Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2014

GCSE Biology

Unit 2

Foundation Tier

[GBY21]

ML

MONDAY 16 JUNE, MORNING

TIME

1 hour 30 minutes, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

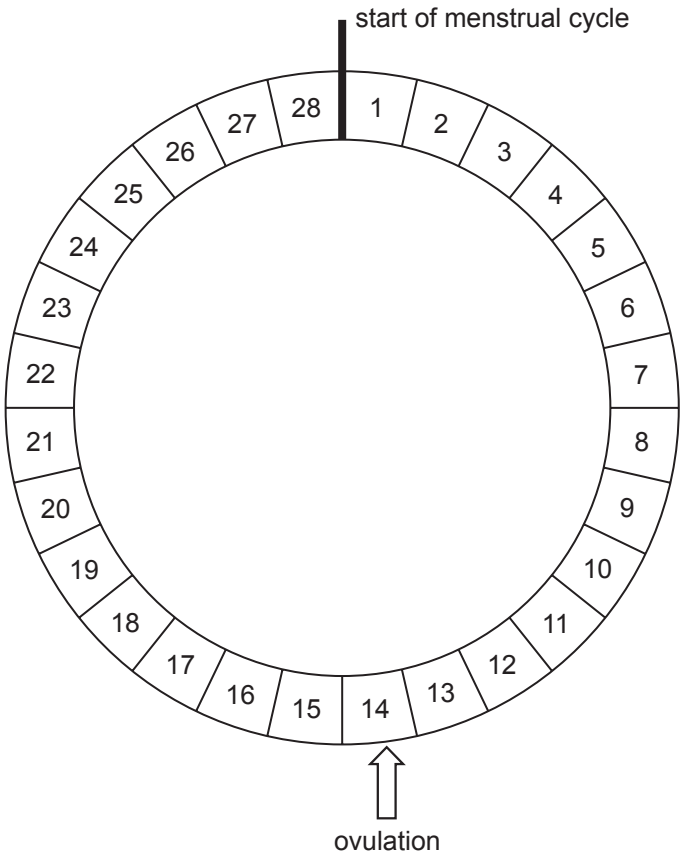
Write your Centre Number and Candidate Number in the spaces provided at the top of the page.
You must answer the questions in the spaces provided. Do not write outside the box, around each page or on blank pages.
Complete in blue or black ink only. **Do not write with a gel pen.**
Answer **all fourteen** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in question **10(b)**.

Examiner Only	
Marks	Remark

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



Look at the diagram.

Menstruation lasts for five days.

(i) **Shade in the five** days of menstruation. Do this on the diagram. [1]

(ii) What happens during menstruation?

_____

_____ [1]

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

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

Explain why this is.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark
Total Question 1	

[Turn over

Examiner Only	
Marks	Remark

2 **(a)** Cigarette smoke contains chemicals that 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.

Chemical in cigarette smoke	**Harmful effect**
Nicotine	Less oxygen carried in the blood
Carbon Monoxide	Causes addiction
Tar	Causes lung cancer

[2]

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

One way is to ban advertising.

Write down two **other** ways.

1. _____ [1]

2. _____ [1]

Total Question 2

3 Look at the words and numbers in the box below.

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

Use the words or numbers from the box to **complete the following sentences**.

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]

