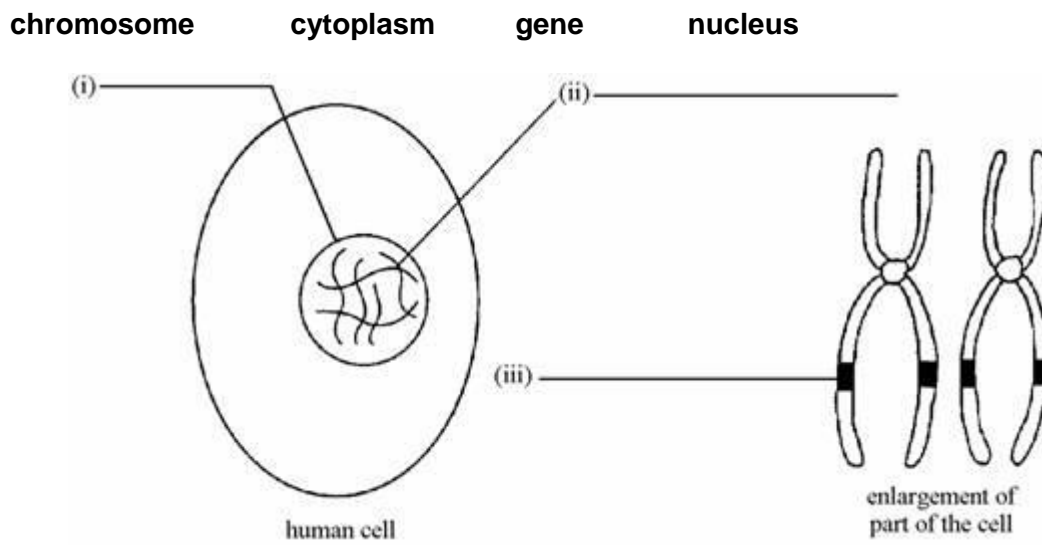


1 The diagram shows a human cell and some of its contents.

(a) Choose words from this list to label the diagrams.



(3)

(b) Choose words from this list to complete the sentence.

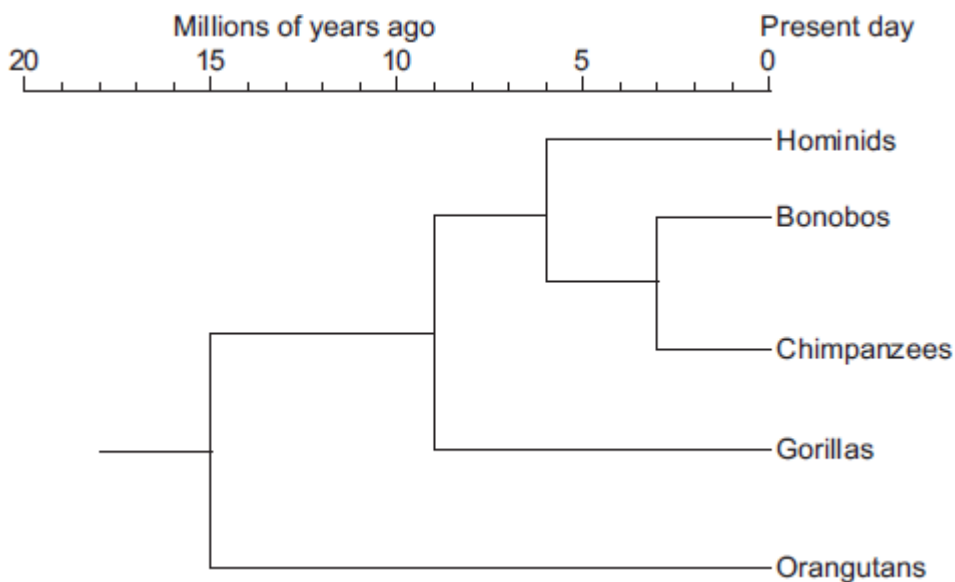
a body cell an egg cell a gamete a sperm cell

In the cell above, the chromosomes are found in pairs so this cell must be

(1)

(Total 4 marks)

2 The diagram shows an evolutionary tree for the great apes.



(a) (i) How many years ago did chimpanzees evolve?

