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)
or
large(r) seeds (on Isabela)

allow small range of (sizes / species of) seeds / food on Daphne

or

allow small(er) seeds on Daphne

1

more competition for seeds / food (on Isabela)

allow less competition for seeds / food on Daphne

ignore competition unqualified

1

birds with larger beaks get enough food to (survive and) reproduce (on Isabela)

allow birds with smaller / medium beak sizes get enough food to (survive and) reproduce on Daphne

1

(survivors) pass on (beneficial) alleles to offspring

allow pass on genes / mutation ignore pass on chromosomes / characteristics

1

(f) Isabela is a large island with more species of plants
or
Isabela is a large island with more variety in seed / food sizes
or
Isabela is a large island with more plants / seeds / food

1

less competition for seeds / food
or
enough seeds / food for both bird species

1

[13]

Q2.

(a) *Elasmotherium*

1

(b) eukaryota

1

(c) Carl Woese

1

(d) any **one** 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) $\mathbf{C^WC^W}$

1

(d)

*allow **R** and **W** throughout*

allow own symbols if defined

parental genotypes / gametes correct for both parents:
$\mathbf{C^R\ C^W}$ $\mathbf{C^R\ C^W}$ **/** $\mathbf{C^R}$ and $\mathbf{C^W}$

1

genotypes of offspring correctly derived in a Punnett square:
$\mathbf{C^RC^R}$ $\mathbf{C^RC^W}$ $\mathbf{C^WC^W}$

allow correctly derived genotypes from incorrect gametes

1

correct identification of phenotypes from their cross:
$\mathbf{C^RC^R}$ = red
$\mathbf{C^RC^W}$ = pink
$\mathbf{C^WC^W}$ = 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 $\mathbf{C^RC^W}$ / heterozygous
allow all are the same genotype / alleles / genes / DNA

1

[14]

Q4.

(a)

Classification group	**Name**
Class	*Mammalia*
Order	*Primates*
Family	*Lemuroidea*
Species	*catta*

*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

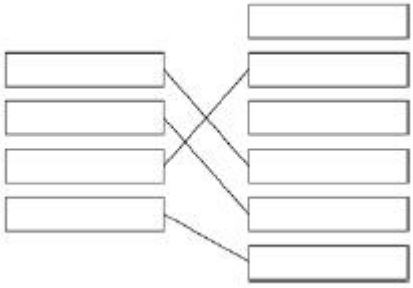
(b) Lithops

extras cancel

ignore capitalisation / non-capitalisation

1

(c)



***1** mark per line*

extra line from adaptation negates the mark for that adaptation

1
1
1
1

(d) any **two** from:

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

2

(e) behavioural

1

[9]