Examiner Only	
Marks	Remark
Total Question 3	

[Turn over

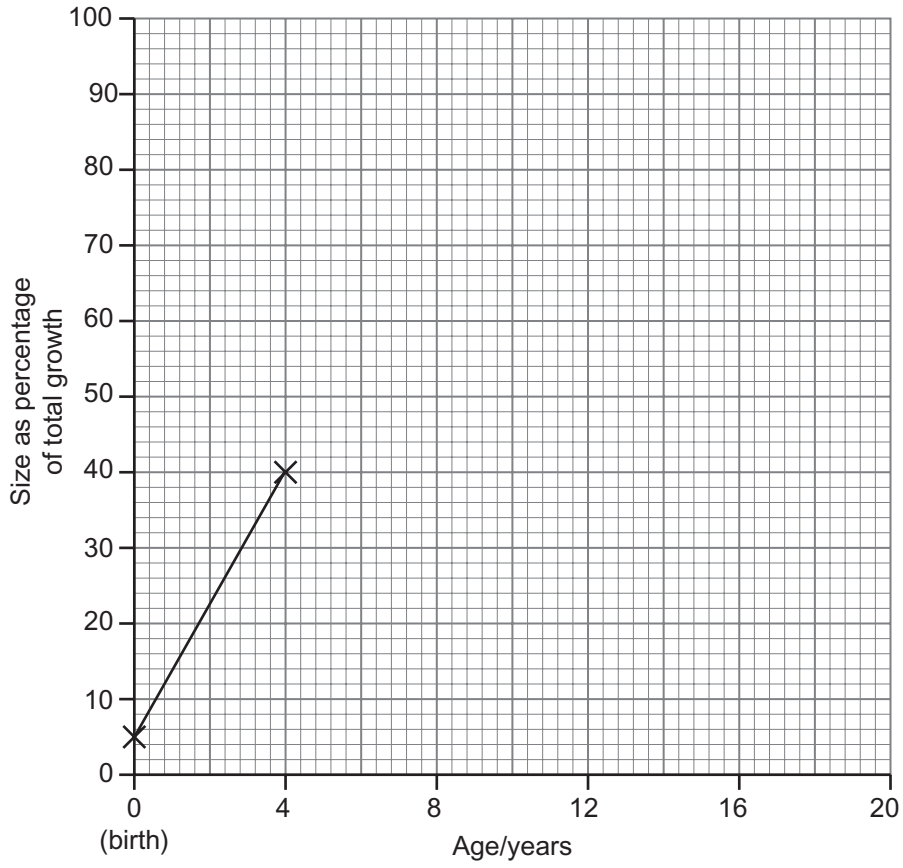
Examiner Only	
Marks	Remark

4 The table below 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 using the numbers in the table.

The first two points have been done for you.



[3]

Look at the graph.

Examiner Only	
Marks	Remark

(b) When is the growth of the child slowest?

Tick (✓) the box beside the correct answer.

between 0 and 4 years ☐

between 4 and 8 years ☐

between 8 and 12 years ☐ [1]

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

(i) How does the **rate** of growth change?

_____

_____ [1]

(ii) What causes this change?

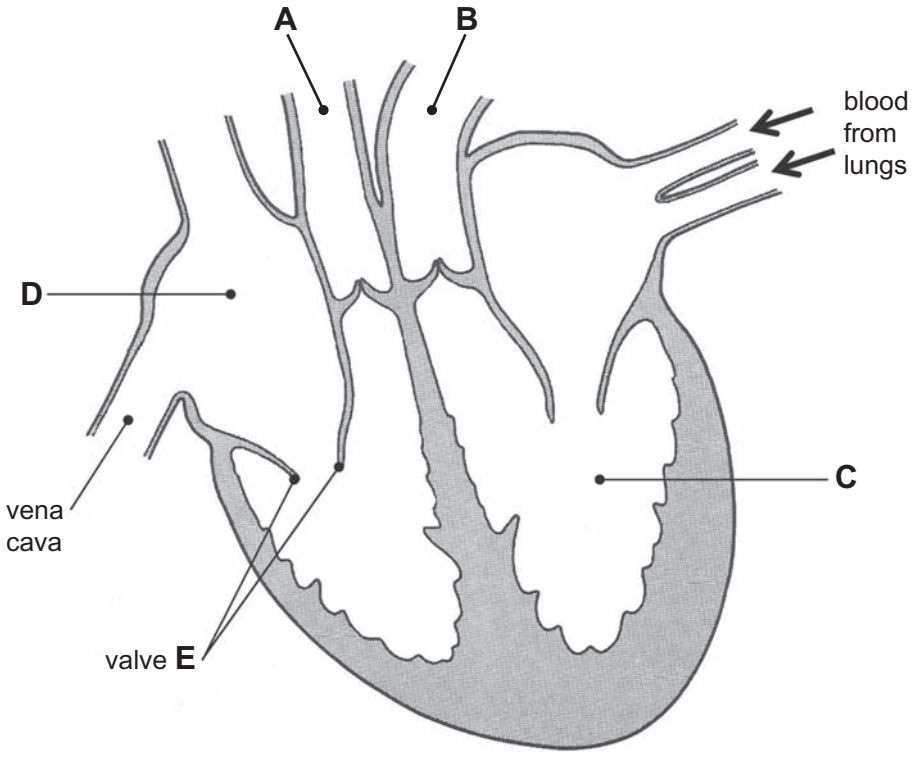
_____

_____ [1]

Total Question 4

[Turn over

5 The diagram below shows a section through the heart.



© Geoffrey H Jones

Look at the diagram.

