



General Certificate of Secondary Education
2016–2017

Centre Number

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Candidate Number

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Science: Single Award

Unit 1 (Biology)
Foundation Tier

[GSS11]

MV18

WEDNESDAY 9 NOVEMBER 2016, MORNING

Time

1 hour, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all nine** questions.

Information for Candidates

The total mark for this paper is 60.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question 8.

- 1 (a) Complete the table below about microorganisms that cause disease. [3 marks]

Choose from:

salmonella

thrush

virus

fungus

Type of microorganism	Disease
	athlete's foot
bacteria	
	chickenpox

- (b) Given below are two substances in cigarette smoke and some effects of smoking on the body. Using lines, link each substance to **one** effect it can cause. [2 marks]

Substance**Effect**

carbon monoxide

affects heart rate

tar

causes cancer

reduces the blood's ability to carry oxygen

- (c) Many people find it difficult to stop smoking because cigarette smoke contains an addictive substance. Name the addictive substance in cigarette smoke. [1 mark]
-

2 Both the nervous and hormone systems help us respond to changes inside and outside the body.

(a) (i) Complete the following sentences. [2 marks]

Choose from:

head

sense organ

control centre

spinal cord

The brain and the _____

together form the Central Nervous System (CNS).

The brain is the _____

linking the senses and the effectors (muscles).

(ii) The nervous system has both reflex and voluntary actions.

Give **one** advantage of a reflex action. [1 mark]

(b) Circle the **two** correct statements below about hormones. [2 marks]

hormones kill microorganisms

insulin is a hormone

hormones work faster than nerve impulses

hormones travel in the blood

- 3 The table below shows the Northern Ireland population in 2013 and 2014.

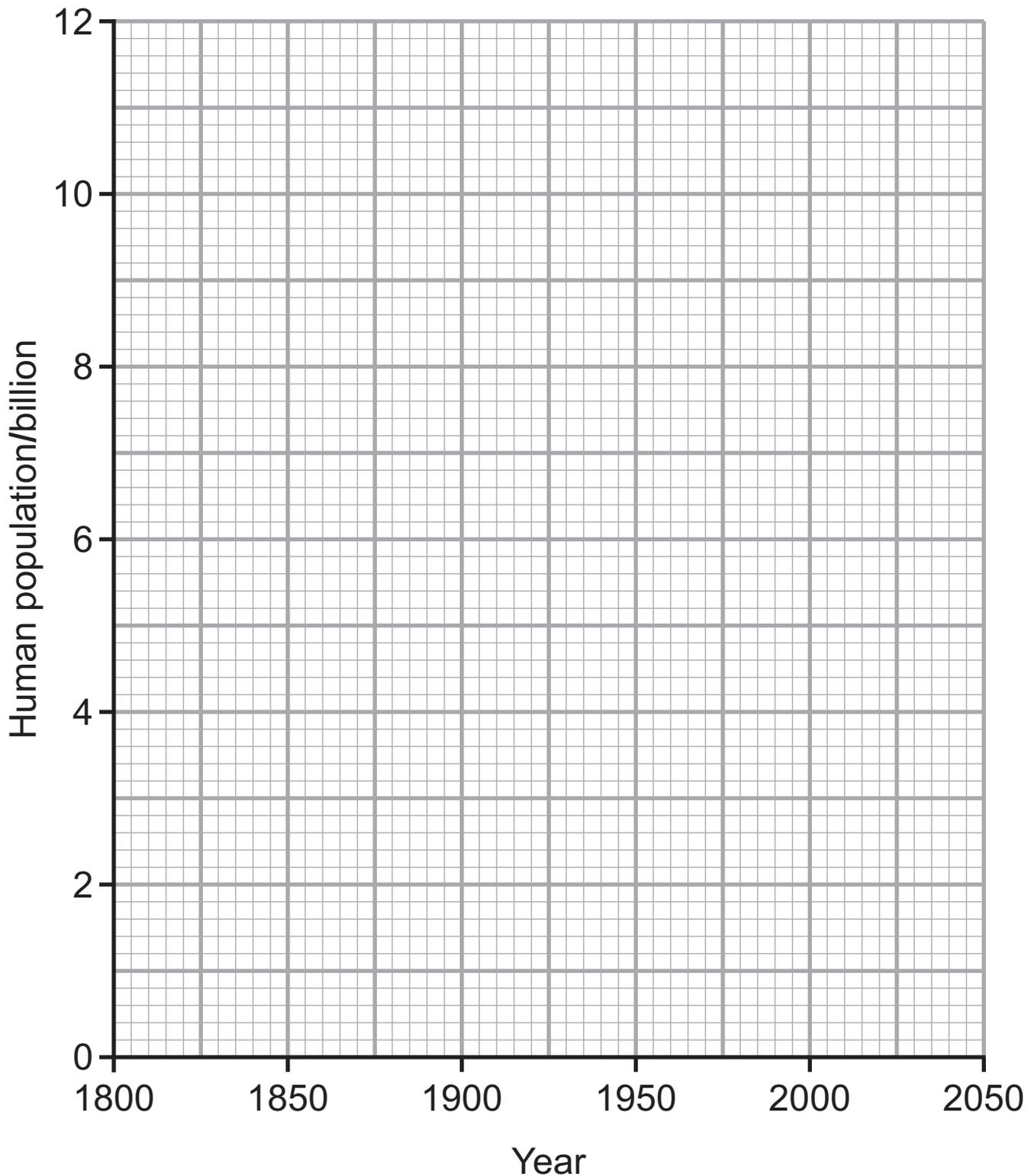
	Year	
	2013	2014
Population	1 829 700	1 840 500

