Centre Number

71

Candidate Number

![cea Rewarding Learning logo]

General Certificate of Secondary Education
2014

GCSE Biology

Unit 2

Foundation Tier

[GBY21]

MONDAY 16 JUNE, MORNING

MV18

TIME

1 hour 30 minutes, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of the page.
You must answer the questions in the spaces provided.
Complete in blue or black ink only.
Answer **all fourteen** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.
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 **10(b)**.

1 **(a)** The diagram shows the 28 days of a menstrual cycle.

start of menstrual cycle

ovulation
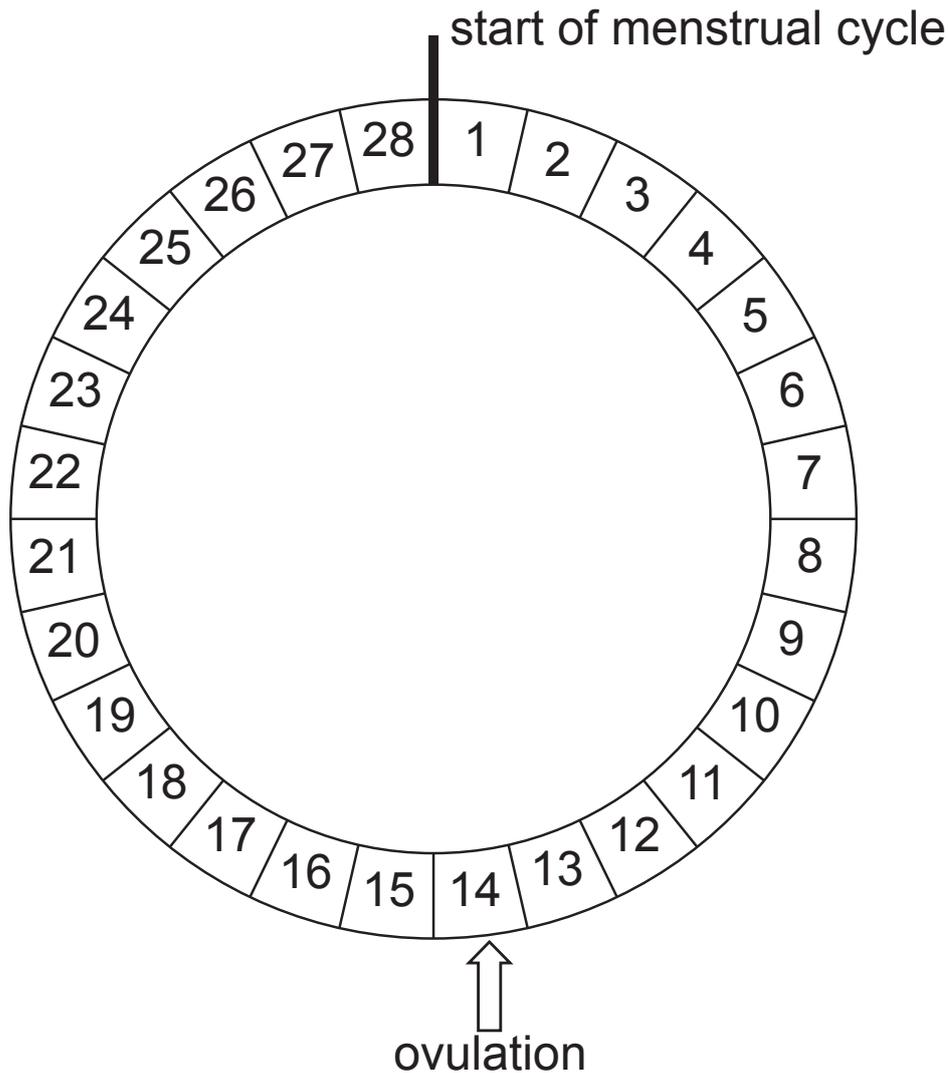
Look at the diagram.

Menstruation lasts for five days.

(i) On the diagram, **shade in the five** days of menstruation. [1 mark]

(ii) What happens during menstruation? [1 mark]

_____

_____

(b) Sperm can live for **three** days.

A woman who has sexual intercourse on day 12 could become pregnant.

Explain why. [2 marks]

_____

_____

_____

_____

2 **(a)** Cigarette smoke contains chemicals which have harmful effects.

Some chemicals in cigarette smoke are shown in the boxes on the left.

Draw lines to link each chemical to its harmful effect. [2 marks]

Chemical in
cigarette smoke

Harmful effect

Nicotine	Less oxygen carried in the blood
Carbon Monoxide	Causes addiction
Tar	Causes lung cancer

(b) Governments are trying different ways to reduce the number of people smoking.

One way is to ban advertising.

Give two **other** ways. [1 mark for each way]

1. _____

2. _____

3 Look at the words and numbers in the box.

Spallanzani	**37**	**Pasteur**	**72**	**swan neck**
spontaneous generation		**100**		**microorganisms**

Use the words or numbers from the box to **complete the following sentences**. [5 marks]

Early scientists thought that living organisms appeared from non-living things.

