



Rewarding Learning

General Certificate of Secondary Education
2014

Centre Number

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Candidate Number

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GCSE Biology

Unit 2

Foundation Tier

[GBY21]

MONDAY 16 JUNE, MORNING



GBY21

TIME

1 hour 30 minutes.

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

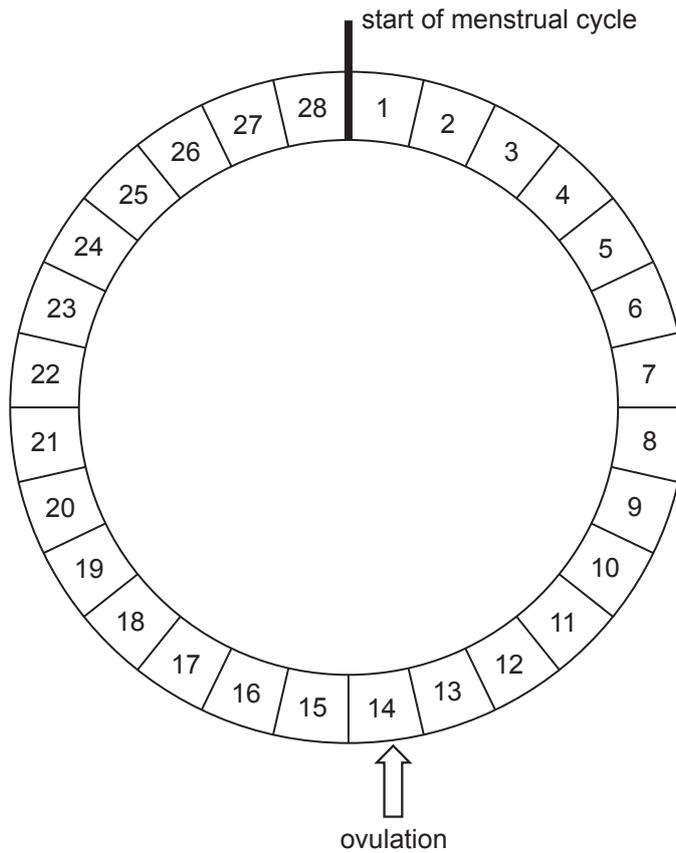
The total mark for this paper is 90.

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)**.



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



Look at the diagram.

Menstruation lasts for five days.

(i) On the diagram, **shade in the five** days of menstruation.

[1]

(ii) What happens during menstruation?

[1]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |



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**.

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]

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| Marks | Remark |
| | |
| Total Question 3 | |
| | |

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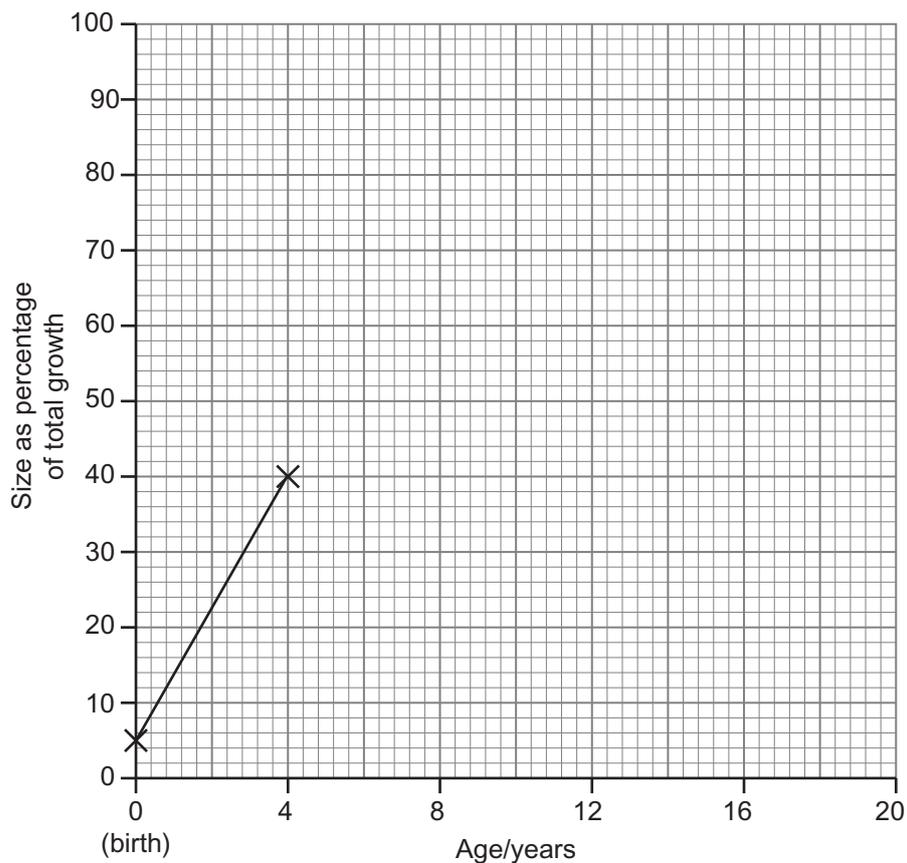
32GBY2105

- 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 using the numbers in the table.

