



Mark schemes

**Q1.**

(a)

Classification group
Kingdom
Phylum
Class
Order
Family
Genus
Species

*all 4 correct = 2 marks*  
*2 or 3 correct = 1 mark*  
*0 or 1 correct = 0 marks*

2

(b) *Geospiza fortis*

*ignore underlining or attempted italics or upper and lower case letters*

1

(c) offspring have similar beak depths to parents

*ignore same beak depths*  
*ignore positive correlation / described*

1

(d) parents of a given beak depth produce offspring with several beak depths

*allow spread of results for a given parental beak depth about line of best fit*  
*allow range of phenotypes for a given parental beak depth*

1

(e) colonisers of Isabela have a range of beak depths

*allow colonisers of Daphne have a range of beak depths*

1

due to different combinations of alleles of several genes

**or**

due to different alleles of one gene

**or**



due to mutation	1
large range of (sizes / species of) seeds / food (on Isabela) <b>or</b> large(r) seeds (on Isabela) <i>allow small range of (sizes / species of) seeds / food on Daphne</i> <b>or</b> <i>allow small(er) seeds on Daphne</i>	1
more competition for seeds / food (on Isabela) <i>allow less competition for seeds / food on Daphne</i> <i>ignore competition unqualified</i>	1
birds with larger beaks get enough food to (survive and) reproduce (on Isabela) <i>allow birds with smaller / medium beak sizes get enough food to (survive and) reproduce on Daphne</i>	1
(survivors) pass on (beneficial) alleles to offspring <i>allow pass on genes / mutation ignore pass on chromosomes / characteristics</i>	1
(f) Isabela is a large island with more species of plants <b>or</b> Isabela is a large island with more variety in seed / food sizes <b>or</b> Isabela is a large island with more plants / seeds / food	1
less competition for seeds / food <b>or</b> enough seeds / food for both bird species	1
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**Q2.**

- |                          |   |
|--------------------------|---|
| (a) <i>Elasmotherium</i> | 1 |
| (b) eukaryota            | 1 |
| (c) Carl Woese           | 1 |
| (d) any <b>one</b> from: |   |



- fighting / competing for mates / food / territory
  - to kill predators / prey  
*allow for defence / protection*
- 1
- (e) (bones **or** hard tissues) did not decay  
*allow soft tissues decayed **or** were eaten*  
*allow other parts decayed or were eaten*  
*allow horn could be damaged / lost in fighting*
- 1
- (f) any **one** from:
- compare to other fossils of known age  
*allow compare with the fossil record*
  - by the age of the rocks (where fossil was found)  
*allow depth underground (where fossil was found)*  
*allow (radio)carbon / isotope dating*  
*allow DNA analysis*
- 1
- (g) 0.05 (million years ago)
- 1
- (h) 0.2 – 0.05  
*allow 0.05 × 3*  
*allow ecf from question (g)*
- 1
- 0.15
- 1
- 150 000 (years)  
*allow 0.15 million (years)*
- 1
- (i) any **two** from:
- ignore pollution*
  - drought
  - ice age / global warming
  - volcanic activity  
*allow earthquakes / tsunami*
  - asteroid / meteor collision
  - (new) predators  
*allow hunters / poachers / eaten*
  - (new) disease  
*allow named pathogen*
  - competition for food  
*allow lack of food*
  - competition for mates  
*allow isolation **or** lack of mates*



- lack of habitat **or** habitat change  
*if no other marks awarded allow natural disaster **or** climate change **or** catastrophic event for 1 mark*

2

[12]

**Q3.**

- (a) same kingdom + phylum + class + order  
**or**  
same order  
**or**  
they have the top four groups the same  
*allow both Poales*

1

- (b) **Rr / rR**  
  
*do **not** accept **RR** or **rr**  
ignore heterozygous  
do **not** accept homozygous*

1

- (c) **C<sup>W</sup>C<sup>W</sup>**

1

- (d)  
  
*allow **R** and **W** throughout  
allow own symbols if defined*

parental genotypes / gametes correct for both parents:  
**C<sup>R</sup> C<sup>W</sup> C<sup>R</sup> C<sup>W</sup> / C<sup>R</sup> and C<sup>W</sup>**