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

(b) Write down the names of parts **B**, **C** and **D**.

B _____ [1]

C _____ [1]

D _____ [1]

(c) Explain why the valve **E** is needed.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark
Total Question 5	

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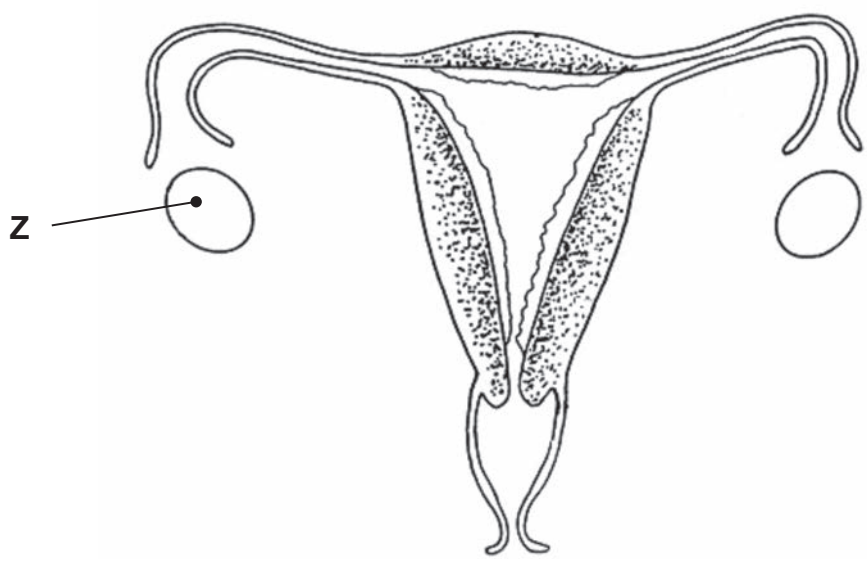
(Questions continue overleaf)

[Turn over

Examiner Only	
Marks	Remark

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



É CCEA

Look at the diagram.

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

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

(iii) What is the function of part **Z**?

_____ [1]

(b) The photograph below shows a developing foetus.

© Dr. G Moscoso/ Science Photo Library

Look at the photograph.

(i) Write down the names of parts **A**, **B** and **C**.

A _____ [1]

B _____ [1]

C _____ [1]

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

Write down two pieces of evidence **from the photograph** which suggest this.

1. _____

_____ [1]

2. _____

_____ [1]

Examiner Only	
Marks	Remark
Total Question 6	

[Turn over

Examiner Only	
Marks	Remark

7 A student carried out a genetic cross between two pure breeding pea plants. The shape of the seed is controlled by two alleles.

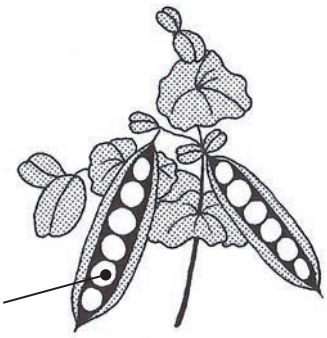
(a) What is an allele?

_____

_____ [1]

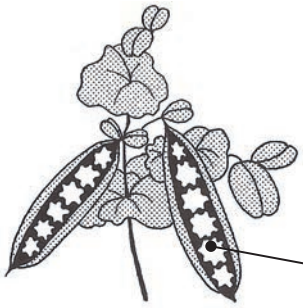
The allele for round seed (**R**) is dominant to the allele for wrinkled seed (**r**).

Parents



Round seed

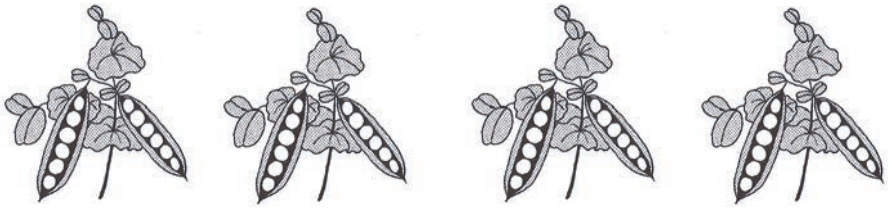
X



Wrinkled seed

Genotypes **RR** ☐

Offspring



Genotypes All **Rr**

Look at the diagram.

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

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]

(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.