This theory is called _____.

A French scientist called _____ proved this theory wrong using a flask with a _____.

This allowed air to enter the flask but

trapped _____.

Food such as milk is now preserved by heating

to _____°C for 15 seconds.

5

[Turn over

4 The table shows the growth of a child from birth to 20 years of age.

Age/years	Size of body as percentage of total growth
0 (birth)	5
4	40
8	44
12	56
16	85
20	100

(a) Complete the graph opposite using the numbers in the table. [3 marks]

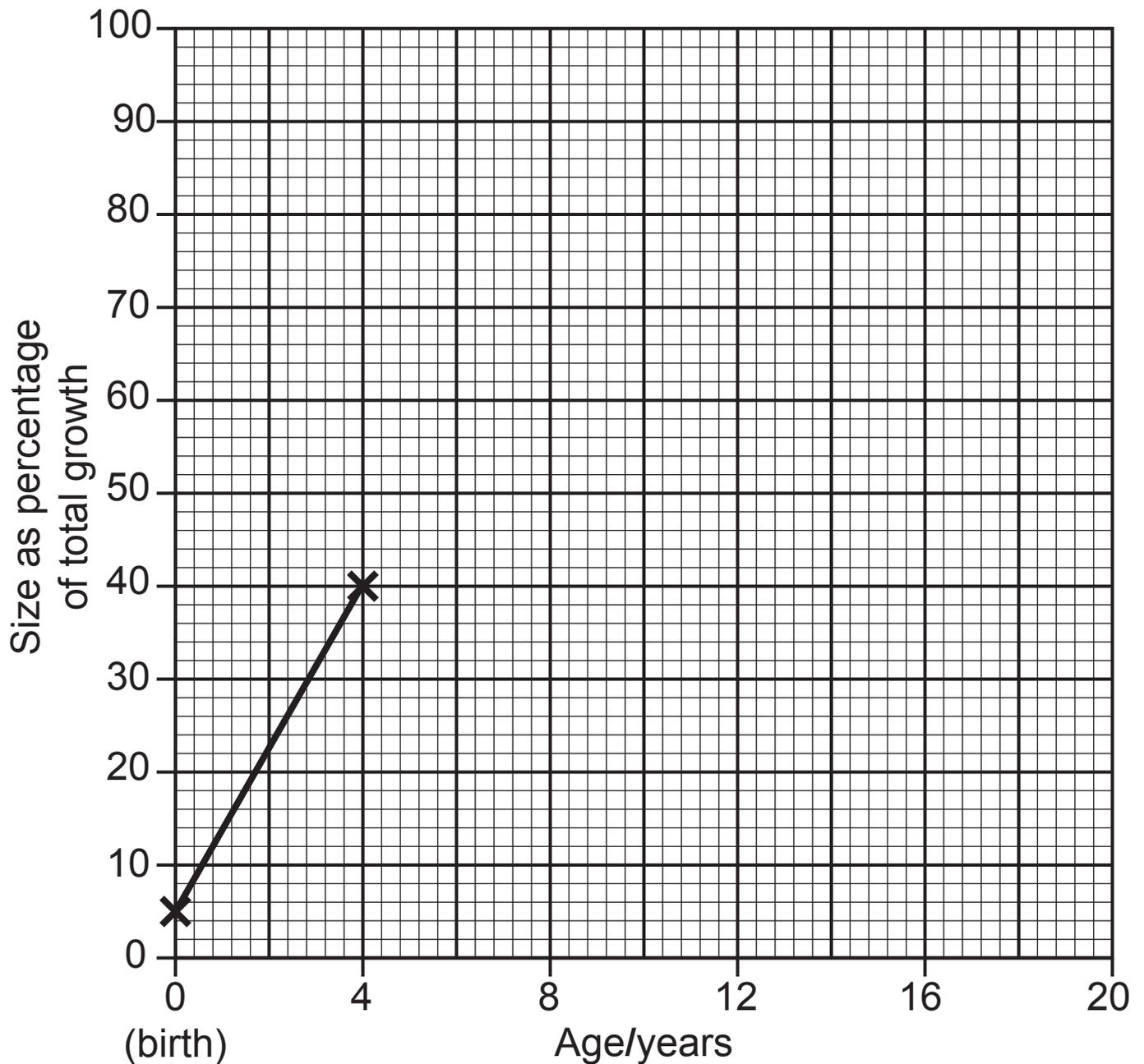The first two points have been done for you.

Look at the graph.

(b) When is the growth of the child slowest? [1 mark]

Tick (✓) the box beside the correct answer.

