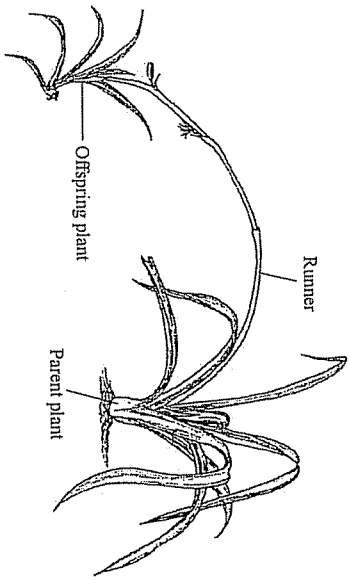


Cell division

1. The diagram shows a spider plant during one type of reproduction.



Complete the sentences using words from the box.

asexual	characteristics	chromosomes
gametes	genes	mitosis
		sexual

- (a) The colour and shape of the leaves of a spider plant are known as (1)
- (b) The shape of the leaves is controlled by (1)
- (c) The thread-like structures inside the nucleus of the cells are called (1)
- (d) The spider plant produces new cells in the runner by a process called (1)
- (e) This type of reproduction is called reproduction. (1)
- (Total 5 marks)

2. Diagram 1 shows the nucleus of a body cell as it begins to divide by mitosis.

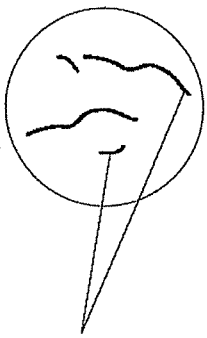


Diagram 1

- (a) Use a word from the box to label Diagram 1.

alleles	chromosomes	gametes
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(1)

- (b) Complete Diagram 2 to show what the nucleus of one of the cells produced by this mitosis would look like.

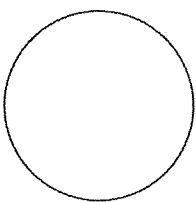


Diagram 2

(1)

- (c) Stem cells from a recently dead embryo can be grown in special solutions. Some facts about stem cells are given below.
- Stem cells from an embryo can grow into any type of tissue.
 - Stem cells may grow out of control, to form cancers.
 - Large numbers of stem cells can be grown in the laboratory.
 - Stem cells may be used in medical research or to treat some human diseases.
 - Patients treated with stem cells need to take drugs for the rest of their life to prevent rejection.
 - Collecting and growing stem cells is expensive.
- Use only the information above to answer these questions.
- (i) Give two advantages of using stem cells.

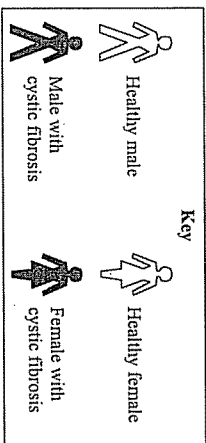
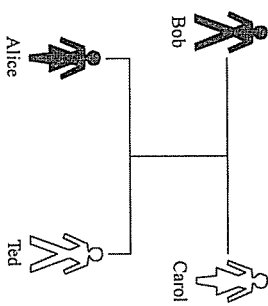
1. (2)
2. (2)

➤ Progress check

Unit B2, B2.7.3

Genetic disorders

1. Cystic fibrosis is an inherited disorder that can seriously affect health.
 - (a) Which one of these is affected by cystic fibrosis?
Draw a ring around your answer.
blood cell membranes kidneys nervous system
 - (b) The diagram shows the inheritance of cystic fibrosis in a family. The allele that produces cystic fibrosis is recessive.



- (i) Explain why Alice inherited cystic fibrosis.
.....
.....
- (ii) Explain why Ted did not inherit cystic fibrosis.
.....
.....