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

[2]

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

Examiner Only	
Marks	**Remark**
Total Question 7	

[Turn over

Examiner Only	
Marks	Remark

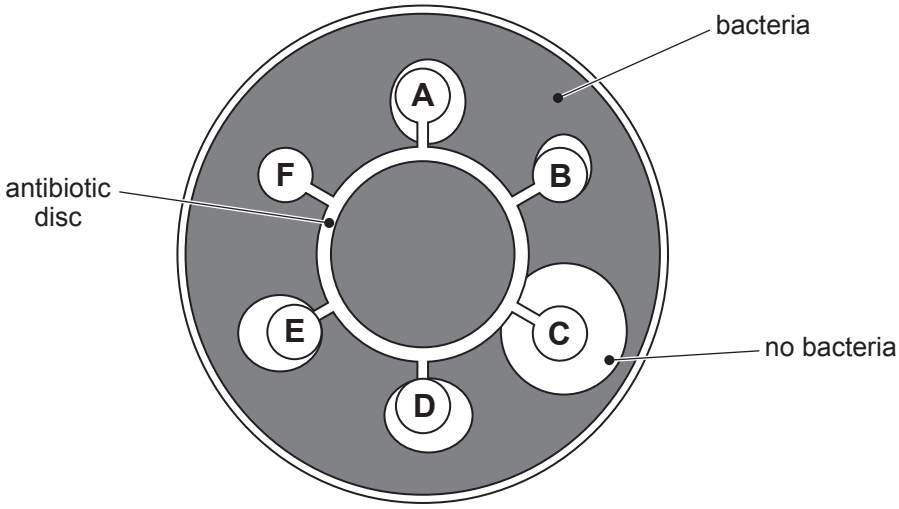
8 A student added bacteria to agar in a Petri dish.

She put a disc with antibiotics **A**–**F** on the agar.

She covered the Petri dish with a lid and incubated it for 24 hours.

The student used aseptic techniques during this experiment.

The diagram below shows the result.



(a) Covering the Petri dish with a lid after adding the bacteria is an aseptic technique.

(i) Write down how this keeps conditions aseptic.

_____

_____ [1]

(ii) Write down **one** other aseptic technique.

_____

_____ [1]

(b) The student incubated the Petri dish at 20 °C.

Explain why she did **not** incubate it at 37 °C.

_____

_____ [1]

Look at the diagram.

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

(i) Write down the letter of this antibiotic.

_____ [1]

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

_____

_____

_____ [1]

Examiner Only	
Marks	Remark
Total Question 8	

[Turn over

Examiner Only	
Marks	Remark

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]

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

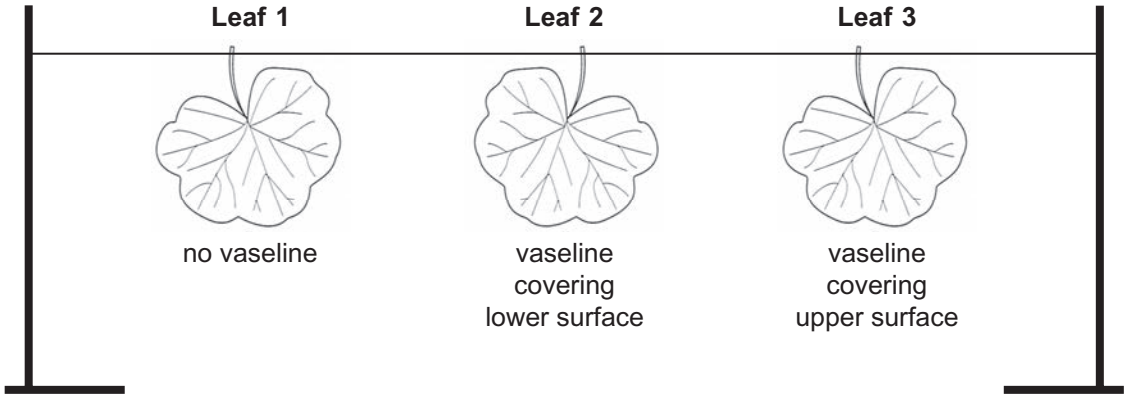
Write down two of these factors.

1. _____

2. _____ [2]

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

He set up the following experiment.



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 below 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**.
Show your working out.

Draw a (circle) around the correct answer.

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

[2]

(ii) The percentage decrease in mass is used to compare the results.
Explain why this is so.