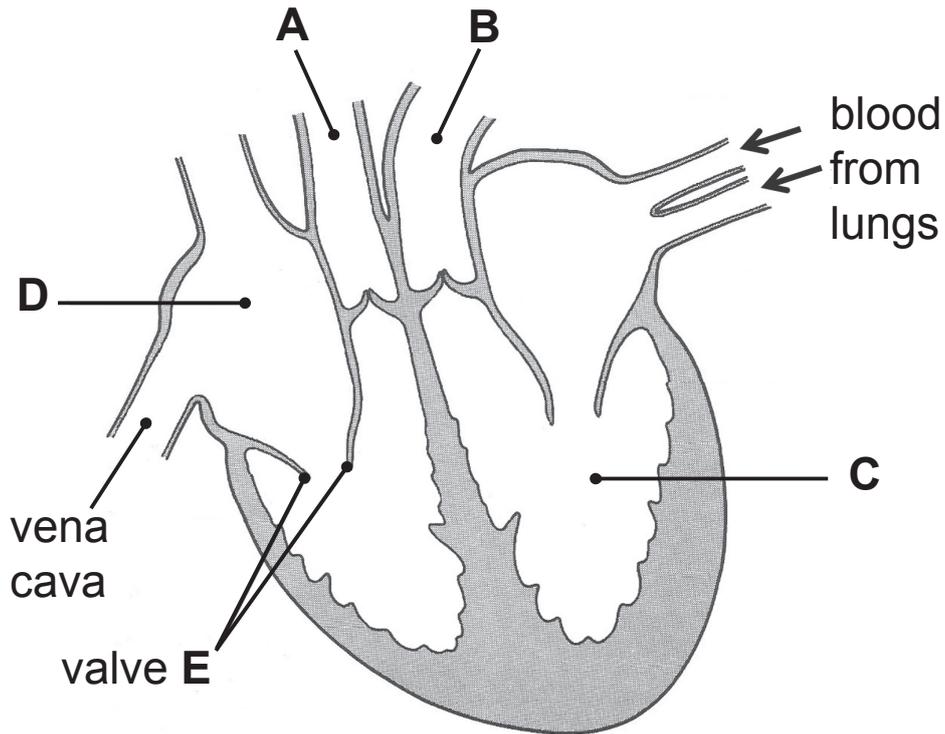between 0 and 4 years ☐

between 4 and 8 years ☐

between 8 and 12 years ☐

(c) When the child is 12 years old the **rate** of growth changes.

    (i) How does the **rate** of growth change? [1 mark]

    _____

    _____

    (ii) What causes this change? [1 mark]

    _____

    _____

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5 The diagram shows a section through the heart.

Look at the diagram.

(a) Draw an arrow on the diagram to show the direction of blood flow in vessel **A**. [1 mark]

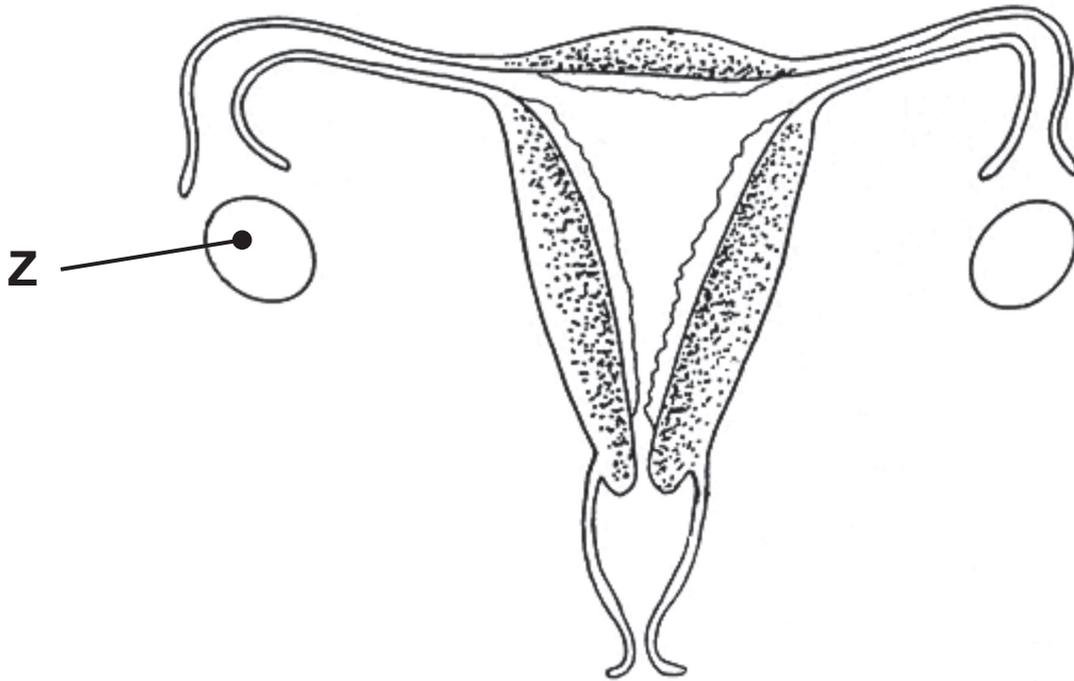**(b)** Name parts **B**, **C** and **D**. [1 mark for each part]

B _____

C _____

D _____

(c) Explain why the valve **E** is needed. [2 marks]

_____

_____

_____

6 **(a)** The diagram shows part of the female reproductive system.