(2)

(2)

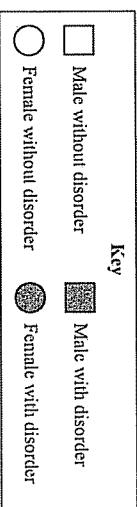
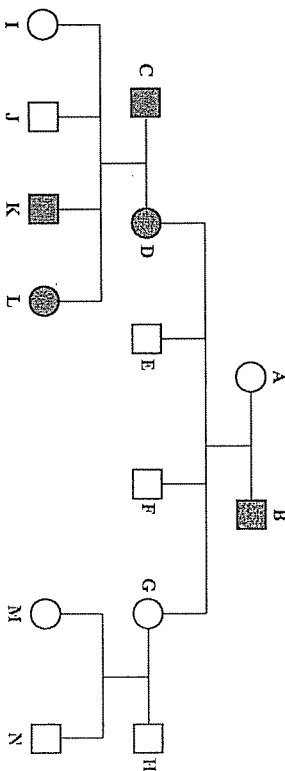
➤ Progress check

Unit B2, B2.7.3

- (c) Bob and Carol know that there is a risk that their next baby will have cystic fibrosis. Embryos can be screened for the allele that produces cystic fibrosis. Many people support the screening of embryos, but others do not.
 - (i) Suggest one reason why many people support the screening of embryos for the cystic fibrosis allele.
.....
.....
 - (ii) Suggest one reason why many people are against the screening of embryos for the cystic fibrosis allele.
.....
.....

(1)

2. The diagram shows a family tree in which some individuals have an inherited disorder, which may cause serious long-term health problems. (Total 7 marks)



- (a) What proportion of the children of A and B have the disorder?
.....

(1)

(b) Explain the evidence from the diagram which shows that the allele for the disorder is dominant.

Use the appropriate letters to identify individuals in your answer.
You may use genetic diagrams in your explanation. There is space for you to draw a genetic diagram at the top of the facing page.

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(3)

(c) (i) What is meant by 'embryo screening'?

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.....
.....

(1)

(ii) A doctor suggests that couple C and D should have their embryos screened but that couple G and H do not need this procedure.
Explain the reasons for the doctor's suggestions.

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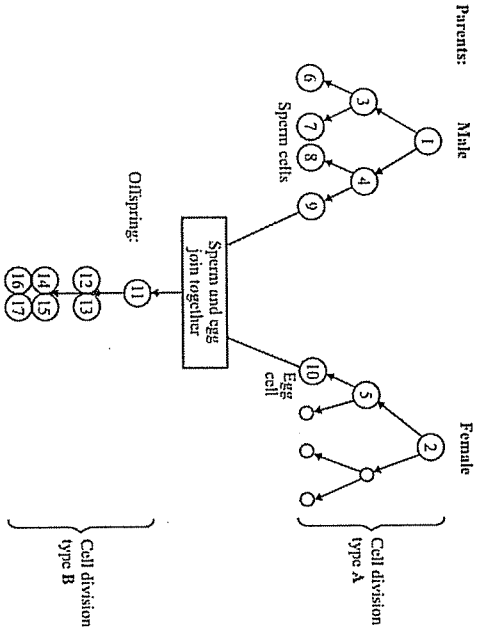
(3)
(Total 8 marks)

(ii) Give two disadvantages of using stem cells.

1

2

3. The diagram shows two patterns of cell division. Cell division type A is used in gamete formation. (2)
Cell division type B is used in normal growth. (Total 6 marks)



(a) Name the two types of cell division, A and B, shown in the diagram.

Type A

Type B

(b) Name the process in which an egg and sperm join together.

.....

(c) Cell 1 contains 46 chromosomes. How many chromosomes will there be in:

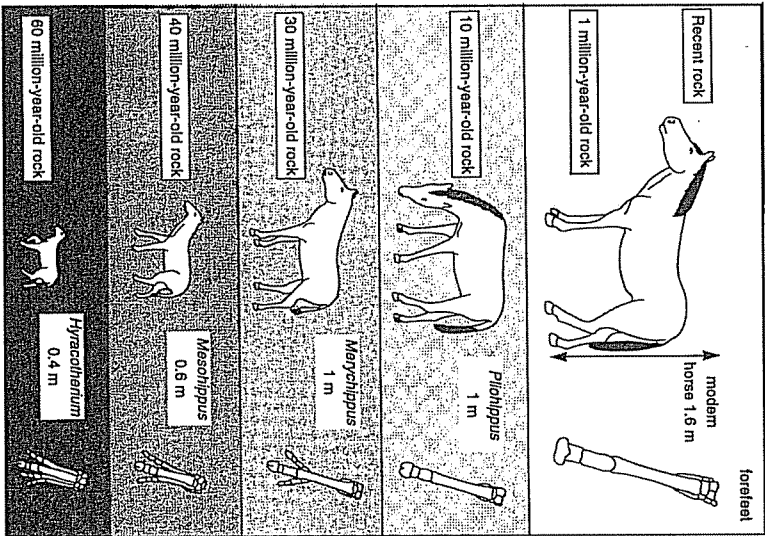
(i) cell 10?