_____million years ago

(1)

(ii) Which animal shown in the diagram is the most distant relative of hominids?

(1)

(b) Charles Darwin is well known for his theory of evolution.

(i) Draw a ring around the correct answer to complete the sentence.

Darwin's theory states that evolution happens by a process

called

mutation

natural selection.

variation.

(1)

(ii) People did not accept Darwin's theory when it was first published.

Give **one** reason why his theory was not accepted at first.

(1)

(Total 4 marks)

3

One type of soil bacterium produces a poison. The poison kills some insects that feed on cotton plants.

A cotton plant



© Michael Valdez/iStock

- (a) Cotton plants can be genetically modified to produce this poison.
Draw a ring around the correct answer to complete each sentence.
The gene that codes for the production of the poison is cut from the

chromosome of

an insect.
the soil bacterium.
the cotton plant.

This is done using

an enzyme.
a microorganism.
scissors.

The gene is then transferred to the cells of the

soil bacterium.
cotton plant.
insect pests.

(3)

(b) Read the following statements about genetically modified (GM) cotton.

- GM cotton reduces the need to use pesticides.
- GM cotton may kill useful insects.
- GM cotton produces higher yields.
- GM cotton may cause wild plants to produce the poison.
- Some people will not wear clothes made from GM cotton.

Some people do not agree with growing GM cotton plants.
Other people think it is a good idea to grow GM cotton plants.

Use information given in the statements to answer the following question.

Suggest **one economic advantage** and **two environmental disadvantages** of growing GM cotton plants.

One economic advantage: _____

Two environmental disadvantages: _____

(3)
(Total 6 marks)

4

The figure below shows flamingos. Flamingos are birds. They have long legs. They can walk in deep water and use their long necks to reach food in the mud.



How would Darwin have explained the evolution of the flamingo's long neck?

Use the correct answer from the box to complete each sentence.

mutation	natural selection	sexual reproduction	variation
-----------------	--------------------------	----------------------------	------------------

In a population of flamingos there are birds with different lengths of neck.

This range of differences in neck length is called_____.

The flamingos with longer necks are better adapted to feed in deeper waters. They are more likely to survive than flamingos with shorter necks.

This is an example of_____.

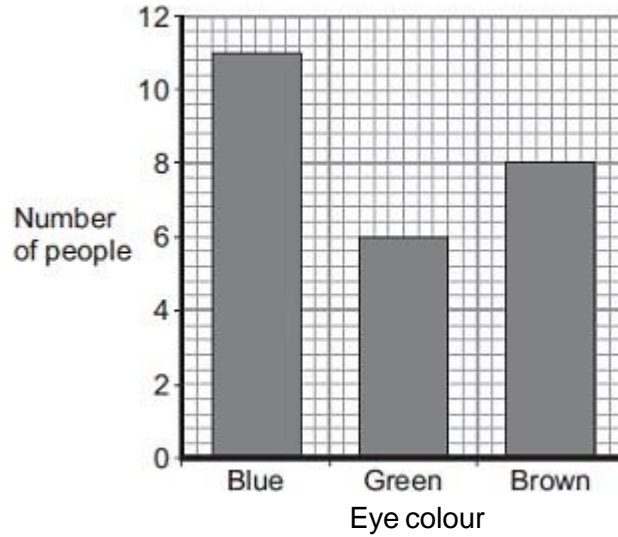
The surviving flamingos pass on their genes for a longer neck to their offspring during_____.

(Total 3 marks)

5

A student carried out a survey of eye colour in her class.

Her results are shown in the figure below.



(a) What type of variable is eye colour?

Draw a ring around the correct answer.

categoric

continuous

control

(1)

(b) (i) How many people in the class had blue eyes?

Number of people with blue eyes = _____

(1)

(ii) How many people were in the student's class?