Look at the diagram.

(i) **Write the letter F** on the diagram to show where fertilisation happens. [1 mark]

(ii) **Write the letter M** on the diagram to show where implantation occurs. [1 mark]

(iii) What is the function of part **Z**? [1 mark]

_____

(b) The photograph shows a developing foetus.

Look at the photograph.

(i) Name parts **A**, **B** and **C**. [1 mark for each part]

A _____

B _____

C _____

(ii) The foetus is **not** ready to be born.

Give two pieces of evidence **from the photograph** which suggest this. [1 mark for each]
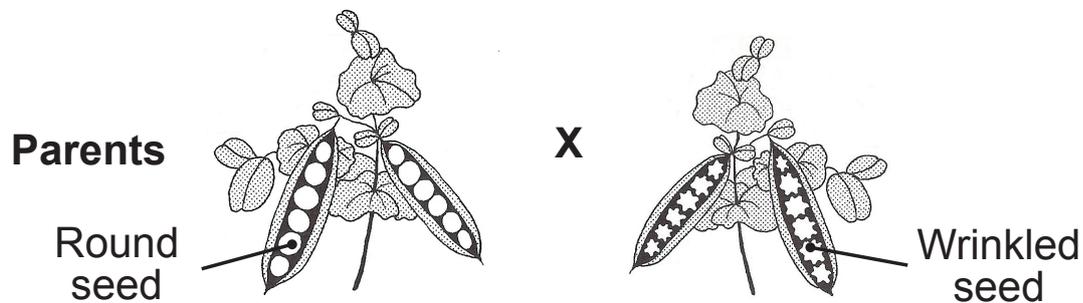
1. _____

_____

2. _____

_____

11

[Turn over

7 A student carried out a genetic cross between two pure breeding pea plants.

The shape of the seed is controlled by two alleles.

(a) What is an allele? [1 mark]

_____

_____

The allele for round seed (**R**) is dominant to the allele for wrinkled seed (**r**).

Parents   **X**

Round seed   Wrinkled seed
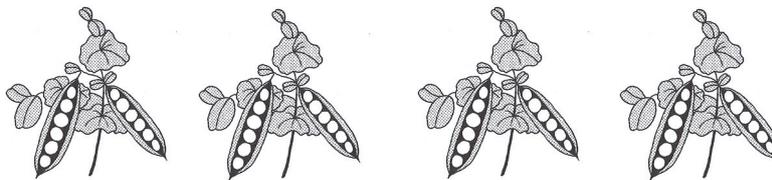
Genotypes   **RR**   ☐

Offspring

Genotypes   All **Rr**

Look at the diagram on page 12.

(b) Complete the diagram by writing the genotype of the wrinkled seed parent in the box. [1 mark]

The allele for wrinkled seed is recessive.

(c) Use evidence from the diagram to explain how you know that the allele for wrinkled seed is recessive. [1 mark]

_____

_____

_____

(d) A student grew plants using two seeds from the offspring.

He allowed these plants to fertilise each other.

(i) Complete the Punnett square to show the results of this cross. [2 marks]

	gametes	
	R	**r**
gametes **R**		
r		

(ii) Draw a (circle) around the homozygous dominant genotype in the Punnett square. [1 mark]

13

[Turn over

S
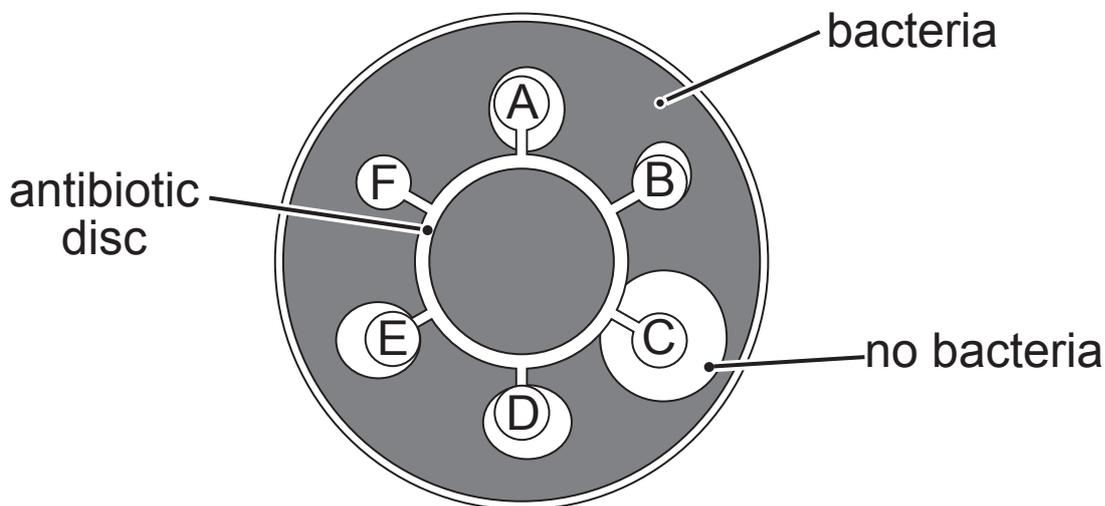
(b) She incubated the Petri dish at 20°C.

