Mark schemes

Q1.

(a) kingdom

1

(b) genus

1

species

1

(c) 3 million years ago

1

(d) black-backed jackal

ignore jackal

*do **not** accept golden jackal*

1

(e) any **two** from:
- drought
- ice age
- global warming

    *if none of these awarded, allow **1** mark for climate change*

    ignore weather

- volcanic activity
- asteroid collision

    *if neither of these, allow catastrophic event **or** natural disaster for **1** mark*

- (new) predators

    allow named example

    allow hunters

- (new) disease / pathogen

    allow named example

- competition for food

    allow lack of food

- competition for mates

    allow lack of mates

    ignore competition unqualified

- lack of habitat or habitat change

    ignore environment change

    ignore isolation

    ignore pollution

2

(f) any **one** from:
   •   wolves ate humans

   •   wolves get left-over food from humans

   •   humans gave food to wolves

1

(g) breed the least / less aggressive wolves

1

breed (least / less aggressive) offspring
        ignore repeat breeding of the original pair(s)

1

[10]

[8]

Q2.

(a) **r r**

         allow homozygous recessive

1

(b) male gametes correct: **R** and **r**

1

     all four offspring genotypes correctly derived from gametes (given)

         *allow **1** mark for 2 or 3 correct*

2

(c) correct ratio from the figure

         *allow 3 : 1 if no answer to **(b)***

1

(d) having (two) different alleles (of a gene)

         ignore example(s)

         *do **not** accept having two different genes*

1

(e) any **two** from:

- other scientists not aware of his work **or** work published in obscure journal

         allow work lost for many years

- other theories accepted at the time

         allow eg theory of blending inheritance

         ignore religion

- not considered to be a scientist **or** not eminent **or** not respected

         *allow he was **only** a monk*

         allow he was not believed

- Mendel's (mathematical) approach was novel concept

         *allow his work was not understood **or** no other scientist had similar ideas*

         allow his results were not corroborated (at the time)

- peas gave unusual results compared with other species

         allow Mendel only worked on pea plants

         allow insufficient results / research

- new discoveries made Mendel's work relevant

         allow specific discoveries

2

[8]

Q3.

(a) 6000 (kJ/m²/year)

1

(b) $\dfrac{40}{16\,000} \times 100$

1

0.25 (%)

1

(c) cows move less indoors

1

it is warmer indoors

1

(d) cows are close(r) together
allow cows are in an enclosed space

1

(e) any **one** from:
- D
- G
- H

1

(f) DNA

1

(g) reproduction

1

(h) any **two** from:
ignore reference to crops

- many animals will become ill
  allow many animals may die

- resistant bacteria passed from animal to animal
  *allow disease passed from animal to animal **or** other animals infected*

- animals cannot be cured (by the antibiotic)
  allow antibiotic will not work

- animals may be less productive / efficient
  allow less meat / milk produced
  allow less growth

- farmer may lose profit / money
  allow cannot sell infected produce / animals

2

[11]

Q4.

(a)   *view with the table*

kingdom

1

genus

1

in this order only

(b)   Linnaeus

1

(c)   *Elrathia kingii*

1

(d)   trilobite **A** was found in older rocks than trilobite **B**

1

trilobite **B** is more complex than trilobite **A**

1

(e)   sediments

1

soft parts

1

minerals

1

in this order only

(f)   any **three** from:

- drought
- ice age
- global warming
    *if none of these, allow climate change for **1** mark*
    ignore weather

- volcanic activity
- asteroid collision
    *if neither of these, allow catastrophic event **or**
    natural disaster for **1** mark*

- (new) predators
    allow named example
    allow hunters

- (new) disease / pathogen
    allow named example

- competition for food
    allow lack of food

- competition for mates
    allow lack of mates
    ignore competition unqualified

- lack of habitat or habitat change
    ignore isolation
    ignore pollution

3

(g)　no / insufficient evidence
    allow lack of evidence

or
cannot perform experiment to find out
    allow no-one was there to observe

1

[13]