



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 m<sup>2</sup> =)

24 **or** 6 × 4

1

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

1

(area of lawn =) 62 m<sup>2</sup>

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

(total number of daisies =)

24 × 62

*allow correct calculation using an*



	<i>incorrectly calculated area of the lawn and / or mean</i>	1
1488	<i>allow answer based on incorrect area</i>	1
	<i>(answer to 3 sig figs =) 1490 allow student's calculated answer rounded to 3 sig figs</i>	1
(d)	too few quadrats <b>or</b> quadrat too small <i>allow sample size too small</i>	1
	sample may not be representative of the lawn <i>allow quadrats may not have been placed randomly</i>	1
		<b>[13]</b>

**Q2.**

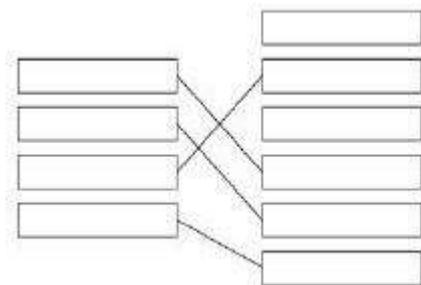
(a)	<i>Elasmotherium</i>	1
(b)	eukaryota	1
(c)	Carl Woese	1
(d)	any <b>one</b> from: <ul style="list-style-type: none"> <li>• fighting / competing for mates / food / territory</li> <li>• to kill predators / prey</li> </ul> <i>allow for defence / protection</i>	1
(e)	(bones <b>or</b> hard tissues) did not decay <i>allow soft tissues decayed <b>or</b> were eaten allow other parts decayed or were eaten allow horn could be damaged / lost in fighting</i>	1
(f)	any <b>one</b> from: <ul style="list-style-type: none"> <li>• compare to other fossils of known age <i>allow compare with the fossil record</i></li> <li>• by the age of the rocks (where fossil was found) <i>allow depth underground (where fossil was found) allow (radio)carbon / isotope dating</i></li> </ul>	



	<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 <b>two</b> from:	
	<i>ignore pollution</i>	
	• 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 <b>or</b> 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]