Number of people in the class = _____

(1)

(iii) Give **one** conclusion that can be made from the data in the figure above.

(1)

(c) (i) Use the correct answer from the box to complete the sentence.

a cell	a gene	nucleus
---------------	---------------	----------------

Eye colour is controlled by _____.

(1)

(ii) Use the correct answer from the box to complete the sentence.

mother's milk	enzyme	sex cells
----------------------	---------------	------------------

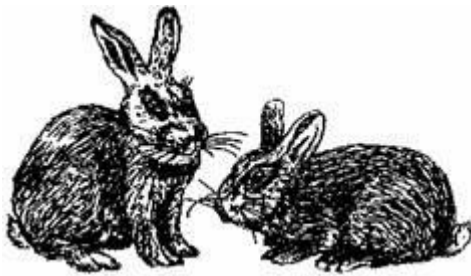
The information for eye colour is passed from parents to offspring in the _____.

(1)

(Total 6 marks)

6

These young rabbits look like their parents. This is because information about characteristics such as fur colour is passed from parents to their young.



Choose words from this list to complete the sentences below.

body	chromosomes	clones	cytoplasm
	genes	nucleus	sex

Information is passed from parents to their young in _____ cells.

Each characteristic, e.g. fur colour, is controlled by _____.

The structures which carry information for a large number of characteristics are called _____.

The part of the cell which contains these structures is called the _____.

(Total 4 marks)

7 Choose words from this list to complete the sentences below.

bones extinct fossils
muscles rocks

In the past some types of animals and plants have died out.

They have become_____.

We know about these animals and plants because we find them as _____.

Sometimes the hard parts of animals such as_____did not decay.

In other cases the bodies of animals and plants were replaced by minerals.

You can still see their shape in_____.

(Total 4 marks)

8 (a) (i) Darwin's theory of evolution states that all species of living things have evolved from simple life forms.

Draw a ring around the correct answer to complete the sentence.

Simple life forms first developed on Earth more than

3 thousand years ago. 3 million years ago. 3 billion years ago.

(1)

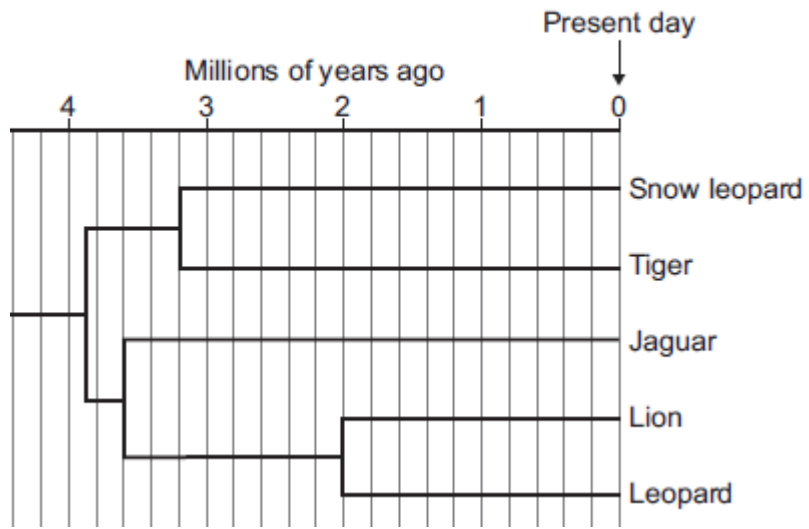
(ii) Darwin's theory of evolution was not accepted when he first suggested it.

Give **one** reason why.

(1)

(b) **Figure 1** shows an evolutionary tree for the 'big cats'.

Figure 1



(i) How long ago did the lion evolve?

_____ million years ago

(1)

(ii) Which animal is the closest relative to the tiger?

(1)

- (c) **Figure 2** shows a tiger. Tigers are large, striped animals. Tigers live and hunt in grassland and forest areas of Asia. They feed on animals such as deer.