_____

_____

_____ [1]

Examiner Only

Marks	Remark

[Turn over

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]

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

Write down why **leaf 2** had the smallest percentage decrease in mass.

_____

_____

_____ [1]

Examiner Only	
Marks	Remark
Total Question 9	

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(Questions continue overleaf)

[Turn over

10 (a) What is cancer?

Examiner Only	
Marks	Remark

_____

_____ [1]

The diagram below shows a developing cancer tumour.

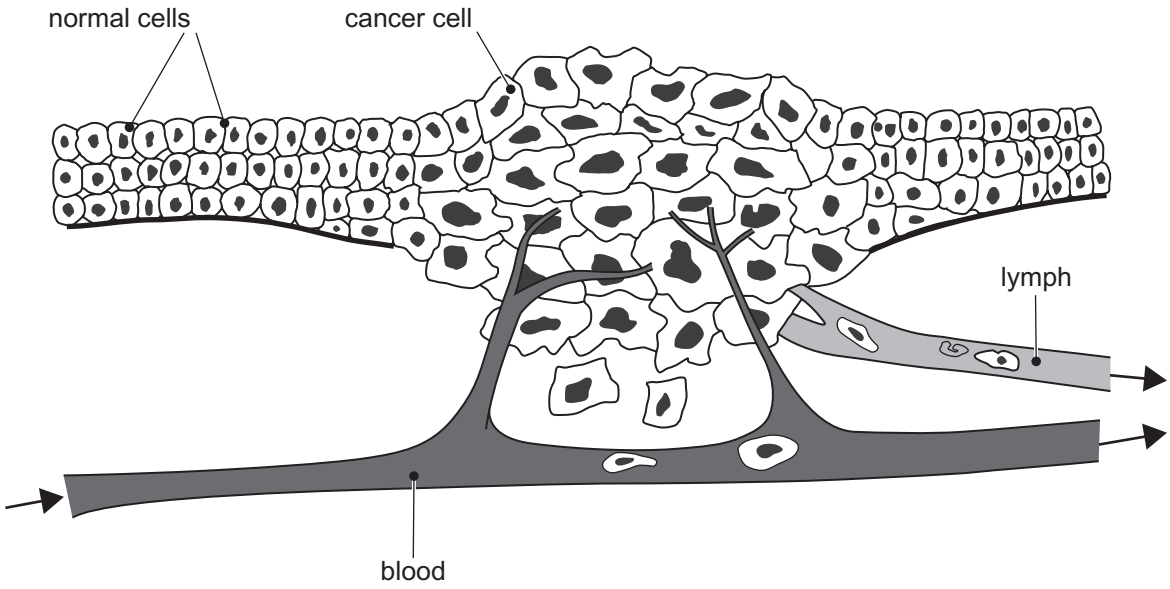

Diagram with permission from Patient.co.uk, http://www.patient.co.uk/health/what-is-cancer ©2015, Egton Medical Information Systems Limited. All Rights Reserved.

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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.