- (a) Calculate the increase in the Northern Ireland population from 2013 to 2014. [1 mark]

- (b) The world human population is also increasing as shown in the table below.

Year	Human population/ billion
1800	1.2
1850	1.4
1900	1.8
1950	2.4
2000	6.0

- (i) Using the information in the table on page 6, plot a **line graph** on the grid below. [3 marks]



- (ii) Predict what the human population will be in the year 2050. [1 mark]

_____ billion

(iii) Suggest **two** reasons why the human population is increasing. [2 marks]

1. _____

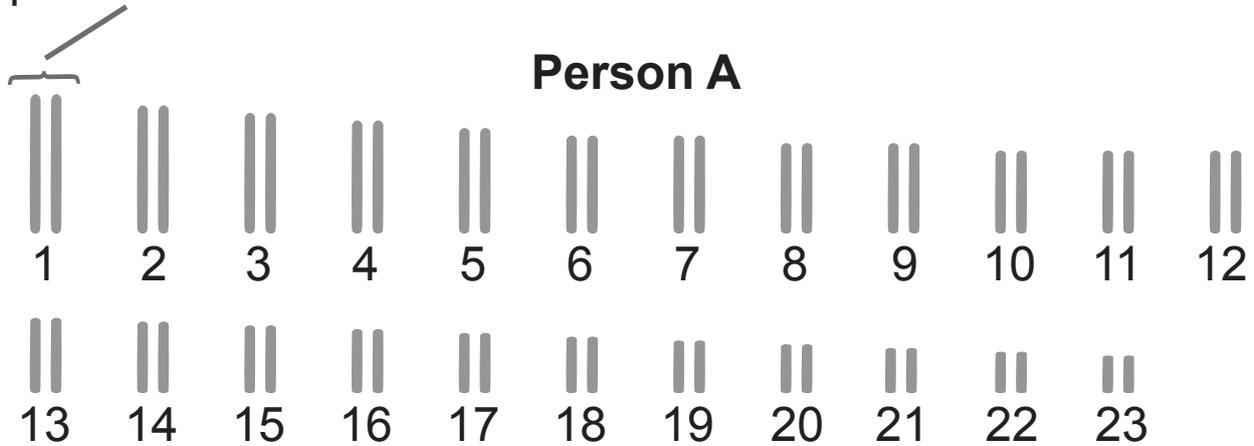
2. _____

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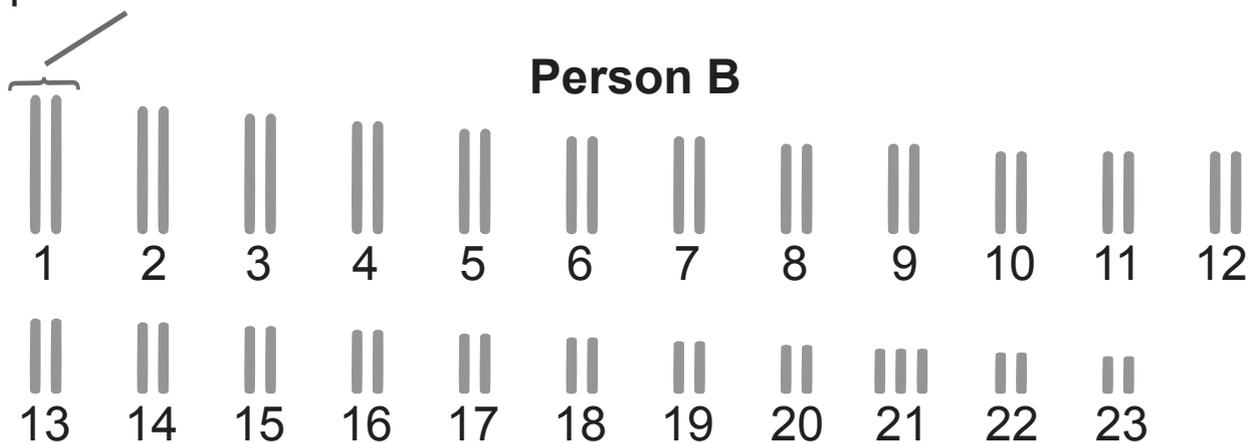