Explain why she did **not** incubate it at 37°C. [1 mark]

_____

_____

Look at the diagram.

(c) One antibiotic was better than all the others at killing these bacteria.

(i) Give the letter of this antibiotic. [1 mark]

_____

(ii) Use evidence from the diagram to explain why you chose this antibiotic. [1 mark]

_____

_____

_____

8957.03 **MV18**   **15**   **[Turn over**

9 **(a)** A student carried out an experiment on water loss from leaves.

   (i) Describe how water moves out of leaves into the surrounding air. [2 marks]

_____

_____

_____

_____

_____

   (ii) Environmental factors affect this loss of water from leaves.

   Give two of these factors. [2 marks]

   1. _____

   2. _____

(b) The student wanted to find out which surface of a leaf loses more water.

He set up the following experiment.

Leaf 1   **Leaf 2**   **Leaf 3**

no vaseline vaseline   vaseline
     covering   covering
     lower surface upper surface
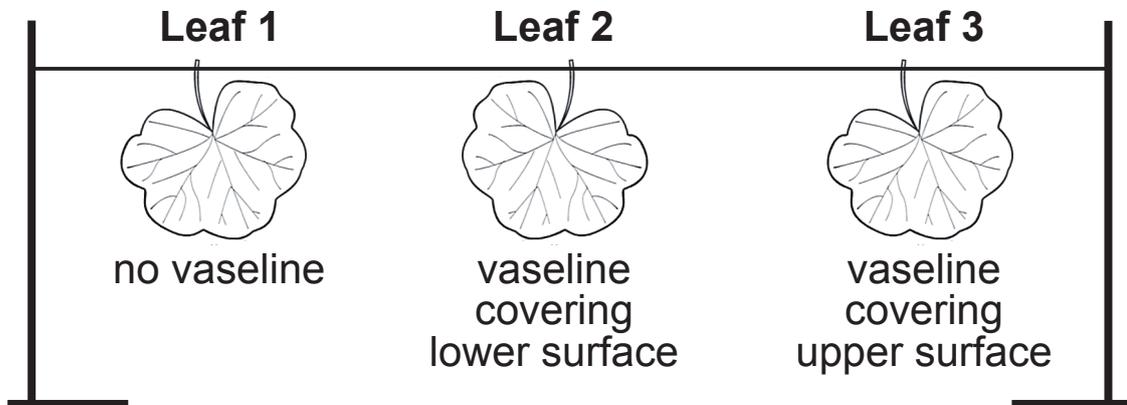
The student weighed each leaf at the start and hung them on the line.

He weighed them again after 24 hours.

When water is lost from a leaf the mass of the leaf decreases.

The table shows the percentage decrease in mass of the three leaves after 24 hours.

Leaf	Surface covered with vaseline	Mass/g		Percentage decrease in mass
		at start	after 24 hours	
1	Neither	1.9	1.3	32
2	Lower	1.8	1.6	11
3	Upper	2.0	1.6	

The student calculated the percentage decrease in mass of leaves 1 and 2 using the following equation.

$$\text{Percentage decrease in mass} = \frac{\text{mass at start} - \text{mass after 24 hours}}{\text{mass at start}} \times 100$$

(i) Use the equation to calculate the percentage decrease in mass of **leaf 3**. [2 marks]
Show your working.

Draw a circle around the correct answer.

12.5%   **20%**   **25%**   **80%**

(ii) The percentage decrease in mass is used to compare the results.
Explain why. [1 mark]

_____

_____

_____

Look at the diagram.