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

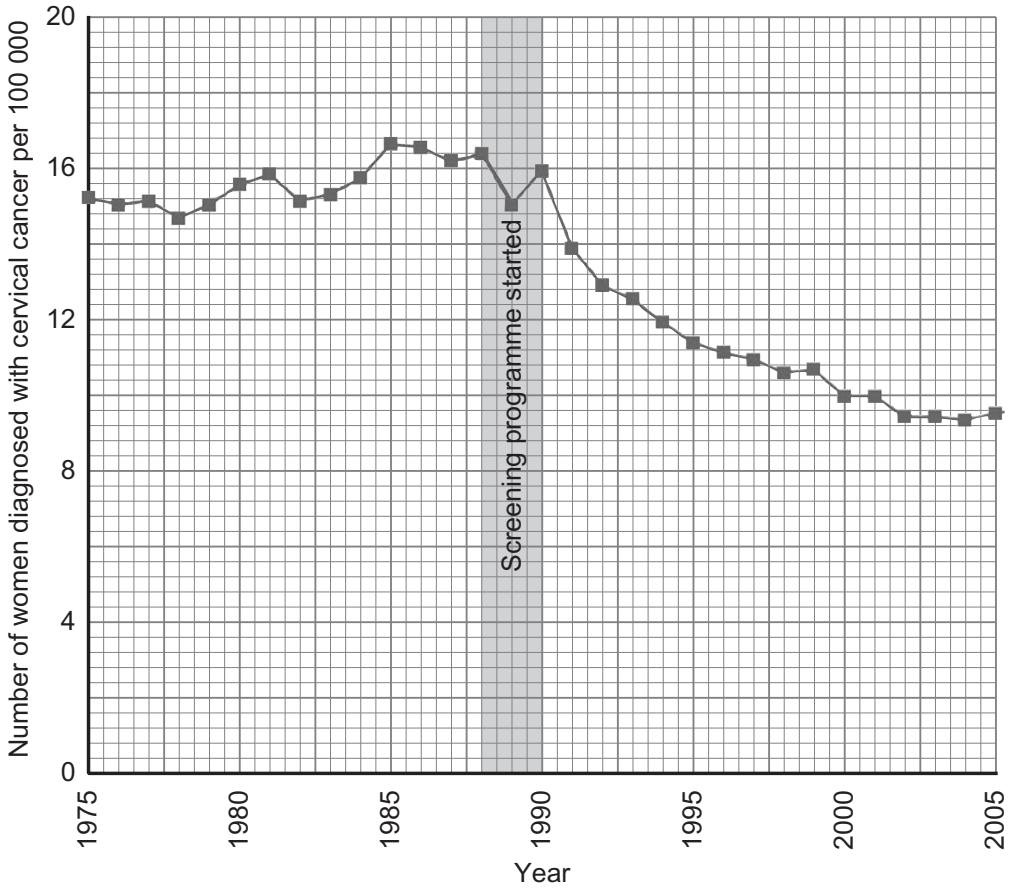
[6]

Examiner Only	
Marks	Remark

[Turn over

Examiner Only	
Marks	Remark

(c) The graph below 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]

(ii) Explain why screening programmes are successful.

_____

_____

_____ [2]

(iii) Write down **three** ways cervical cancer can be treated.

1. _____

2. _____

3. _____ [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) Write down two reasons why.

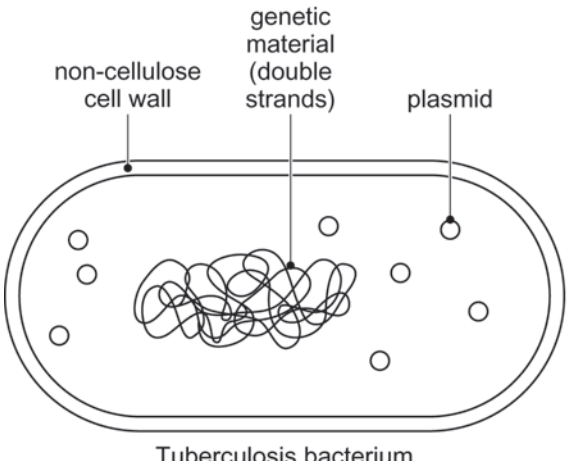
1. _____ [1]

2. _____ [1]

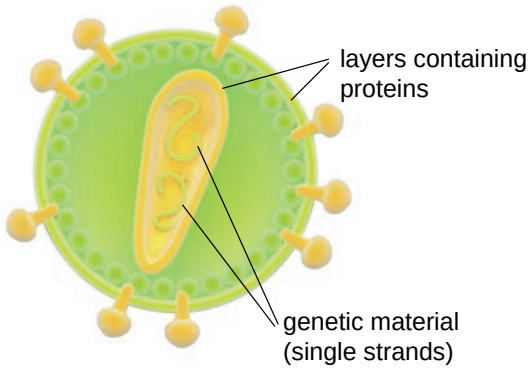
Examiner Only	
Marks	Remark
Total Question 10	

[Turn over

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



Tuberculosis bacterium



Examiner Only	
Marks	Remark

Look at the diagrams.

(a) Write down one similarity and one difference between the bacterium and the virus.

Similarity _____

_____

_____ [1]

Difference _____

_____

_____ [1]

(b) Tuberculosis is spread by droplet infection.

Explain what is meant by droplet infection.

_____

_____ [1]

(c) Write down one way HIV can be spread and prevented.

Spread _____

_____ [1]

Prevented _____

_____ [1]

Examiner Only	
Marks	Remark
Total Question 11	

[Turn over

Examiner Only	
Marks	Remark

12 **(a)** The table below 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

Source: www.ons.gov.uk

Look at the table.

(i) Describe one similarity and one difference between the number of deaths from coronary heart disease in men and women.