(ii) cell 14?

(Total 5 marks)

Speciation

1. The diagrams show fossil animals found in rocks of different ages. Scientists have used this information to work out how the modern horse evolved.



- (a) *Mesochippus* became extinct over thirty million years ago. Use information from the diagrams to suggest two reasons why this happened.

1

2

(2)

- (b) (i) How do scientists know how big these early horses were?

- (ii) How do scientists know when they lived?

- (c) Explain how the information in the diagrams supports the theory of evolution.

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(Total 7 marks)

2. When animals die, bacteria make them decay. Warmth, moisture and oxygen are needed for this to happen.

- (a) (i) In northern Russia whole bodies of mammoths have been found in the frozen soils. Explain why they did not decay.



- (ii) Fish fossils have been found in mudstone rock. Explain why they did not decay?



.....

.....

(2)

(b) Some of the mammoths had flint weapons in their bodies.
Suggest two things that this tells us about human evolution.

1.

2.

(2)

(c) Mammoths are now extinct. Suggest two reasons for this.

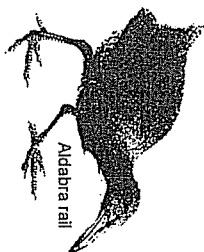
1.

2.

(Total 7 marks)

3. Flightless birds called Rails once inhabited 20 islands in the Pacific Ocean. During the last two centuries they have disappeared from 15 of these islands. The Aldabra Rail, shown below, is one of the few survivors. The island which it lives on is very remote.

Suggest three reasons why Rails have disappeared from 15 of the 20 islands they once inhabited.



Aldabra rail

1.

2.

3.

(Total 3 marks)

4. The dodo is an extinct bird. The drawing shows an artist's impression of the bird.

The dodo lived on a small island in the middle of the Indian Ocean. Its ancestors were pigeon-like birds which flew to the island millions of years ago. There were no predators on the island. There was a lot of fruit on the ground. This fruit became the main diet of the birds. Gradually, the birds became much heavier, lost their ability to fly and evolved into the dodo.



(a) Suggest an explanation for the evolution of the pigeon-like ancestor into the flightless dodo.

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(b) The dodo became extinct about 80 years after Dutch sailors first discovered the island in the eighteenth century.

Scientists are uncertain about the reasons for the dodo's extinction.

Suggest an explanation for this uncertainty.

.....

.....

(Total 5 marks)

5. There is a large amount of evidence that evolution is taking place.

(a) Some evidence for evolution comes from the study of fossils. Describe one way in which fossils may be formed.

.....

.....

(1)

(b) Scientists are uncertain about how life started on earth. Explain why.

.....

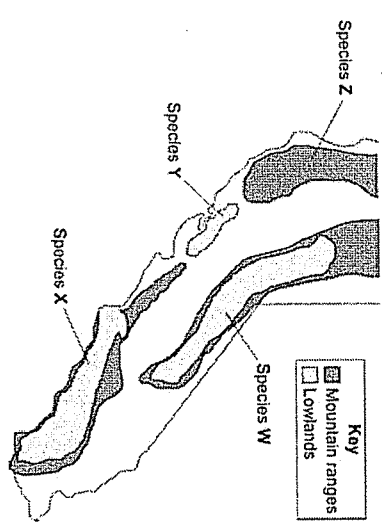
.....

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(2)

(c) Salamanders are terrestrial amphibians.

The diagram shows the distribution of four different species of salamander in a country.



Originally, there was only one species of salamander in the country.
Suggest an explanation for the development of the four different species.

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(4)
(Total 7 marks)