

Question Number	Answer	Mark
1(a)(i)	C – hydrolysis ;	(1)

Question Number	Answer	Mark
1(a)(ii)	C – glucose ;	(1)

Question Number	Answer	Mark
1(b)	<ol style="list-style-type: none"> 1. reference to {low pH / (hydrochloric) acid / HCl / eq} ; 2. idea that acid destroys bacteria ; 3. reference to {low / no} oxygen ; 4. reference to using anaerobic respiration ; 5. idea of resistant to {(stomach) enzymes / protease / named protease} ; 6. idea of bacterial cell resistant to digestion ; 7. ref to adaptation to cow's temperature ; 	(3)

Question Number	Answer	Mark
1(c)(i)	<ol style="list-style-type: none"> 1. group A = 720 and group B = {662 / 662.4} ; 2. units correct = {dm³ day⁻¹ / dm³ per day} ; 	(2)

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<p>* 1(c)(ii) QWC</p>	<p>Take into account quality of written communication when awarding the following points.</p> <ol style="list-style-type: none"> 1. reference to less { <i>greenhouse gas / methane / carbon dioxide</i> } ; 2. <i>carbon dioxide</i> and <i>methane</i> are (both) { <i>greenhouse gases / cause greenhouse effect</i> } ; 3. (that can) { <i>absorb / trap / eq</i> } { <i>heat / infra red / longer wavelengths</i> } (<i>radiation</i>) ; 4. { <i>reflected / eq</i> } from the Earth / eq ; 5. reference to decrease in { <i>these gases / carbon dioxide / methane</i> } leads to { <i>reduced / eq</i> } <i>greenhouse effect</i> ; 6. idea of <i>methane</i> having a greater <i>greenhouse effect</i> than <i>carbon dioxide</i> ; 7. idea of <i>temperature</i> of { <i>Earth's surface / atmosphere</i> } less likely to rise ; 8. reference to reduced possibility of <i>climate change</i> ; 9. description of example of effect of this (e.g. ice caps melting, crop failure) ; 	<p>(5)</p>

Question Number	Answer	Mark
2 (a)	1. natural ; 2. evolution / speciation / reproduction; 3. behavioural ;	(3)

Question Number	Answer	Mark								
2 (b)	<table border="1"> <thead> <tr> <th>Description</th> <th>Adaptation</th> </tr> </thead> <tbody> <tr> <td>Hearing becoming temporarily less sensitive after listening to a loud music for a few hours</td> <td>Physiological ;</td> </tr> <tr> <td>Heart beats faster when the hormone adrenaline is released</td> <td>Physiological ;</td> </tr> <tr> <td>People in a cold climates having a shorter neck than people living in hot, dry conditions</td> <td>Anatomical ;</td> </tr> </tbody> </table>	Description	Adaptation	Hearing becoming temporarily less sensitive after listening to a loud music for a few hours	Physiological ;	Heart beats faster when the hormone adrenaline is released	Physiological ;	People in a cold climates having a shorter neck than people living in hot, dry conditions	Anatomical ;	(3)
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3(a)	A ;	(1)

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*3(b) QWC	<p>(QWC - Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. idea of <i>geographical isolation</i> e.g. <i>physical barrier</i> between Corsican and mainland birds / <i>allopatric speciation</i> ; 2. idea that there are different <i>selection pressures</i> (between Corsica and the mainland) ; 3. an example of selection pressure e.g. food source, different habitats ; 4. idea that <i>mutations</i> occurred ; 5. Idea that this results in <i>adaptation</i> to the conditions ; 6. these {<i>alleles /genes</i>} passed on (to <i>offspring</i>); 7. idea of change in <i>gene pool</i> e.g. increasing <i>frequency</i> of (these) <i>alleles</i>, changes in <i>gene pool</i> ; 8. reference to <i>reproductive isolation</i> (of Corsican nuthatches from mainland nuthatches) ; 9. idea that birds on mainland could live in all regions as there is no restriction on <i>gene flow</i> ; 	(5)

Question Number	Answer	Mark
3(c)(i)	<p>ACCEPT the converse in the context of <i>S. europaea</i>, if clearly expressed</p> <ol style="list-style-type: none"> reference to <i>S. whiteheadi</i> adapted to {colder / mountainous} regions ; (if climate warms) {food supply / pine seeds / invertebrates} less available ; idea of {small population / only 2500 pairs} (of <i>S. whiteheadi</i>) ; idea of limited {gene pool / genetic diversity / variety of alleles} ; idea that all the <i>S. whiteheadi</i> will be adversely affected ; idea that the <i>S. whiteheadi</i> cannot fly to other regions ; 	(3)

Question Number	Answer	Mark
3(c)(ii)	<ol style="list-style-type: none"> idea that <i>S. whiteheadi</i> have a variety of food sources e.g. can change their feeding habits, eat seeds and invertebrates} ; idea that {more / different} {invertebrates / seeds / food / eq} might become available ; idea that they have another allele that gives a survival advantage ; idea that they could migrate (NOT south, somewhere warmer) ; 	(2)

Question Number	Answer	Mark
3(d)	<ol style="list-style-type: none"> idea of captive-breeding programmes ; reference to {conserve / preserve / eq} {alleles / genes / gene pools} ; reference to {re-introduction / releasing of <i>S. whiteheadi</i> into suitable habitats} ; 	(2)

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4(b)	<p>N.B. D = description; E = explanation Points to be paired i.e. cannot score three marks for three D points</p> <p>1D {haploid / 23 chromosomes / half set of chromosomes in } nucleus ; 1E so that {{diploid / eq} number / full complement / 46 chromosomes} restored(at fertilisation) ;</p> <p>2D lipid droplets / food store / eq ; 2E supplies {energy / nutrients} for division / eq ;</p> <p>3D large (cell) {size / surface area / eq} ; 3E increased chance of fertilisation / eq ;</p> <p>4D reference to {cortical granules / lysosomes / zona pellucida} (in cytoplasm) ; 4E to prevent {more sperm entry / polyspermy / eq} ;</p> <p>5D reference to {release / eq} of a {chemical / eq} ; 5E to attract sperm / chemotaxis / eq ;</p> <p>6D membrane with '(sperm) receptors' on surface / eq ; 6E to allow sperm to {bind / eq} ;</p> <p>7D {much / eq} mRNA present ; 7E to allow early translation of transcription factors / eq ;</p>	max (4)

Question Number	Answer	Mark
4(c)	<ol style="list-style-type: none"> 1. {pine needles /extract / filter paper soaked in extract} placed on {agar plate / in wells / eq} ; 2. with bacterial {lawn / eq} ; 3. reference to sterile/aseptic approach e.g. appropriate reference to sealing ; 4. reference to an appropriate time (for incubation) e.g. 24 hours, 1 week ; 5. (incubate at) a sensible temperature suggested e.g. 25°C ; NOT 37°C / human body temp 6. (looking for) {clear area / inhibition zone / loss of cloudiness /reduced cell number/ eq} (around pine needles, extract / filter paper / wells) ; 7. (clear area) shows no bacteria / eq ; 8. reference to suitable control ; 	<p style="text-align: right;">max (5)</p>