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) C^WC^W

1

(d)

   allow R and W throughout
   allow own symbols if defined

parental genotypes / gametes correct for both parents:
CR CW CR CW / CR and CW

1

genotypes of offspring correctly derived in a Punnett square:
C^RC^R C^RC^W C^WC^W
   allow correctly derived genotypes from incorrect gametes

1

correct identification of phenotypes from their cross:
CRCR = red
CRCW = pink
CWCW = 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
CRCW / 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
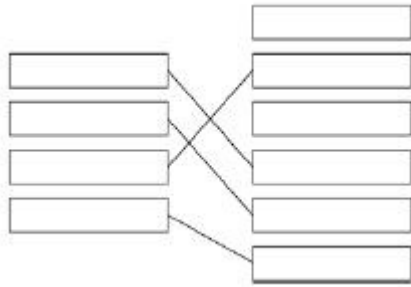*ignore cannot reproduce unqualified*

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]