



**BLANK PAGE**

**PLEASE DO NOT WRITE ON THIS PAGE**

Answer **all** the questions.

- 1 (a) DNA is the chemical that carries the genetic code.  
In humans, it carries instructions to make a new person.  
Some of the following statements about DNA are true. Some are false.

Put a tick (✓) in the box if the statement is **true**.

Put a cross (x) in the box if the statement is **false**.

A gene has only one allele.

☐

A gene is part of a DNA molecule.

☐

DNA is a long molecule that makes up a chromosome.

☐

DNA is found in the nucleus of a cell.

☐

Genes code for making proteins.

☐

The Y chromosome does not have any DNA.

☐

[3]

- (b) Body cells contain pairs of chromosomes.

Which **one** of the following, **A**, **B**, **C** or **D**, best describes why?

- A** The chromosomes in each pair are joined together.
- B** One chromosome in each pair comes from the mother and one from the father.
- C** The chromosomes are all the same size.
- D** One chromosome in each pair is a copy of the other.

answer .....

[1]

[Total: 4]

2 Rosie has cystic fibrosis.

(a) Which **one** of the following statements about cystic fibrosis is true?

Put a tick (✓) in the correct box.

cystic fibrosis is inherited from parents

☐

cystic fibrosis is caused as a result of  
environmental factors

☐

cystic fibrosis is caused by a  
microorganism

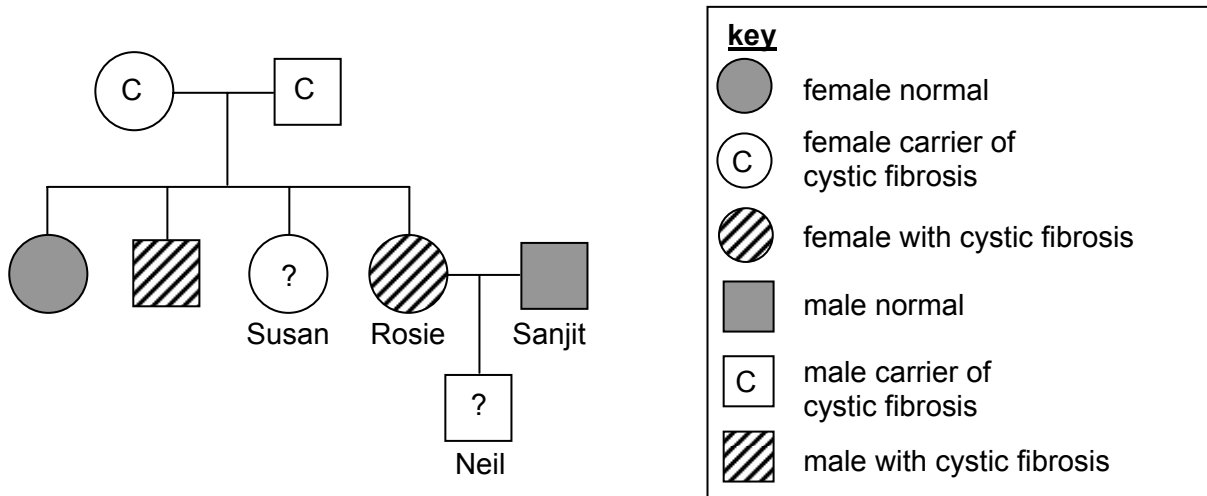
☐

cystic fibrosis is caused by both genetics  
and the environment

☐

[1]

(b) This is Rosie's family tree.



(i) What are the chances that Susan is a carrier?

Put a tick (✓) in the correct box.

0%	<input type="checkbox"/>
33%	<input type="checkbox"/>
50%	<input type="checkbox"/>
100%	<input type="checkbox"/>

[1]

(ii) Which **symbol** should be used for Neil?

Put a tick (✓) in the correct box.