(iii) The student did not put vaseline on either surface of **leaf 1**.
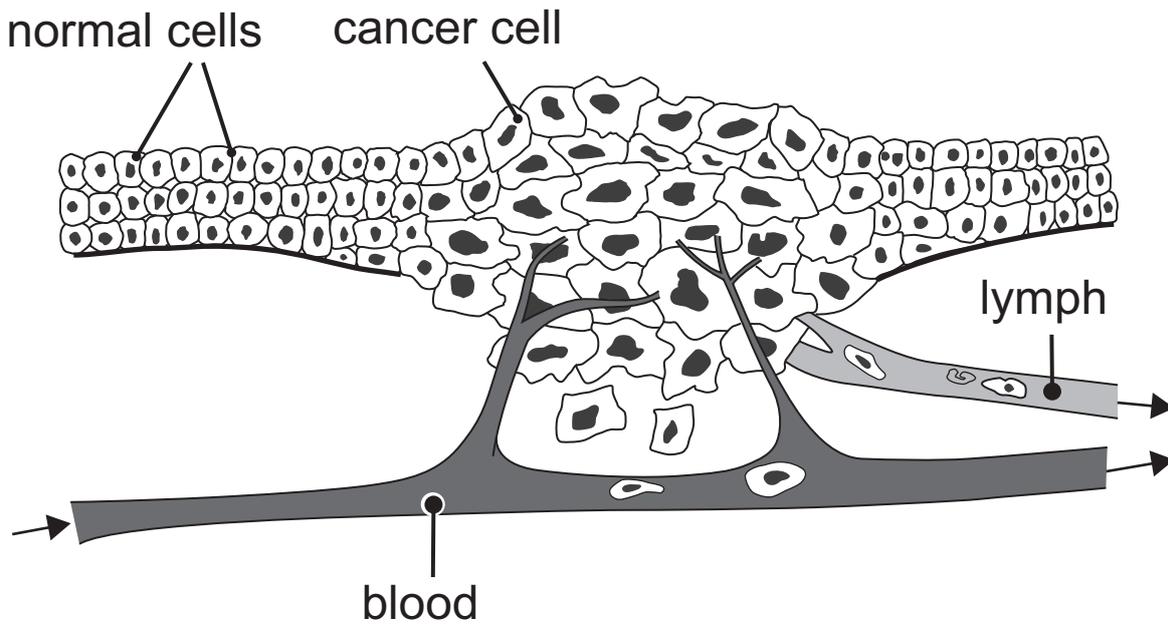
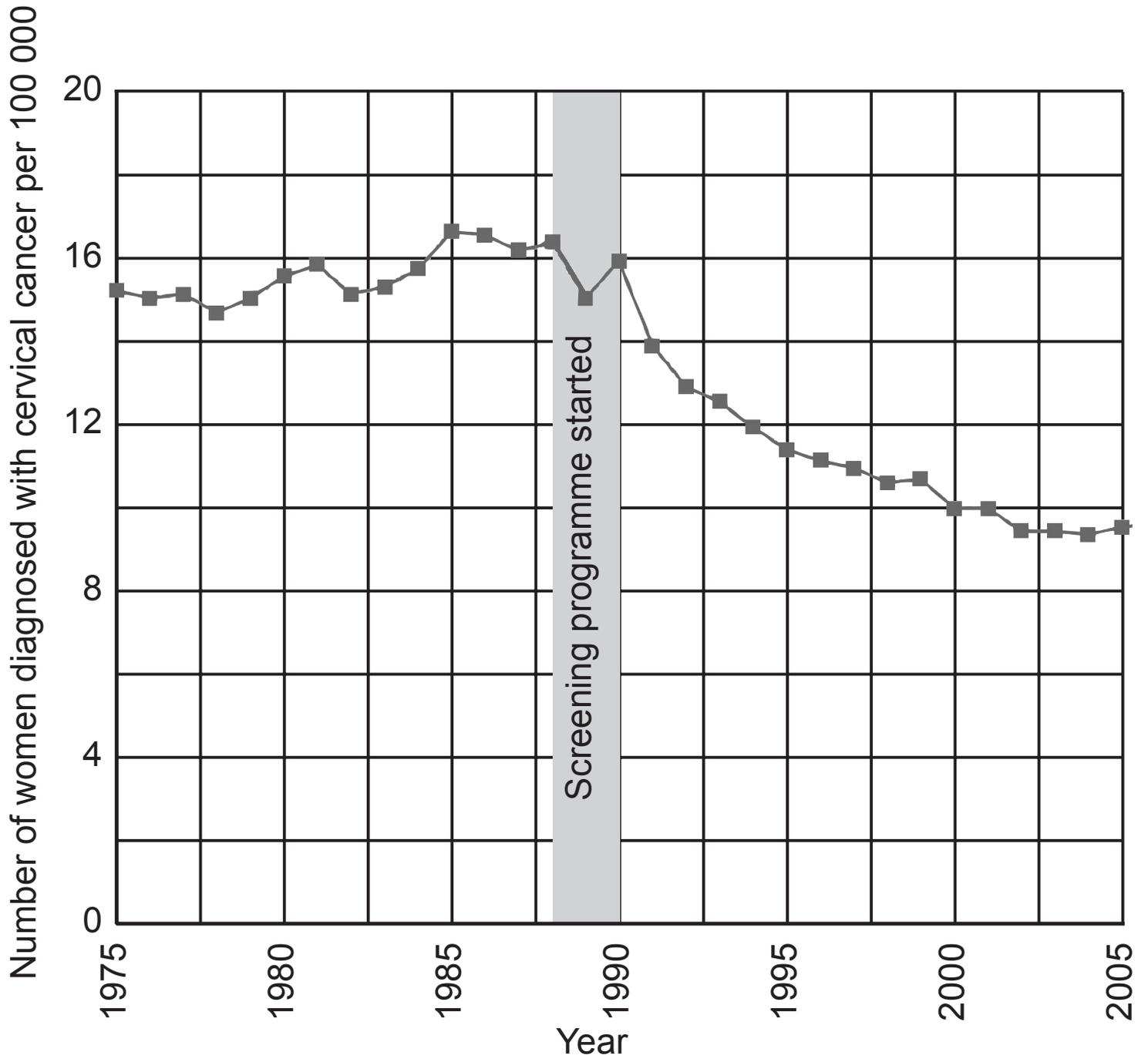What was the purpose of **leaf 1**? [1 mark]

_____

_____

(iv) The student covered the lower surface of **leaf 2** with vaseline.