(Questions continue overleaf)

- 4 (a) The diagram below shows the karyotypes of two different people.

pair of chromosomes



pair of chromosomes



- (i) Describe **one** difference between each pair of chromosomes (1 to 23) in person **A**. [1 mark]

From these karyotypes, doctors know that person **B** suffers from an inherited condition.

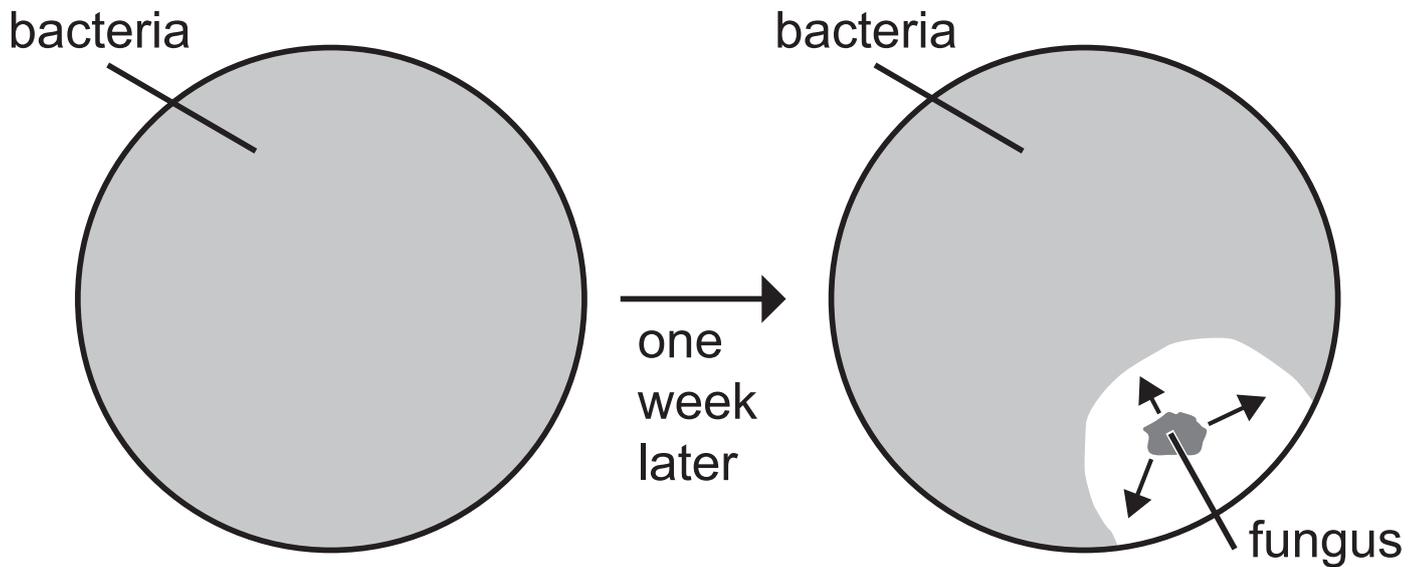
(ii) Name the inherited condition person **B** suffers from. Explain how the karyotype shows this. [2 marks]

(b) Complete the following sentences. [2 marks]

A change in the structure or number of chromosomes is called a _____ .

Too much exposure to UV light can make chromosomes change and cause _____ cancer.