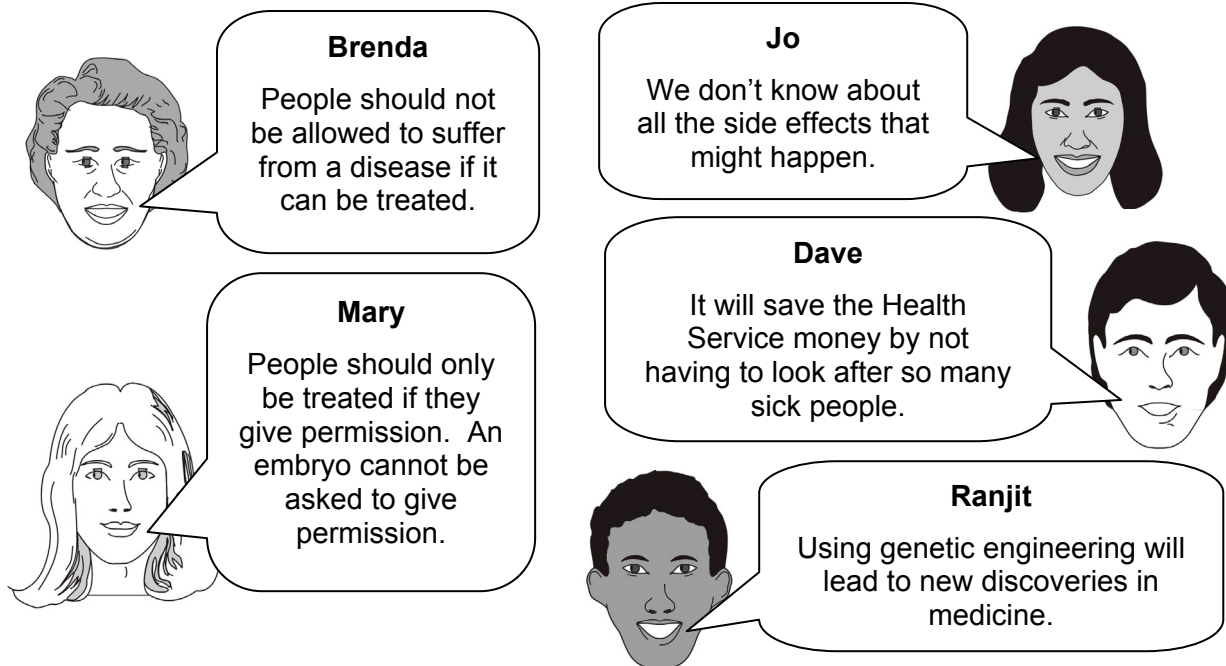
symbol	
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

[1]

[Total: 3]

[Turn over]

- 3 Some diseases can be treated using genetic engineering.  
Some people think genetic engineering is a good idea.  
Other people do not.



- (a) Complete the table to show the names of people who talk about an **advantage** and the names of people who talk about a **disadvantage** in genetic engineering.

names of people who talk about <b>an advantage</b>	names of people who talk about <b>a disadvantage</b>

[3]

- (b) Clones can be made by using genetic engineering.  
Dolly the sheep was the first cloned mammal.



© Ph. Plailly / Eurolios / Science Photo Library

The following steps, **A**, **B**, **C**, **D**, **E** and **F**, explain how Dolly was cloned.  
They are in the wrong order.

- A** DNA removed from donor cell
- B** egg develops into Dolly
- C** egg taken from Dolly's mother and DNA is removed
- D** egg with new DNA is placed in mother's womb
- E** body cell taken from donor sheep
- F** DNA is injected into egg

Fill in the boxes to show the correct order. The first one has been done for you.

C					
---	--	--	--	--	--

[4]

[Total: 7]

4 David is finding out about air quality.

(a) He finds out that the atmosphere contains a mixture of gases.