Suggest why **leaf 2** had the smallest percentage decrease in mass. [1 mark]

_____

_____

_____

10 (a) What is cancer? [1 mark]

_____

_____

The diagram shows a developing cancer tumour.

normal cells   cancer cell

lymph

blood

Look at the diagram.

(b) Use evidence from the diagram to

- describe **two** differences between a normal cell and a cancer cell.

- give **two** reasons why these cancer cells are malignant.

- suggest why this tumour can continue to grow.
  [6 marks]

In this question, you will be assessed on your written communication skills, including the use of specialist scientific terms.

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(c) The graph on page 22 shows the number of women per 100 000 diagnosed with cervical cancer between 1975 and 2005 in the United Kingdom.

Cervical screening programmes were started by the National Health Service in 1988.

Look at the graph.

(i) Describe the trend in the graph **after** the screening programme started. [1 mark]

_____

_____

(ii) Explain why screening programmes are successful. [2 marks]

_____

_____

_____

(iii) Give **three** ways cervical cancer can be treated. [3 marks]

1. _____

2. _____

3. _____

HPV (Human Papillomavirus) can cause cervical cancer.

This virus can be passed from one person to another during sexual intercourse.

An HPV vaccination programme has been introduced into schools.

The vaccine is given to 12-year-old girls.

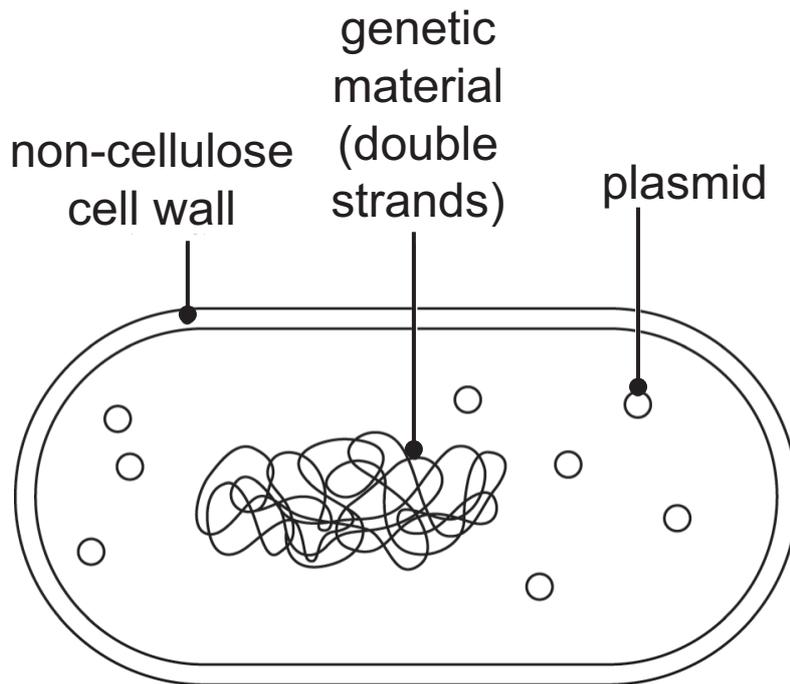**(d)** Suggest two reasons why. [1 mark for each reason]
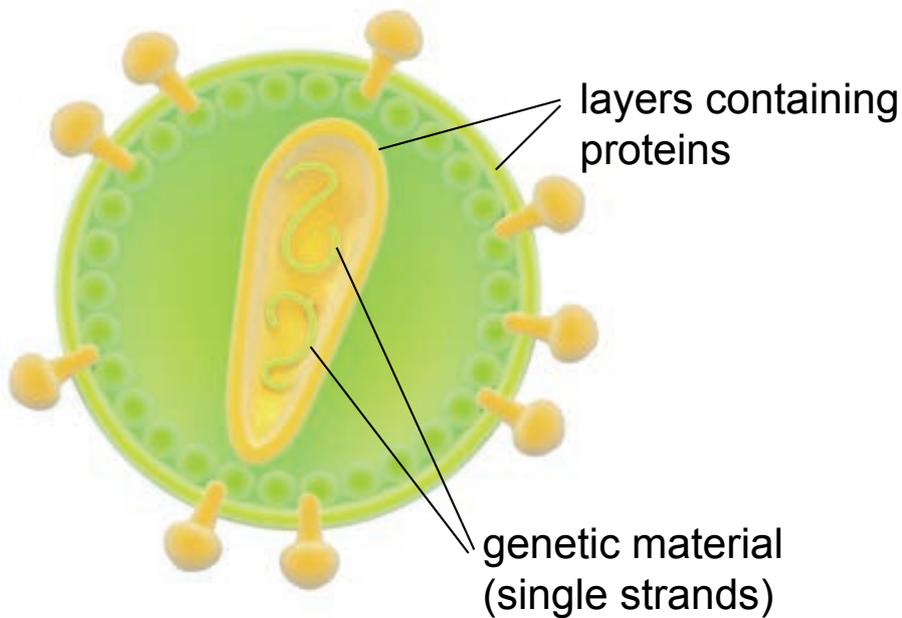
1. _____