- 5 (a) The following diagram shows what Alexander Fleming observed when one of his Petri dishes of bacteria was contaminated by a fungus.



- (i) State **one** conclusion that can be made about the effect of the fungus. [1 mark]

- (ii) The drug penicillin was produced from this fungus. What name is used to describe drugs such as penicillin? [1 mark]

- (iii) Scientists are developing a blood test that shows if an infection is caused by a virus or bacteria. Suggest why this test may save the NHS a large amount of money. [1 mark]

(b) Drugs go through a series of costly trials before they are licensed. Suggest **one** reason why each of the following trial stages costs a lot of money. [2 marks]

In-vitro testing _____

Clinical trials _____

(c) The statements below describe how our body defends against microorganisms, but they are **not** in the correct order.

- A** microorganisms are clumped together (immobilised)
- B** white blood cells produce antibodies
- C** microorganisms enter our body
- D** phagocytes engulf and destroy the clumps of microorganisms
- E** antibodies attach to the antigens on the microorganisms

Using the letters **A**, **B**, **C**, **D** and **E**, place these statements in the correct order. [2 marks]
The first one has been done.

C

- (b)** The length of hair in cats is controlled by two alleles.
The allele for long hair is dominant to the allele for short hair:
H = long hair and h = short hair.

- (i)** Complete the Punnett square to show the offspring produced by breeding a cat with genotype HH with a cat of genotype hh. [2 marks]

	H	
h		
		Hh

- (ii)** State the phenotype(s) shown in the Punnett square.
[1 mark]

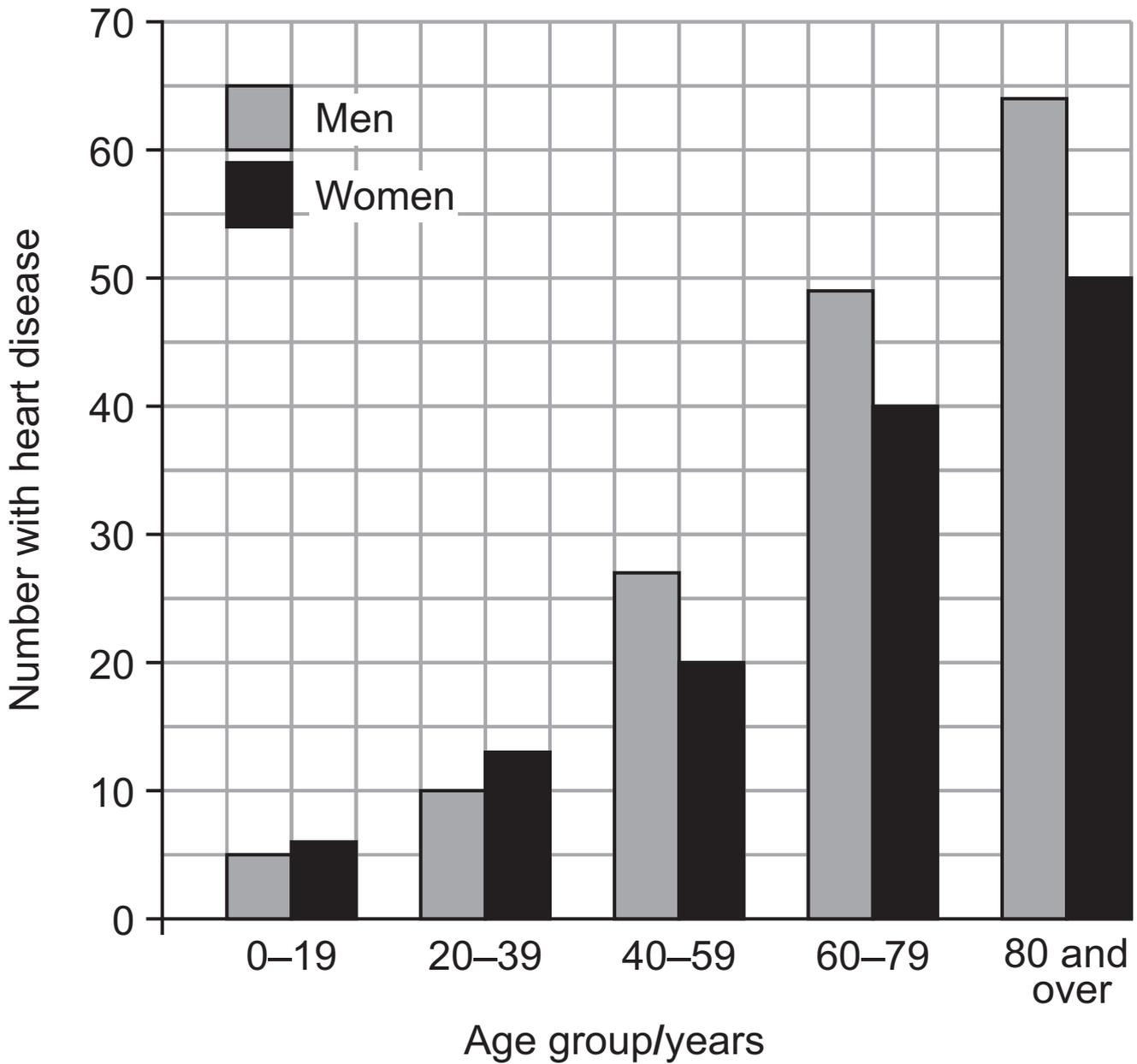
7 (a) Fiona wanted to compare the amount of sugar in chocolate and an onion. Both chocolate and onion contain a lot of sugar. She added equal amounts of white chocolate and onion to separate boiling tubes containing Benedict's reagent. Fiona then placed the boiling tubes in a beaker containing very hot water and waited for the blue Benedict's reagent to turn red.