The first two points have been done for you.



[3]

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Look at the graph.

(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]

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Marks

Remark

Total Question 4

[Turn over

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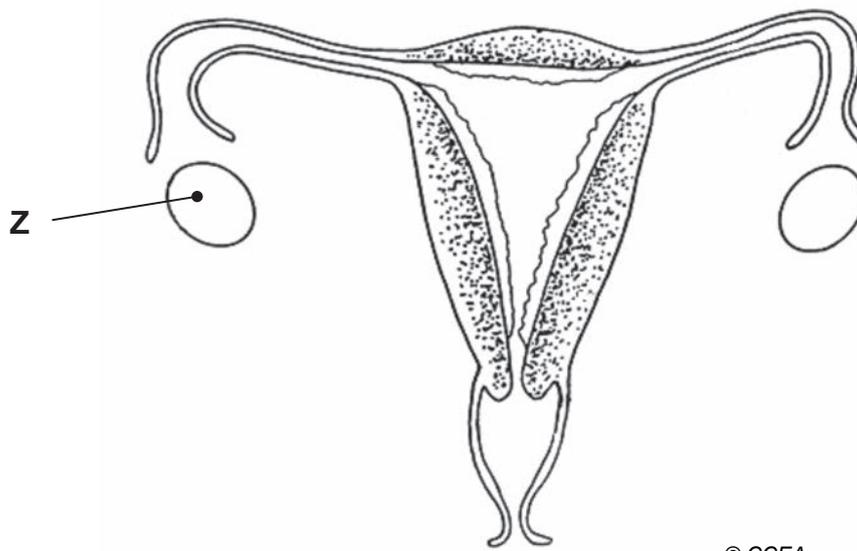
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6 (a) The diagram shows part of the female reproductive system.



Look at the diagram.

- (i) Write the letter **F** on the diagram to show where fertilisation happens. [1]
- (ii) Write the letter **M** on the diagram to show where implantation occurs. [1]
- (iii) What is the function of part **Z**? [1]
- _____

| Examiner Only | |
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| Marks | Remark |
| | |



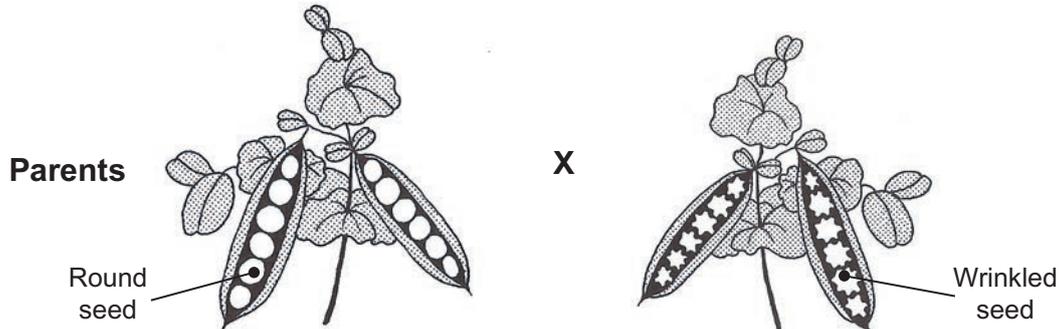
7 A student carried out a genetic cross between two pure breeding pea plants. The shape of the seed is controlled by two alleles.

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|---------------|--------|
| Marks | Remark |
| | |

(a) What is an allele?

_____ [1]

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



© Biology Modules by James Torrance, James Fullarton, Clare Marsh, James Simms & Caroline Stevenson. Published in 1994 by Hodder Education. ISBN: 9780340600979. Reproduced by permission of Hodder Education.



