Q1.

The growth of daisy plants on a lawn is affected by biotic factors and by abiotic factors.

(a)   The table below shows six factors.

Tick (✓) one box in each row to show whether the factor is biotic or abiotic.

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

(3)

The figure below shows a plan of a garden.
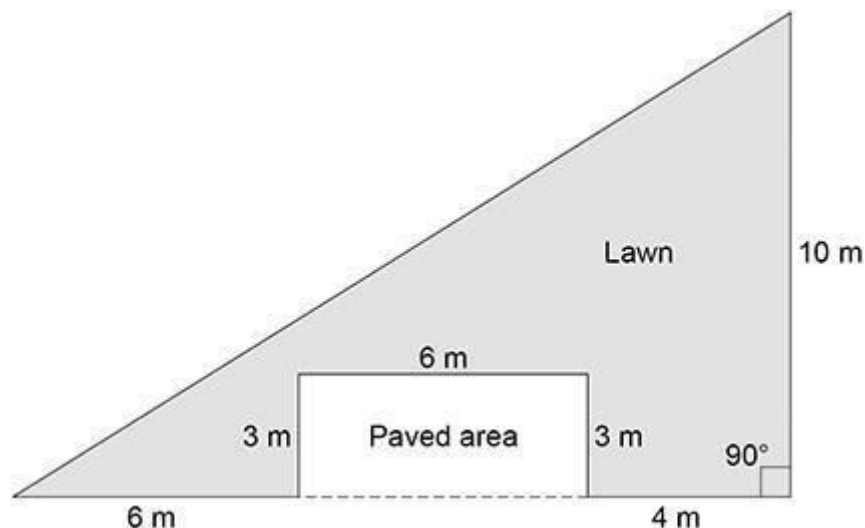
A student estimates the number of daisy plants growing on the lawn.

The student places a quadrat at 10 different positions on the lawn.

The quadrat measures 50 cm × 50 cm.

The student counts the number of daisy plants in each quadrat.

(b)   How should the student decide where to place the quadrat?

Give the reason for your answer.

_____

_____

_____

_____

(2)

(c)   The mean number of daisy plants in each quadrat is 6.

Calculate the number of daisy plants on the lawn. Give

your answer to 3 significant figures.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Number of daisy plants on the lawn = _____

(6)

(d)   Using the mean from this investigation to calculate the number of daisy plants
on the lawn may not be accurate.
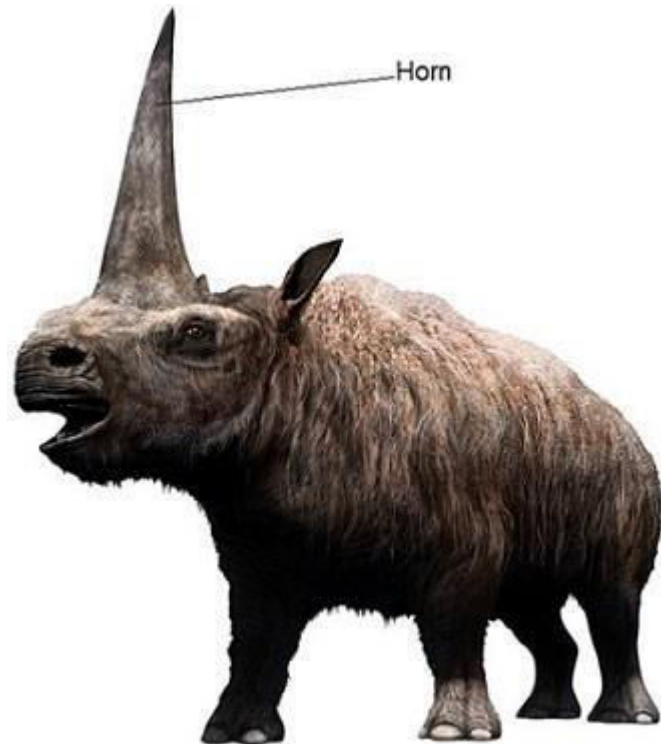
Give two reasons why.

1   _____

_____

2   _____

_____

(2)
(Total 13 marks)

Q2.
The image below shows what the extinct Siberian rhinoceros (*Elasmotherium sibiricum*) might have looked like.