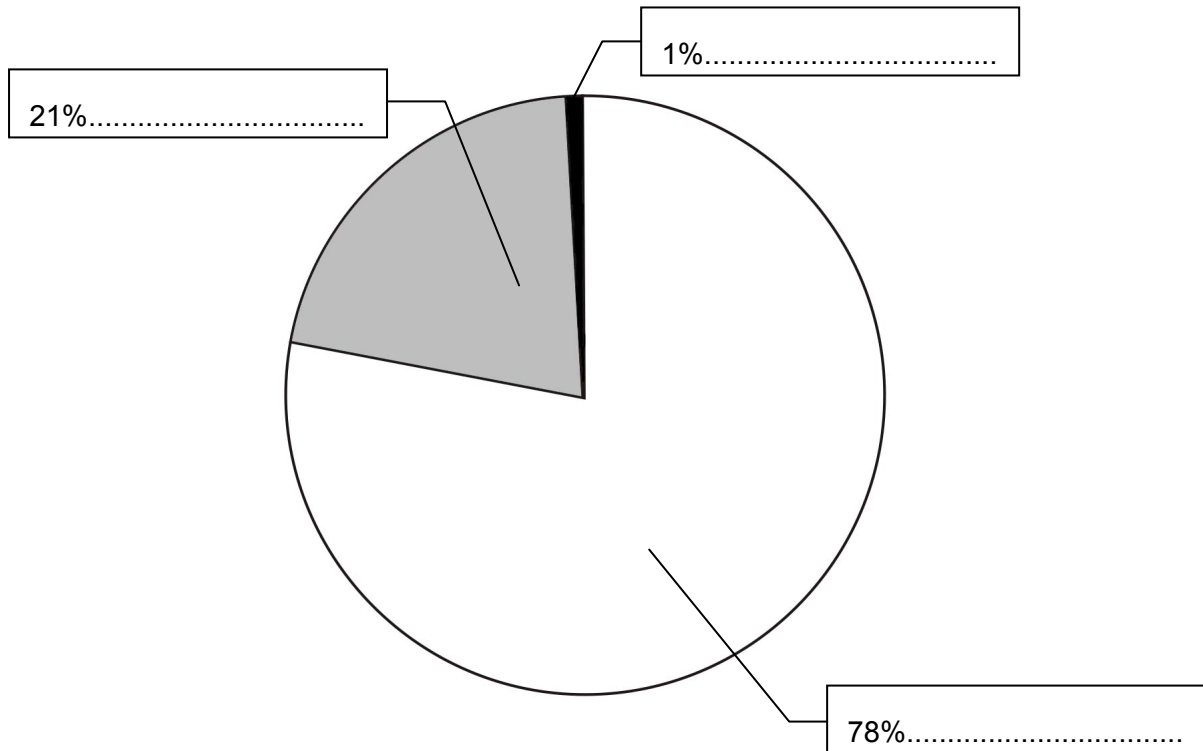
Label the pie chart to show **three** of these gases. Choose words from this list.

**argon**

**carbon dioxide**

**nitrogen**

**oxygen**



[3]

(b) David finds out that one way to reduce air pollution is to plant more trees.

Choose **one** of the words below to complete the explanation.

**germinate**

**photosynthesise**

**respire**

**die**

The trees use up carbon dioxide when they ..... [1]

[Total: 4]



- 5 David buys a second hand car. He wants to know if it will pollute the atmosphere.



- (a) The air going into a car engine contains many gases.  
Fuel vapour also goes into the engine and burns.

(i) Which gas reacts with the fuel vapour to make carbon dioxide?

..... [1]

(ii) Which **two** gases react to make nitrogen oxides?

