<table>
<tr><th></th><th>Answers</th><th>Marks</th><th>Guidance for Examiners</th></tr>
<tr><td>1 (a)</td><td>
<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>×</td><td>✓</td><td>×</td></tr>
<tr><td>bony fish</td><td>✓</td><td>×</td><td>×</td><td>× ;</td></tr>
<tr><td>amphibians</td><td>×</td><td>×</td><td>×</td><td>× ;</td></tr>
<tr><td>reptiles</td><td>✓</td><td>×</td><td>×</td><td>× ;</td></tr>
<tr><td>mammals</td><td>×</td><td>✓</td><td>×</td><td>✓ ;</td></tr>
</table>
</td><td>[4]</td><td></td></tr>
<tr><td>(b)</td><td>• 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 ;</td><td>[2]</td><td>I refs to teeth</td></tr>
</table>

	Answers		Marks	Guidance for Examiners
1 (c)	**1** **2** **3** **4** **5** **6**	wind (dispersal) **;** 'hairs' / wing(s), on seed / fruit, to aid dispersal **;** self– (dispersal) **;** explosive, pods / fruits **;** water (dispersal) **;** 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** **2** **3** **4** **5**	(cassowaries are large birds) so need large, territory / habitat / feeding area / lots of space **;** cannot fly so cannot move easily from one area to another **;** need many trees to produce enough fruit **;** cassowaries are dependent on many (tree) species **;** need suitable nesting areas **;**	**[max 3]**	
			[Total: 13]	

Question		E Answers	Marks	Additional Guidance
2	**(a)**	arthropods/Arthropoda **;**	[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 **;** shorter 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 **;** longer/wider 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*** exoskeleton for carapace ***ignore*** 'tail' for abdomen ***ignore*** segmented abdomen ***ignore*** clamp ***ignore*** fur for hair **A** larger/bigger 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** **2** **3** **4** **5** **6** **7**	stops/reduces, blood loss/bleeding **;** reduce (bacterial) infection/bacteria killed in wound **;** (clotting) prevents entry of pathogens **;** more <u>red</u> blood cells, trapped in mesh/fibrin (forming a clot/scab) **;** promotes healing **;** (in an emergency) may need wound to be sealed quickly **;** less chance of allergies **;**	[max 3]	***ignore*** bandages help quicker clotting **R** <u>viral</u> infections
				[Total: 13]	

<table>
<tr><th colspan="2">Question</th><th>E Answers</th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>3</td><td>(a)</td><td>segmented body / segmentation ;
jointed, limbs / legs ;
exoskeleton / outer skeleton ;</td><td>3</td><td></td></tr>
<tr><td colspan="5"></td></tr>
<tr><td></td><td>(b)</td><td>5 / 6 RIGHT = 4
4 RIGHT = 3
3 RIGHT = 2
1 / 2 RIGHT =1
0 RIGHT = 0</td><td>
<table>
<tr><td>Abaliella dicranotarsalis</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>Tegenaria domestica</td><td>A</td></tr>
<tr><td>Odielus spinosus</td><td>G</td></tr>
<tr><td>Chelifer tuberculatus</td><td>D</td></tr>
<tr><td>go to 5</td><td></td></tr>
<tr><td>Poecilotheria regalis</td><td>F</td></tr>
<tr><td>go to 6</td><td></td></tr>
<tr><td>Tyroglyphus longior</td><td>C</td></tr>
<tr><td>Ixodes hexagonus</td><td>B</td></tr>
</table>
</td><td>4</td><td></td></tr>
<tr><td colspan="4">[Total: 7]</td><td></td></tr>
</table>

Question	E answers	Mark	Additional Guidance
4 (a) (i)	*either* insects 1 and 2, are in the same genus / have the same generic name ; (both have) *Vespula* ; *or* insect 3 is in a different genus ; (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	mutation ; 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)		**max 3 for advantages OR disadvantages** *advantages*		
	1 **2** **3** **4** **5**	*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 **;**		**I** faster
		disadvantages		
	6 **7** **8** **9** **10** **11**	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]	**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]	