

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

(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 m² =)
 24 or 6 × 4

1

(calculation of area of lawn =) $(\frac{1}{2} \times 16 \times 10) - (6 \times 3)$
 or 80 – 18

1

(area of lawn =) 62 m²
*allow correct calculation using total area
 (of triangle) – area of rectangle*

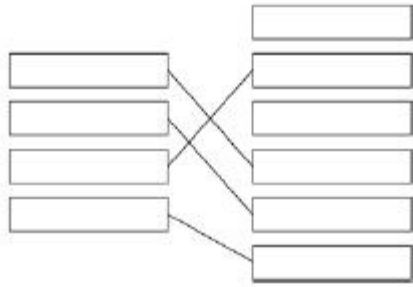
(total number of daisies =)
 24 × 62
allow correct calculation using an

- 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

	<i>allow DNA analysis</i>	1
(g)	0.05 (million years ago)	1
(h)	0.2 – 0.05 <i>allow 0.05 × 3</i> <i>allow ecf from question (g)</i>	1
	0.15	1
	150 000 (years) <i>allow 0.15 million (years)</i>	1
(i)	any two from: <i>ignore pollution</i> <ul style="list-style-type: none"> • drought • ice age / global warming • volcanic activity • <i>allow earthquakes / tsunami</i> • asteroid / meteor collision • (new) predators • <i>allow hunters / poachers / eaten</i> • (new) disease • <i>allow named pathogen</i> • competition for food • <i>allow lack of food</i> • competition for mates • <i>allow isolation or lack of mates</i> • lack of habitat or habitat change <i>if no other marks awarded allow natural disaster or climate change or catastrophic event for 1 mark</i>	2
		[12]
Q3.		
(a)	Carl Linnaeus	1
(b)	Lithops <i>extras cancel</i> <i>ignore capitalisation / non-capitalisation</i>	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]