..... and ..... [1]

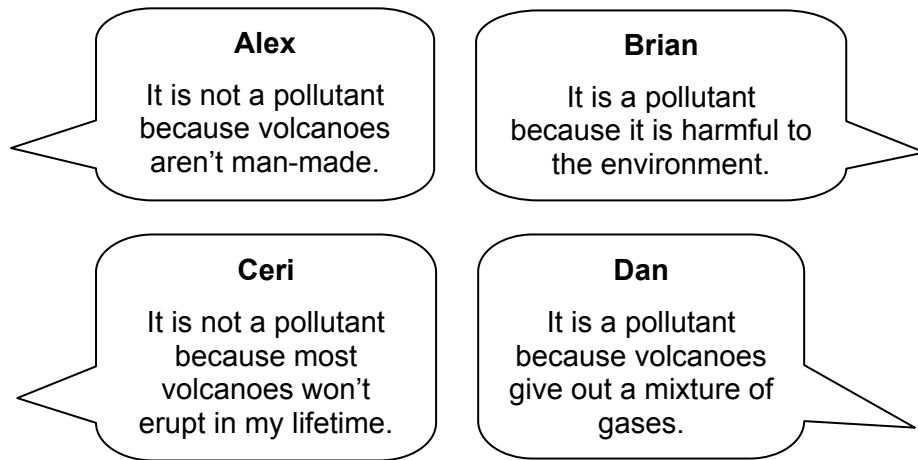
- (b) One of the gases which comes out of the car exhaust is oxygen.

Which statement, **A**, **B**, **C** or **D**, explains why?

- A** oxygen is produced in the car engine
- B** oxygen is produced by reactions in the catalytic converter
- C** not all the oxygen that goes into the car engine is used
- D** modern fuels give out more oxygen than they use

answer ..... [1]

- (c) Another gas which comes out of car exhausts is sulfur dioxide. When a volcano erupts, it can give out a million tonnes of sulfur dioxide. David's friends have different ideas about sulfur dioxide from volcanoes.



Which friend has the **right** idea about what a pollutant is?

answer ..... [1]

(d) The chart is about different ways of reducing pollution.

Draw a line from each **way of reducing pollution** to the correct box that shows **more information**.

Then draw another line from each **more information** box to the correct box that shows its **effect**.

way of reducing pollution	more information	effect
catalytic converters	need heavier vehicles which use more fuel	more energy used but make less pollution
public transport	must be hot to turn pollutants into less harmful substances	more energy used per vehicle but less per person
more efficient car engines	use less fuel	produces less sulfur dioxide
cleaner fuels	fuel contains less sulfur	less energy per vehicle but still a lot of energy per person

[6]

[Total: 10]

- 6 Vesto Slipher was an astronomer.  
In 1915, he measured the speed of a number of distant galaxies.

(a) Which **one** of the following statements about distant galaxies is true?

Put a tick (✓) in the box next to the **correct** statement.

Distant galaxies are moving towards our galaxy. ☐

Distant galaxies are at a fixed distance from our galaxy. ☐

Distant galaxies are moving away from our galaxy. ☐

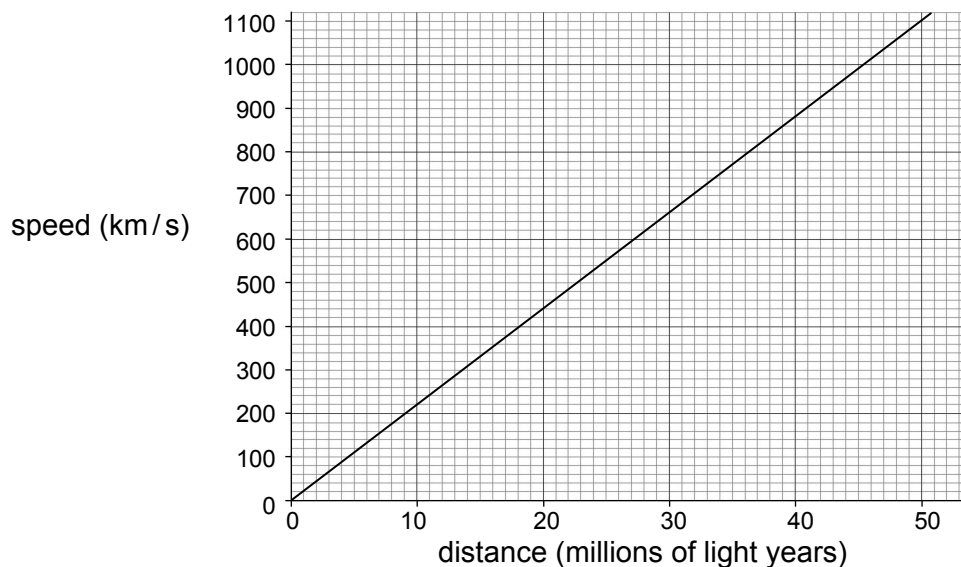
Distant galaxies are orbiting our galaxy. ☐