2. _____

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(Questions continue overleaf)

11 The diagrams show a tuberculosis bacterium and a Human Immunodeficiency Virus (HIV).

Tuberculosis bacterium

Human Immunodeficiency Virus

26

Look at the diagrams.

(a) Give one similarity and one difference between the bacterium and the virus. [1 mark for each]

Similarity _____

_____

_____

Difference _____

_____

_____

(b) Tuberculosis is spread by droplet infection.

Explain what is meant by droplet infection. [1 mark]

_____

_____

(c) Give one way HIV can be spread and prevented.
[1 mark for each]

Spread _____

_____

Prevented _____

_____

12 (a) The table shows the number of deaths from coronary heart disease in men and women in the UK during 2008.

Age/years	Deaths from coronary heart disease per 100 000 of population	
	Men	Women
35–44	17	4
45–54	67	14
55–64	175	47
65–74	443	179

Look at the table.

(i) Describe one similarity and one difference between the number of deaths from coronary heart disease in men and women. [1 mark for each]

Similarity _____

_____

Difference _____

_____

(ii) The number of deaths from coronary heart disease will affect the number of men and women surviving in the population.

Suggest how the number of 65–74 year old men and women surviving in the population will differ. [1 mark]

_____

_____

(b) Describe **two** ways to reduce the risk of coronary heart disease. [2 marks]

_____

_____

_____

_____

13 A market gardener investigated the variation in the mass of strawberries. The photograph shows how he sampled his crop.

The results are shown in the table.

Mass interval/g	Number of strawberries
6.0 to 7.9	29
8.0 to 9.9	68
10.0 to 11.9	211
12.0 to 13.9	45
14.0 to 15.9	35
16.0 to 17.9	0

(a) Describe how he sampled, measured and recorded the results. [3 marks]

_____

_____

_____

_____

_____

_____

_____

(b) (i) Name the variation shown by these results. [1 mark]

_____

(ii) What type of graph should be used to present these results? [1 mark]

_____

_____

(c) Give **one** conclusion that can be made from these results. [1 mark]

_____

_____

14 (a) The diagram shows one cell from an onion epidermis.
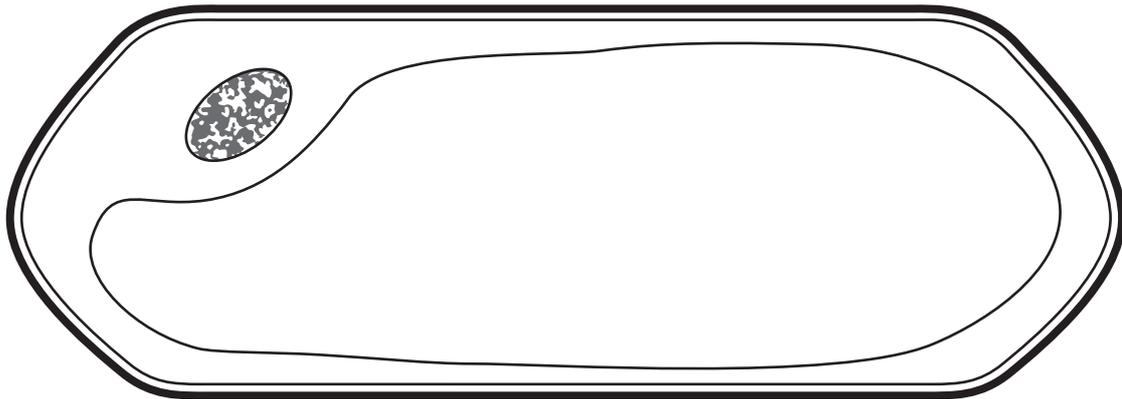
Part of the cell is selectively permeable.

(i) Name this part. [1 mark]

_____

(ii) What does selectively permeable mean? [1 mark]

_____

_____

(b) The cell is placed in concentrated sugar solution for 30 minutes.

(i) Complete the diagram below to show the appearance of this cell **after** 30 minutes. [3 marks]

(ii) What word is used to describe the cell after 30 minutes? [1 mark]

_____

_____

THIS IS THE END OF THE QUESTION PAPER

_____

SOURCES

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
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13	
14	
Total Marks	

Examiner Number

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