Similarity _____

_____ [1]

Difference _____

_____ [1]

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

Write down how the number of 65–74 year old men and women surviving in the population will differ.

_____

_____ [1]

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

_____

_____

_____

_____ [2]

Examiner Only	
Marks	Remark
Total Question 12	

[Turn over

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

© rayvee / iStock / Thinkstock

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

Examiner Only	
Marks	Remark

(a) Describe how the gardener sampled, measured and recorded the results.

_____

_____

_____

_____

_____ [3]

(b) **(i)** Write down the name of the variation shown by these results.

_____ [1]

(ii) What type of graph should be used to present these results?

_____

_____ [1]

(c) Write down **one** conclusion that can be made from these results.

_____

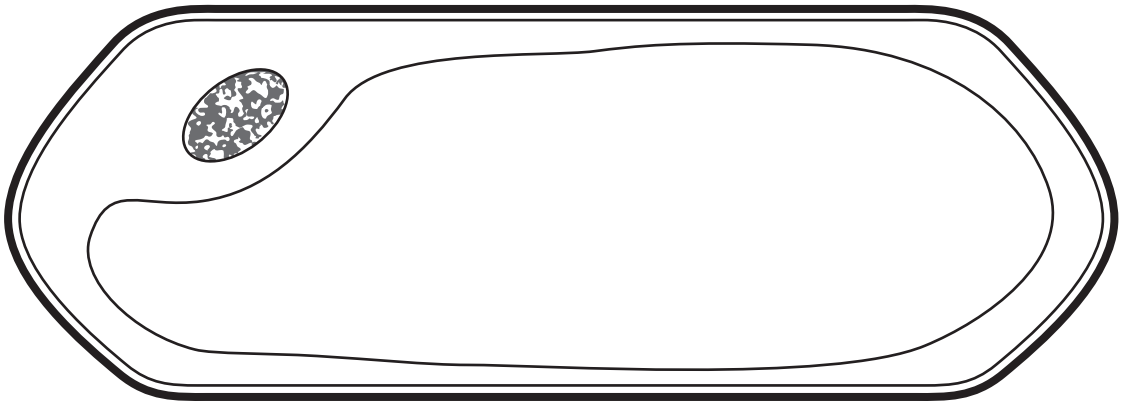
_____ [1]

Examiner Only	
Marks	Remark
Total Question 13	

[Turn over

Examiner Only	
Marks	Remark

14 **(a)** The diagram below shows one cell from an onion epidermis.



Part of the cell is selectively permeable.

(i) Write down the name of this part.

_____ [1]

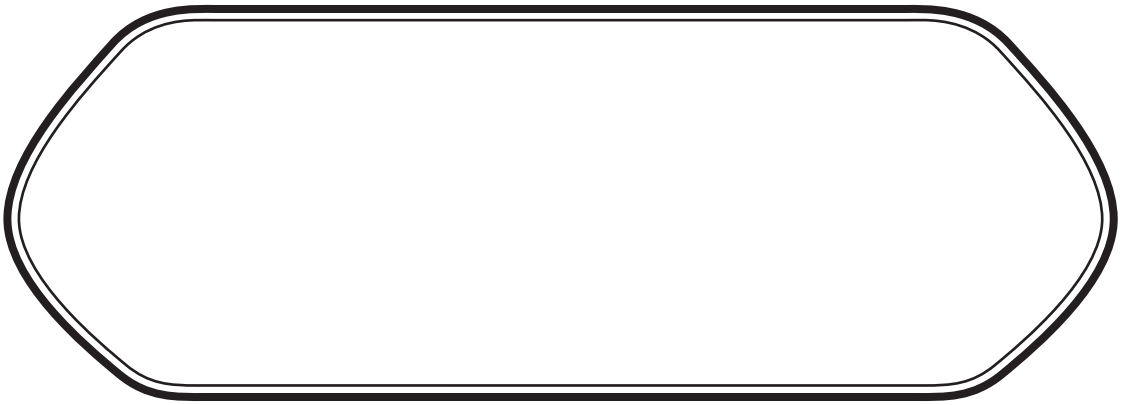
(ii) What does selectively permeable mean?

_____

_____ [1]

(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]

(ii) What word is used to describe the cell after 30 minutes?

_____

[1]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark
Total Question 14	

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For Examiner's use only	
Question Number	**Marks**
1	
2	
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Examiner Number