[1]

(b) These are some of Vesto Slipher's results.

galaxy	speed (km/s)
A	1100
B	500
C	1100
D	600
E	300

Recent work by astronomers shows that these galaxies are moving relative to us with speeds given by this graph:



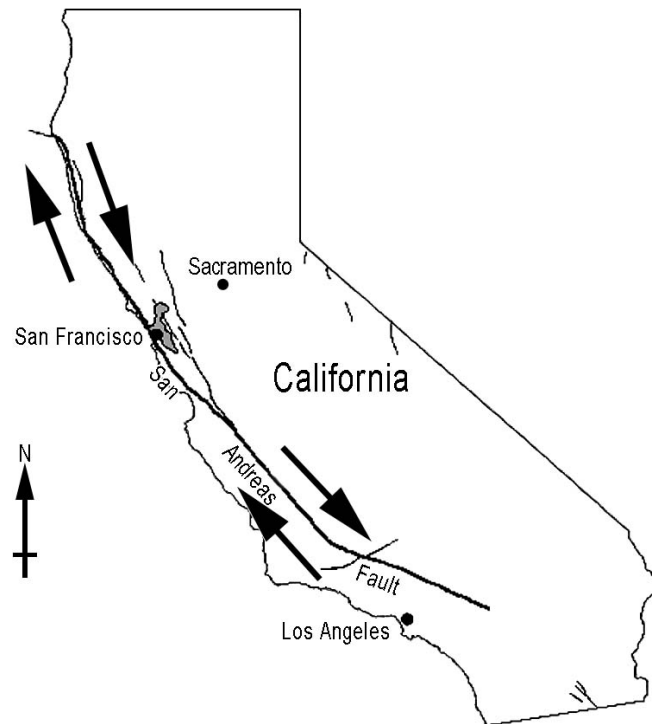
Use the graph to decide which galaxy in Vesto Slipher's table is 23 million light years away from us.

Show on the graph how you work out your answer.

galaxy ..... [2]

[Total: 3]

- 7 In 1906, a violent earthquake happened in San Francisco, on the California coast. The map shows the position of the San Andreas Fault and San Francisco.



The following statements describe the events leading to the earthquake. They are in the wrong order.

- A** Great pressure builds up where the plates cannot move easily.
- B** Two tectonic plates meet at a plate boundary at the San Andreas Fault.
- C** Slow movements of the magma make tectonic plates move.
- D** Friction at the edges prevents the plates from sliding easily.
- E** The sudden movement causes an earthquake.
- F** When the pressure becomes too great, the plates suddenly slip.

Fill in the boxes to show the right order. The first two have been done for you.

<b>B</b>	<b>C</b>				
----------	----------	--	--	--	--

[3]

[Total: 3]

- 8 (a) Put a ring around the best estimate of the age of the Solar System.