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]

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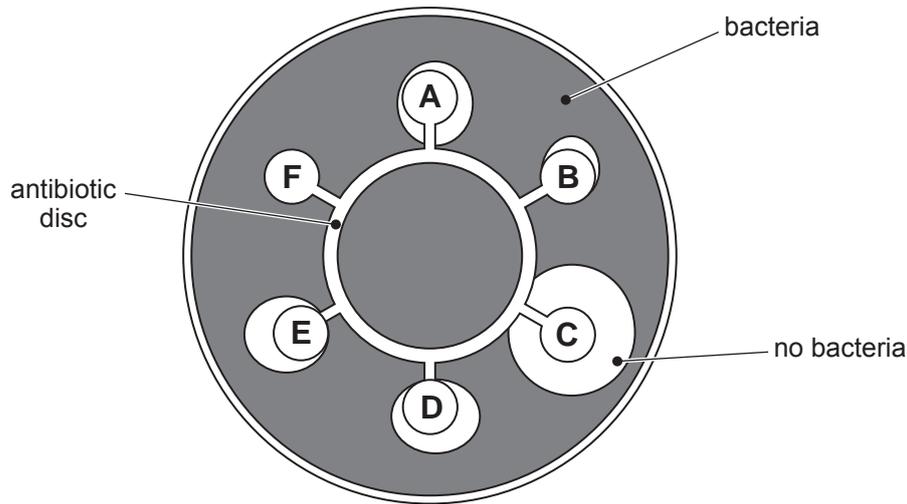
Marks Remark

Total Question 7

[Turn over



- 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 shows the result.



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

- (i)** Suggest how this keeps conditions aseptic.

_____ [1]

- (ii)** Give **one** other aseptic technique.

_____ [1]

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|---------------|--------|
| Marks | Remark |
| | |



(b) She 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) Give the letter of this antibiotic.

_____ [1]

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

_____ [1]

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Marks Remark

Total Question 8

[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]

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

Give two of these factors.

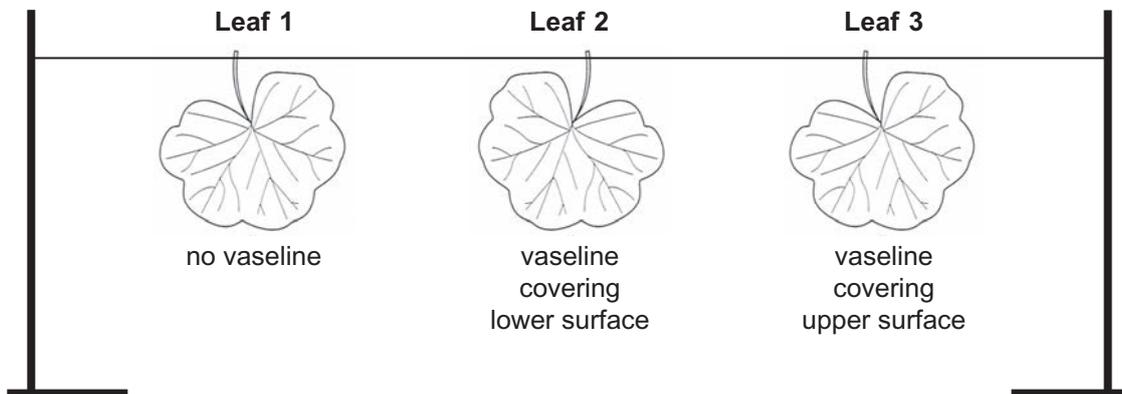
1. _____

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.

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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.
Show your working.

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.

[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.

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

_____ [1]

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Marks Remark

Total Question 9



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10 (a) What is cancer?

_____ [1]

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| Marks | Remark |
| | |

The diagram shows a developing cancer tumour.