(i) Suggest why Fiona used white chocolate rather than dark brown chocolate, when testing with Benedict's reagent. [1 mark]

(ii) To find out which had the most sugar, Fiona had to constantly check the colour in the boiling tubes. Suggest why she had to continually check the colour change rather than wait until they had both reached their final colour. [2 marks]

(iii) Suggest **one** reason why Fiona placed the two boiling tubes in the same beaker rather than using two separate beakers. [1 mark]

- (b) Taking too much sugar in the diet can lead to obesity and eventually heart disease. The bar chart below shows the number of men and women with heart disease in different age groups in one hospital.



- (i) Give **one** trend shown by this information. [1 mark]

(ii) Apart from smoking and obesity, give **two** other risk factors for heart disease. [2 marks]

1. _____

2. _____

(iii) Complete the sentence below. [1 mark]

These risk factors may also lead to a blockage of blood vessels in the brain resulting in a

_____.

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(Questions continue overleaf)

- 9 (a) The growing of willow as a biofuel is encouraged by many conservation groups. It can take four years for willow to grow to a suitable size before it can be used.

The table below shows some information about the growth of willow plants over the four year cycle.

Year	Average mass of each plant/kg	Average carbon dioxide <u>taken in</u> per plant/arbitrary units	Average carbon dioxide <u>given out</u> per plant/arbitrary units
1	4.4	5	2
2	12.7	20	9
3	20.4	37	16
4	28.3	55	24
		Total 117	Total 51

Two processes in plants involve the exchange of carbon dioxide. One process takes in and uses carbon dioxide; the other produces carbon dioxide which is given out by the plant.

- (i) Name the process in plants that: [2 marks]

1. uses carbon dioxide

2. produces carbon dioxide

- (ii) Describe the change in the average amount of carbon dioxide **taken in** over the four years. Suggest an explanation for this change. [3 marks]

- (iii) When the willow is burned as a biofuel, after growing for four years, each plant produces an average of **66** arbitrary units of carbon dioxide.

In terms of carbon dioxide taken in and given out, explain why willow can be described as a carbon neutral fuel. [2 marks]

(b) One effect of global warming is that the Arctic icecap is decreasing in area. It is now less than 15 million km² which is the lowest since satellite records began in 1979. The ice is also up to 60% thinner than it was in 1979.



Adult polar bears are large, heavy animals with white fur. They are good swimmers but hunt seals on the ice. The seals are at risk when they come out of the water onto the ice.

Using **only** the information provided, answer parts (i) and (ii) below.

(i) Describe and explain **one** way in which polar bears are adapted for their environment. [2 marks]

(ii) Suggest **one** way in which global warming is harming the polar bears. [1 mark]

(c) (i) Suggest **one** way in which satellite imaging has increased the reliability of data about the effects of global warming on the Arctic icecap. [1 mark]

(ii) Suggest why it is important to have reliable data about the effects of global warming. [1 mark]

THIS IS THE END OF THE QUESTION PAPER

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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Examiner Number

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