gamete / female nucleus ;	[3]	**R** egg / ovum
(ii)	1 2 3 4 5 6 7 8	(stigma) place where pollen grain, germinates / develops (to form a tube) ; growth of pollen <u>tube</u> (down the style) ; pollen tube / **A**, enters, ovule / **B** ; ref to micropyle ; tip of, pollen tube / **A**, opens ; (male) nucleus / gamete fuses with, female gamete / nucleus / egg cell (nucleus) / **C** ; forms zygote ; diploid ;	[max 3]	**I** lands MP2 **A** male gamete travels down **R** pollen grain moves linked to pollen tube **A** ovum as an *ecf*
(iii)	 1 2 3 4 5 6 7 8 9 10 11	**max 3 for advantages OR disadvantages** *advantages* *idea that* self-pollination perpetuates variety that is well adapted to habitat ; greater chance of pollination / ensures pollination occurs ; **A** reproduction / fertilisation less wastage of pollen / gametes / energy (in pollen production) ; *idea that* useful if no other plants (of same species) nearby ; no need for pollinating agent ; *disadvantages* less, variation ; ref. to genotype becoming homozygous ; ref. to harmful alleles (**A** genes) ; less chance of adapting to changing conditions / AW ; more susceptible to diseases ; may become extinct ;	[max 4]	 **I** faster **R** ref. to clones / genetically identical

Question	Expected Answers	Marks	Additional Guidance
5 **(b) (i)**	*Glycine* ;	[1]	**R** *Glycine max*
(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]	