Mark schemes

Q1.

(a)

Factor	Biotic	Abiotic
Nitrates in the soil		✓
Rabbits eating the plants	✓	
Shading by a building		✓
Soil pH		✓
Temperature		✓
Trampling by people	✓	

all 6 correct = **3** marks
4 or 5 correct = **2** marks
2 or 3 correct = **1** mark
0 or 1 correct = **0** marks 3

3

(b) (grid and) coordinates

1

to achieve randomness

ignore throwing quadrat

*allow random coordinates for **2** marks*

*if no other mark awarded allow random walk **or** description of random walk for **1** mark*

1

(c) *(mean per m^2 =)*
24 **or** 6 × 4

1

(calculation of area of lawn =) (½ × 16 × 10) – (6 × 3)
or 80 – 18

1

(area of lawn =) 62 m^2

allow correct calculation using total area (of triangle) – area of rectangle

(total number of daisies =)
24 × 62

allow correct calculation using an

incorrectly calculated area of the lawn and / or mean

1

1488

allow answer based on incorrect area

1

(answer to 3 sig figs =) 1490

allow student's calculated answer rounded to 3 sig figs

1

(d) too few quadrats **or** quadrat too small

allow sample size too small

1

sample may not be representative of the lawn

allow quadrats may not have been placed randomly

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.

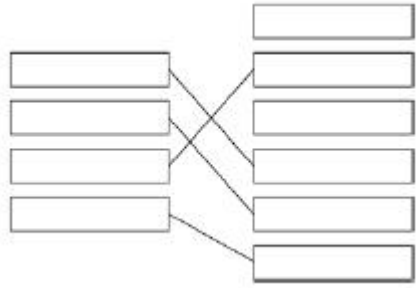
(a) Carl Linnaeus

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]

Q4.

(a) less sweating so less water loss

1

(as) no / little water available in desert

1

(b) (fat store) can be metabolised / respired to water

1

(little urine…) conserve water

1

(hard mouth) not damaged by spines on plants / on food
or
not damaged by hard / dry food

1

(c) dromedary / *C.dromedarius*
and bactrian / *C. bactrianus*

no mark for the names, but must be identified

because
same genus

ignore 'both are Camelus'

1

(d) any **two** from:

- the fossil record
- oldest fossils in N. America
  or
- newer fossils in S. America / in Asia / in Africa

  *allow numbers for ages (45 Mya **and** 3 Mya / 6 Mya)*

- chemical / DNA analysis of living species

  allow radioactive dating of fossils

2

(e) isolation of separate camel populations by sea
or
by mountains

1

habitat variation / described between populations

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

1

genetic variation / mutation in each population

1

45 million years is sufficient time to accumulate enough mutations

1

natural selection
or
better adapted survive to reproduce

1

pass on favourable allele(s)

allow gene(s)

1

[14]