4000 million years

5000 million years

10 000 million years

14 000 million years

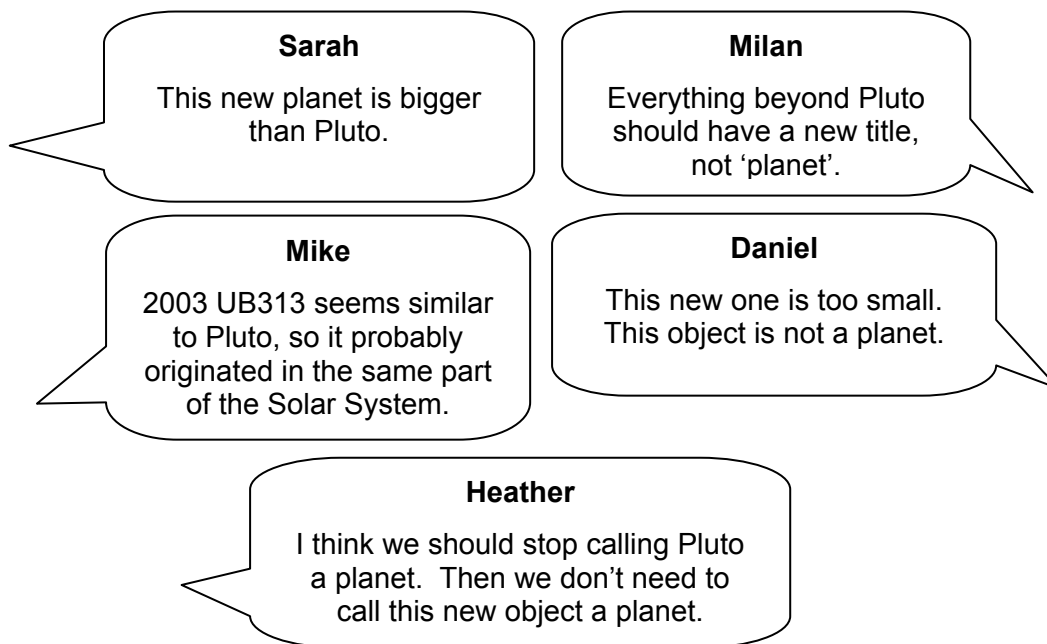
[1]

- (b) Several new icy 'planets' have been discovered in recent years. These all orbit the Sun beyond the orbit of Neptune.

One of these 'planets', 2003 UB313, is a bit bigger than Pluto, and seems to be made from the same sort of material.

The International Astronomical Union has said that both 2003 UB313 and Pluto should be called 'dwarf planets'.

Here are some people's comments about 2003 UB313.



- (i) Put a tick (✓) in the box next to each person who says that 2003 UB313 is **not** a planet.

Sarah	<input type="checkbox"/>
Milan	<input type="checkbox"/>
Mike	<input type="checkbox"/>
Daniel	<input type="checkbox"/>
Heather	<input type="checkbox"/>

[2]

- (ii) Put a tick (✓) in the box next to each person whose comments include data **without** an explanation.

Sarah

☐

Milan

☐

Mike

☐

Daniel

☐

Heather

☐

[2]

- (iii) Put a tick (✓) in the box next to each person whose comments include data **with** an explanation.

Sarah

☐

Milan

☐

Mike

☐

Daniel

☐

Heather

☐

[1]

[Total: 6]

- 9 This question is about the movement of the Earth's continents.  
In 1912, Wegener suggested that the position of the continents had changed over millions of years.

(a) In 1912, geologists rejected this suggestion.

Put a tick (✓) in the box next to their **best** reason for rejecting Wegener's suggestion.

Continents did not seem to move about.

☐

There was no geological theory which could explain how continents could move.

☐

There were only a few similar fossil animals in South America and Africa.

☐

Wegener was not trained in geology.

☐

[1]

- (b) Wegener's suggestion is now accepted as correct, even though it was not accepted in 1912.

Put a tick (✓) in the box next to the **best** reason for this change in the thinking of the scientific community.

Africa and South America have shapes which seem to fit together.

☐

Fossils of similar animals have been found in Africa and South America.

☐

Sea floor spreading was discovered in the 1960s.

☐

Similar rocks have been found in Africa and South America.

☐

[1]

[Total: 2]

## END OF QUESTION PAPER

### Acknowledgements:

Q.3 photo

© Ph. Plailly / Eurelios / Science Photo Library

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (OCR) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.  
OCR is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.