1

genotypes of offspring correctly derived in a Punnett square:  
**C<sup>R</sup>C<sup>R</sup> C<sup>R</sup>C<sup>W</sup> C<sup>W</sup>C<sup>W</sup>**  
*allow correctly derived genotypes from incorrect gametes*

1

correct identification of phenotypes from their cross:  
**C<sup>R</sup>C<sup>R</sup> = red**  
**C<sup>R</sup>C<sup>W</sup> = pink**  
**C<sup>W</sup>C<sup>W</sup> = white**  
*allow colours correctly identified from different offspring, only if pink and other colour(s) are given*

1

- (e) answer correctly derived from part **(d)** to match stated phenotypes  
*allow 50(%) if no offspring given in part **(d)**  
allow to match genotypes if no phenotypes given*

1



(f) *(several groups)*  
 so many / several plants can be produced  
*allow each (group) will give a new plant*

1

*(nutrients)*  
 for making protein / amino acids **or** for making  
 chlorophyll **or for providing energy or for  
 respiration**

*allow other examples*  
*do **not** accept making energy*  
*ignore for growth*

1

*(add hormones)*  
 so differentiation occurs **or** so roots / shoots develop  
*allow for the formation of different  
 tissues / organs / named*  
*allow to stimulate cell division*

1

*(sterile conditions)*  
 to prevent growth / entry of microorganisms /  
 named type **or** prevent decay / disease  
*ignore to kill microorganisms*  
*ignore contamination unqualified*

1

*(temperature = 20 °C)*  
 so optimum / good growth  
*allow reference to enzymes working  
 well*  
*ignore enzymes not denatured*  
*ignore reference to pathogens /  
 microorganisms*

1

(g) (all new plants have been) produced by asexual  
 reproduction / mitosis **or** produced without (fusion  
 of) gametes  
*ignore produced from one parent*

1

(so) all are genetically identical / clones **or** all are  
**C<sup>R</sup>C<sup>w</sup>** / heterozygous  
*allow all are the same genotype / alleles  
 / genes / DNA*

1

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**Q4.**

(a)



Classification group	Name
Class	<i>Mammalia</i>
Order	<i>Primates</i>
Family	<i>Lemuroidea</i>
Species	<i>catta</i>

*all 4 correct = 2 marks*  
*2 or 3 correct = 1 mark*  
*0 or 1 correct = 0 marks*

2

(b) Lemur catta

*ignore capitalisation / non-capitalisation of initial letters*

*ignore italics / non-italics*

*ignore underlining / non-underlining*

1

(c) carried by (favourable) currents on masses of vegetation

*allow description of currents from Figure 2*

*ignore swimming*

1

(d) isolation of different populations

1

habitat variation between lemur populations

*allow examples – biotic (e.g. food / predators) or abiotic (e.g. temperature)*

1

genetic variation or mutation (in each population)

1

better adapted survive (reproduce) **and** pass on (favourable) allele(s) to offspring

*allow natural selection **or** survival of the fittest **and** pass on (favourable) allele(s) to offspring*

*allow gene(s) / mutation as an alternative to allele(s)*

1

(eventually) cannot produce fertile offspring with other populations

*allow cannot reproduce 'successfully' with other populations*

*ignore cannot reproduce unqualified*

1

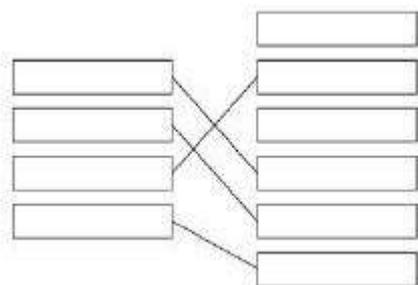
[9]



**Q5.**

(a) Carl Linnaeus 1

(b) Lithops 1  
*extras cancel*  
*ignore capitalisation / non-capitalisation*



(c) 1  
*1 mark per line*  
*extra line from adaptation negates the mark for that adaptation*  
1  
1  
1  
1

(d) any **two** from: 2

- cooler underground / at night
- or**
- the jerboa can keep cool
- loses less water
- or**
- sweats less
- less likely to be seen (by predators / prey)

(e) behavioural 1

**[9]**