Figure 2



© Jupiterimages/PHOTOS.com/Thinkstock

Suggest how stripes help the tiger to survive in its habitat.

(1)

(Total 5 marks)

9

- (a) In sexual reproduction a sperm cell joins with an egg cell.

Complete the sentences by choosing the correct words from the box.

bladder	kidney	liver	lung	ovary	testis
----------------	---------------	--------------	-------------	--------------	---------------

- (i) The organ in which a sperm cell is made is the _____

(1)

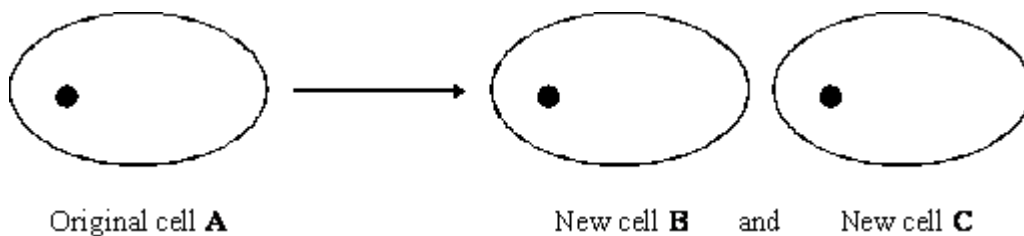
- (ii) The organ in which an egg cell is made is the _____

(1)

- (b) What name is given to the process in which sperm cells and eggs cells join together?

(1)

- (c) Two new cells are formed from one cell by **asexual** reproduction.



How, genetically, does the nucleus of new cell **C** compare with:

- (i) the nucleus of the other new cell **B**;

(1)

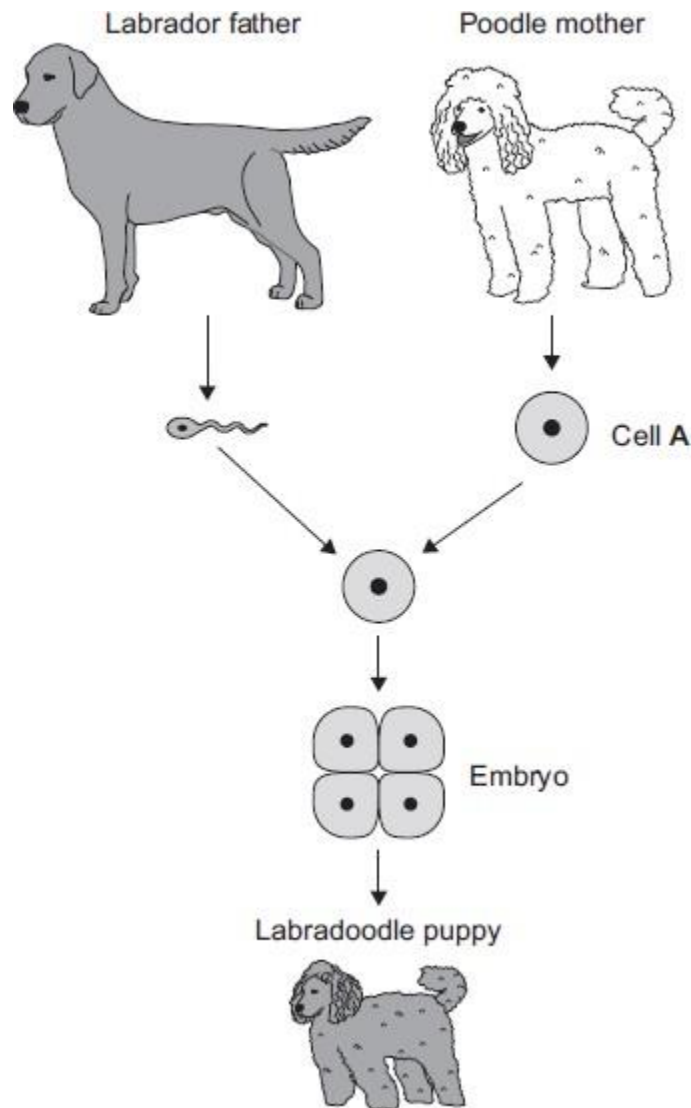
- (ii) the nucleus of the original cell **A**?