Horn

(a)   What is the genus of the Siberian rhinoceros?

Tick (✓) one box.

Elasmotherium

Elasmotherium sibiricum

sibiricum

(1)

The 'three-domain system' of classification places all living organisms in one of three domains.

(b)   Which domain was the Siberian rhinoceros in?

Tick (✓) one box. Archaea

Eukaryota ☐

Prokaryota ☐

(1)

(c)   Who developed the 'three-domain system' of classification? Tick

(✓) one box.

Carl Woese ☐

Charles Darwin ☐

Gregor Mendel ☐

(1)

(d)   The horn of the Siberian rhinoceros is estimated to have been 150 cm long.

Suggest one advantage of this adaptation to the Siberian rhinoceros.

_____

_____

(1)

(e)   The only parts of the Siberian rhinoceros that have been found are
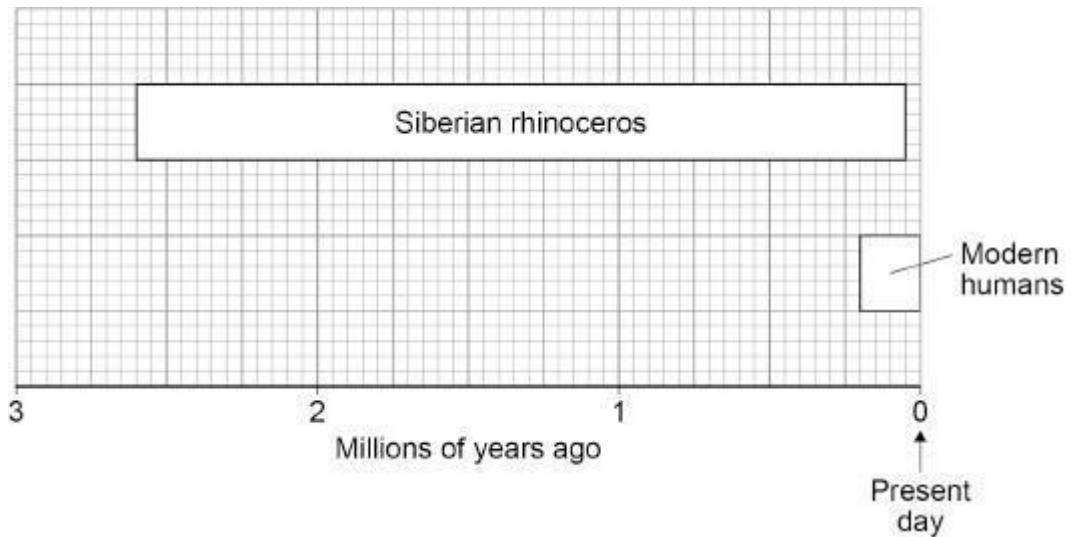fossilised bones.

Give one reason why only the bones of the body of the Siberian
rhinoceros became fossils.

_____

_____

(1)

(f)   Suggest how scientists can estimate when the Siberian rhinoceros was alive.

_____

_____

(1)

The below diagram shows when the Siberian rhinoceros existed and when
modern humans existed.

(g) How many million years ago did the Siberian rhinoceros become extinct?

_____ million years ago

(1)

(h) Determine the time in years when both the Siberian rhinoceros and modern humans existed together.

Use the diagram above and your answer to Question (g).

_____

_____

_____

_____

Time = _____ years

(3)

(i) Suggest two factors that may have caused the extinction of the Siberian rhinoceros.

1 _____

_____

2 _____

_____

(2)

(Total 12 marks)

Q3.