(1)

(Total 5 marks)

10

The diagram shows how a Labrador can be crossed with a Poodle to produce a Labradoodle puppy.



- (a) (i) What is the name of Cell **A** shown above?

(1)

(ii) Draw a ring around the correct answer to complete each sentence.

The sperm cell and Cell **A** are types of

embryo.

gamete.

gene.

The type of reproduction shown in the diagram is called

asexual reproduction.

tissue culture.

sexual reproduction.

(2)

(b) The Labradoodle puppy has some characteristics of each of its parents, but it is not identical to either parent.

(i) Give **one** characteristic of the Labradoodle puppy which is similar to the Labrador father but **not** the Poodle mother.

(1)

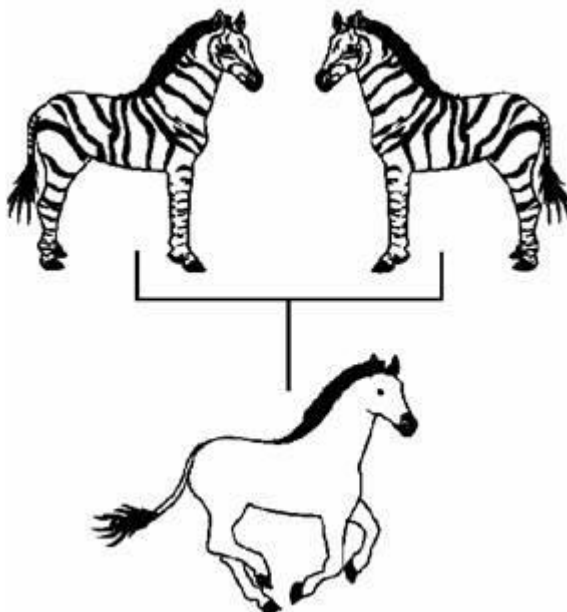
(ii) Give **one** characteristic of the Labradoodle puppy which is similar to the Poodle mother but **not** the Labrador father.

(1)

(Total 5 marks)

11

Sometimes an adult offspring will show a distinct variation from its parents, like a zebra appearing to have no stripes.



(a) (i) Changes of this sort are called _____ (1)

(ii) Which part of the cell has chemically changed to cause this variation? Circle the correct answer.

Cytoplasm gene membrane nucleus

(1)

(b) Give a cause of this type of chemical change in a cell.

(1)

(c) Use zebras as an example to explain the term *species*.

(2)

(Total 5 marks)

12

Choose words from this list to complete the sentences below.

coal dinosaurs extinct fossils rocks

Many animals and plants which once existed have died out.

They are now _____.

We know about them because their remains formed

_____ which are found in _____.

(Total 4 marks)

13

Bacteria and viruses can reproduce quickly inside the body and make people feel ill.

(a) Use the correct answer from the box to complete the sentence.

antibodies	antitoxins	toxins
-------------------	-------------------	---------------

Bacteria and viruses make us feel ill because they produce _____.

(1)

- (b) (i) Antibiotics can be used to treat some infections.

Use the correct answer from the box to complete the sentence.

bacteria	bacteria and viruses	viruses
-----------------	-----------------------------	----------------

Antibiotics are medicines that kill _____.

(1)

- (ii) New strains of pathogens have developed which are resistant to antibiotics.

Use the correct answer from the box to complete the sentence.

are short of food	invade body cells	mutate
--------------------------	--------------------------	---------------

New strains are produced when pathogens _____.

(1)

- (iii) What will scientists have to develop to kill these new resistant strains?

(1)

(Total 4 marks)

Mark schemes

1	(a) (i) nucleus		
	(ii) chromosome		
	(iii) gene		
	<i>each for 1 mark</i>		
			3
	(b) a body cell		
	<i>for 1 mark</i>		
			1
			[4]
2	(a) (i) 3 (million years ago)		
			1
	(ii) orangutans		
			1
	(b) (i) natural selection		
			1
	(ii) any one from:		
	• went against religious beliefs		
	• insufficient evidence (at the time)		
	<i>allow no proof</i>		
	• mechanism of inheritance / variation not known (at the time)		
	• there were other theories e.g. Lamarck		
	<i>allow people couldn't accept the idea of evolving from other animals</i>		
			1
			[4]
3	(a) the soil bacterium		
			1
	an enzyme		
			1
	cotton plant		
			1
	(b) economic advantage		
	any one from:		
	• (higher yield) so can <u>sell more</u>		
	<i>allow farmer makes more <u>money</u></i>		
			1

- less spent (on pesticides)

1

environmental disadvantages

any **two** from:

- may kill useful / other insects
- may cause wild plants to produce the poison
allow example eg bees
- may affect ecosystem / food chain
ignore environment

2

[6]

4 variation

must be in correct order

1

natural selection

1

(sexual) reproduction

1

[3]

5 (a) categoric

extra words circled negates mark

1

(b) (i) 11

1

(ii) 25

*allow ecf from part (i)
ie (i) +14*

1

(iii) any **one** from:

- blue is the most common eye colour
- green is the least common eye colour
*ignore figures
allow mode / modal
allow more have blue eyes*

1

(c) (i) a gene

1

(ii) sex cells

1

[6]

6	sex genes chromosomes nucleus	<i>in order</i> <i>for 1 mark each</i>	[4]
7	extinct (NOT fossils) fossils bones rocks	<i>each for 1 mark</i>	[4]
8	(a) (i) 3 billion years ago		1
	(ii) any one from:		
	• the theory challenged religious beliefs		
	• there was insufficient evidence at the time		
	<i>allow no evidence / proof</i>		
	• mechanism of inheritance / variation not known		
	<i>accept genes not known about</i>		
	• people believed in different theories.		1
	(b) (i) 2 (million years ago)		1
	(ii) <u>Snow leopard</u>		
	<i>do not allow leopard</i>		1
	(c) camouflaged		
	<i>allow description of camouflage,</i>		
	<i>eg blends in with background</i>		
	<i>allow less likely to be seen</i>		1
			[5]
9	(a) (i) testis		1
	ovary		1
	(b) fertilisation or fertilise(d) / (ing)		
	<i>accept fusion</i>		
	<i>do not credit conception or intercourse</i>		1

	(c)	(i)	the same, identical <i>do not credit very similar make clear their genetic material is the same do not credit the same number of chromosomes or genes</i>	1	
		(ii)	the same, identical <i>make clear their genetic material is the same do not credit the same number of chromosomes or genes</i>	1	
					[5]
10	(a)	(i)	egg (cell) <i>accept ovum allow ova ignore gamete</i>	1	
		(ii)	gamete	1	
			sexual reproduction	1	
	(b)	(i)	<i>Labrador father</i> any one from: • (fur) colour • (shape of) nose / face / head. <i>allow (shape of) eyes do not allow references to ears / tail</i>	1	
		(ii)	<i>Poodle mother</i> any one from: • curly fur • furry legs • (shape of) tail • (shape of) legs • (shape of) ears. <i>allow same body shape</i>	1	
					[5]
11	(a)	(i)	any one from mutations discontinuous variation	1	
		(ii)	gene <i>accept any clear indication such as a tick</i>	1	

(b) any **one** from
gamma radiation
accept radiation

X-rays

ultra violet rays

chemicals

accept mutagens

chance

1

(c) zebras breed (to produce)

1

fertile offspring

do not accept mating

1

[5]

12 fossils

gains 1 mark

but
extinct

gains 2 marks

fossils
rocks/coal

each for 1 mark

[4]

13 (a) toxins

1

(b) (i) bacteria

1

(ii) mutate

1

(iii) new / different antibiotic
allow new / different drug
*do **not** allow vaccine*

1

[4]