Living organisms are classified into the following groups:

• Kingdom

• Phylum

• Class

• Order

• Family

• Genus

• Species

(a) Which scientist first suggested this type of classification system? Tick

one box.
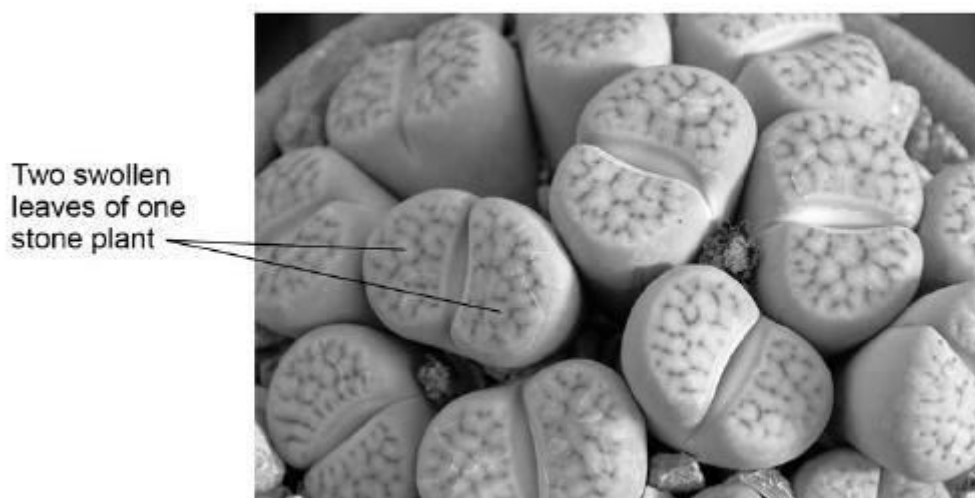
Alfred Russel Wallace ☐

Carl Linnaeus ☐

Charles Darwin ☐

Gregor Mendel ☐

(1)

The stone plant, *Lithops bromfieldi*, is adapted to live in very dry deserts.

Figure 1 shows several stone plants.

Figure 1

Two swollen leaves of one stone plant

(b)   Give the genus to which the stone plant belongs.

_____

(1)

(c)   The stone plant has many adaptations that help it to survive in the desert.

Draw one line from each adaptation to how the adaptation helps the stone plant to survive.

Adaptation

Plants look like stones

Leaves with thick, waxy cuticles

Many long, branching roots

Thick, fleshy leaves

How the adaptation helps survival

Can trap a lot of light

Absorb water from deep in the ground

Help cross-pollination

Are not easy to see and so are not eaten

Reduce water loss

Store water

(4)

The jerboa is a small desert animal.

Figure 2 shows a jerboa.

Figure 2

The jerboa is adapted for survival in the desert.
The jerboa spends the daytime in its underground burrow.
The jerboa only leaves its burrow to look for food during the night.

(d)   Describe how these adaptations help the jerboa to survive in the desert.

_____

_____

_____

_____

(2)

(e)   What type of adaptations are described in Question (d)? Tick

one box.

Behavioural   ☐

Functional   ☐
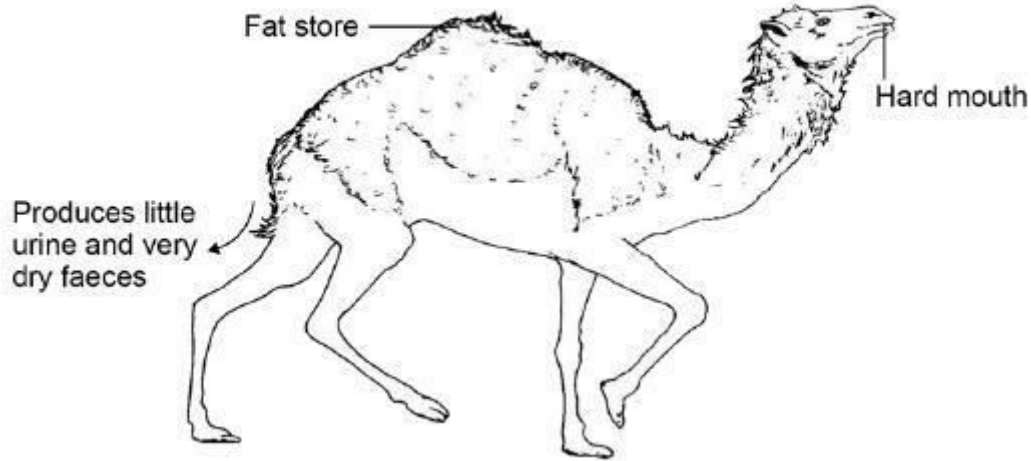
Structural   ☐

(1)
(Total 9 marks)

Q4.

Figure 1 shows a type of camel called a dromedary (*Camelus dromedarius*).

The dromedary lives in hot, dry deserts.

Figure 1

(a)   One adaptation of the dromedary is 'temperature tolerance'.

This means that the animal's body temperature can rise by up to 6 °C before it starts to sweat.

Explain how temperature tolerance can help the dromedary to survive in the desert.

_____

_____

_____

_____

(2)

(b)   Three more adaptations of the dromedary are given in Figure 1.

Give a reason why each adaptation helps the animal survive in the desert.

Fat store

_____

_____

Produces little urine and very dry faeces _____

_____

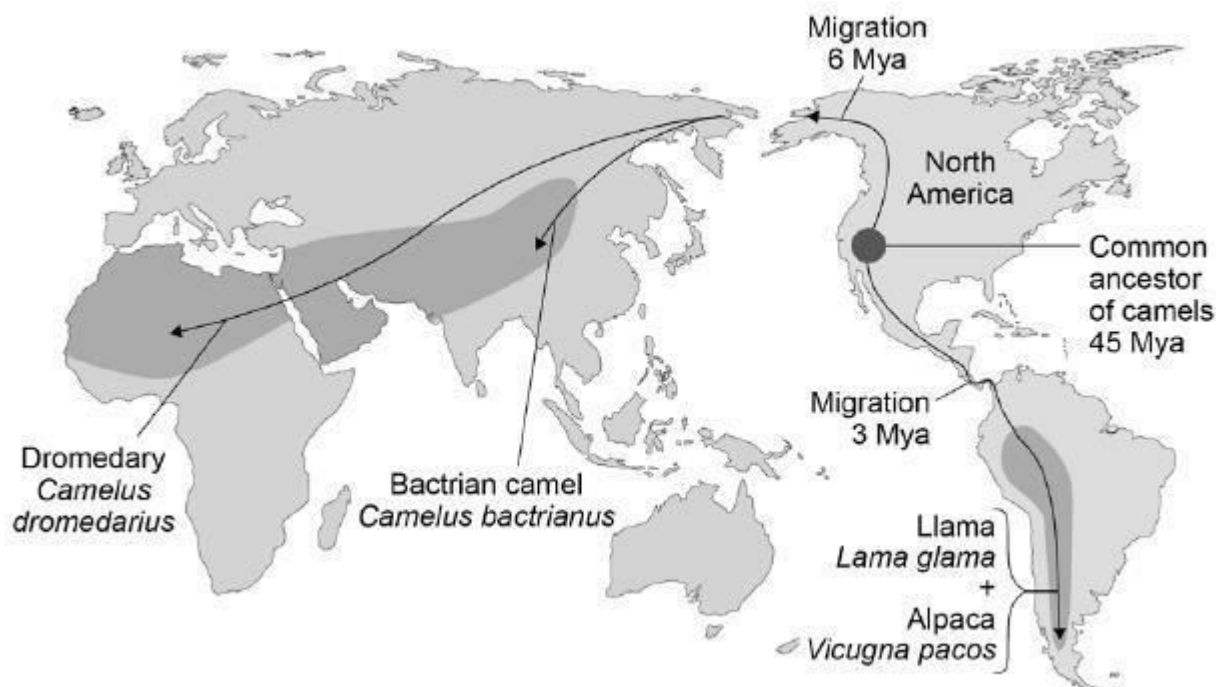Hard mouth _____

_____

(3)

There are several species of the camel family alive today.

Scientists think these species evolved from a common ancestor that lived in North America about 45 million years ago (Mya).

Figure 2 shows:

• where four modern species of the camel family live today

• how the ancestors of these camels migrated from North America.

Figure 2

(c)   Which two of the four modern species of camel do scientists believe to be most closely related to each other?

Give the reason for your answer.

_____ and _____

Reason _____

_____

(1)

(d)   Describe the type of evidence used for developing the theory of camel migration shown in Figure 2.

_____

_____

_____

_____

(2)

(e)   Explain how several different species of camel could have evolved from a common ancestor over 45 million years.

(6)

(Total 14 marks)