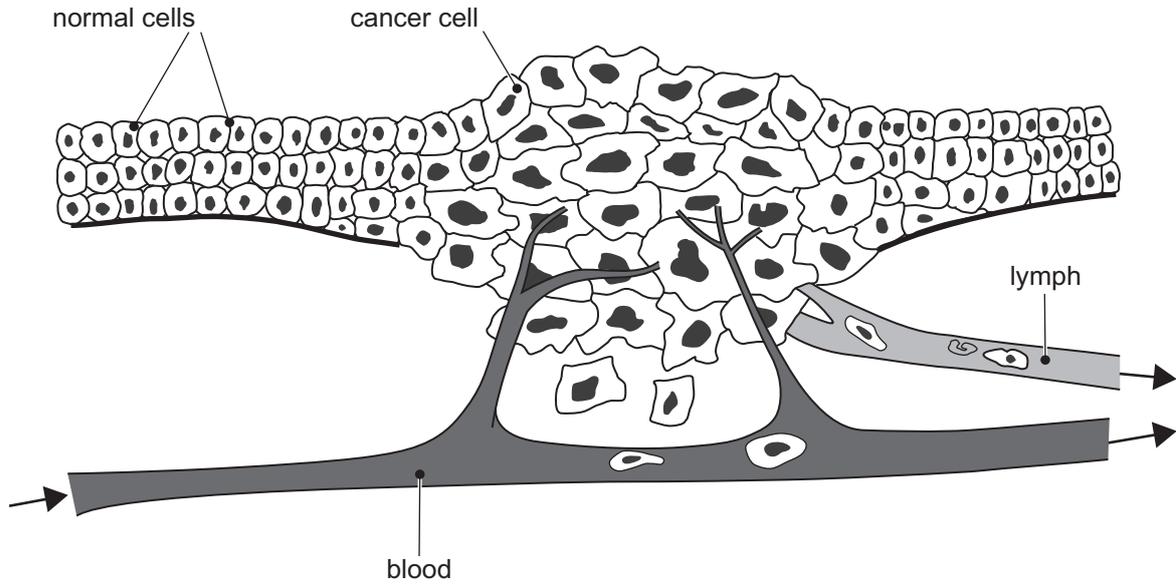
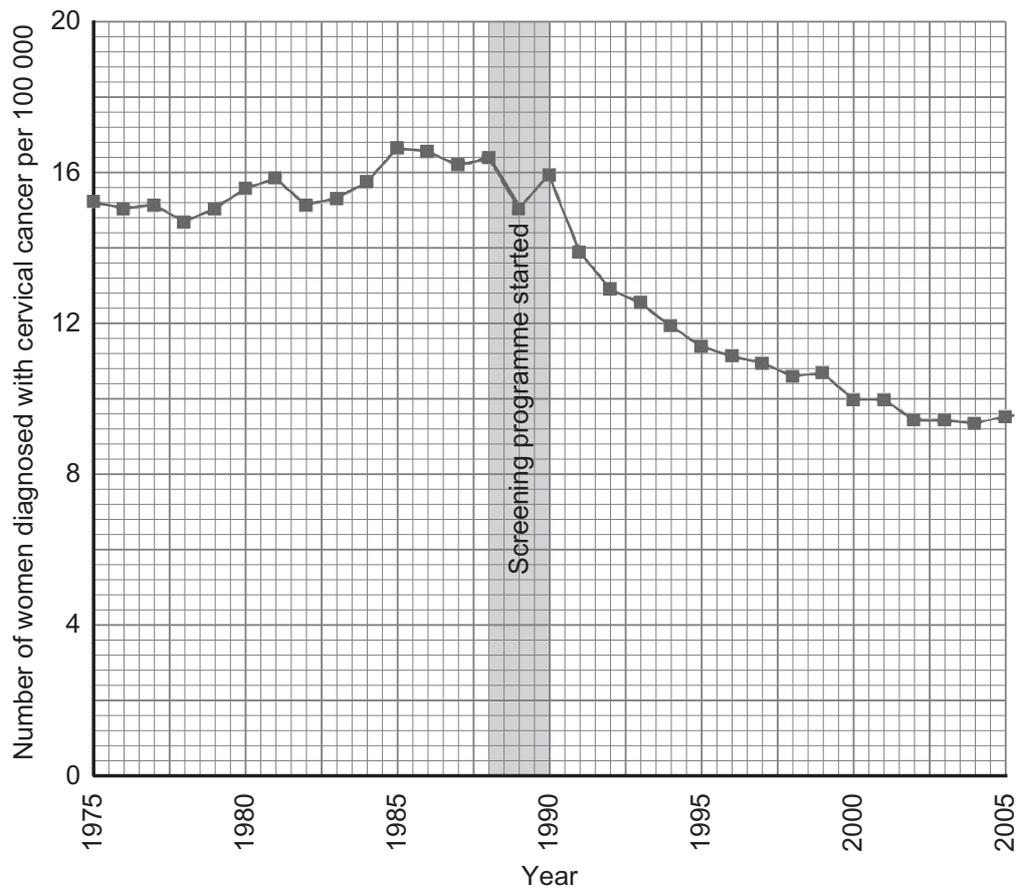


Diagram with permission from Patient.co.uk, <http://www.patient.co.uk/health/what-is-cancer> ©2015, Egton Medical Information Systems Limited. All Rights Reserved.



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



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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) Give **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) Suggest two reasons why.

1. _____ [1]
2. _____ [1]

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Marks Remark

Total Question 10

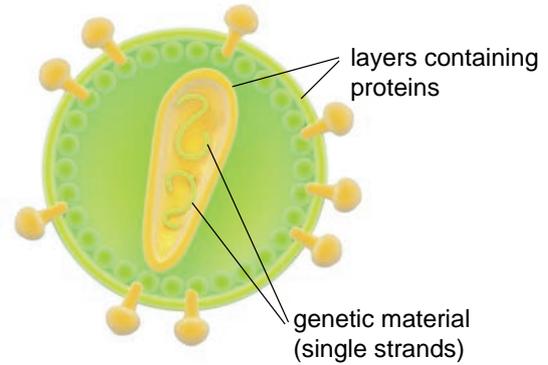
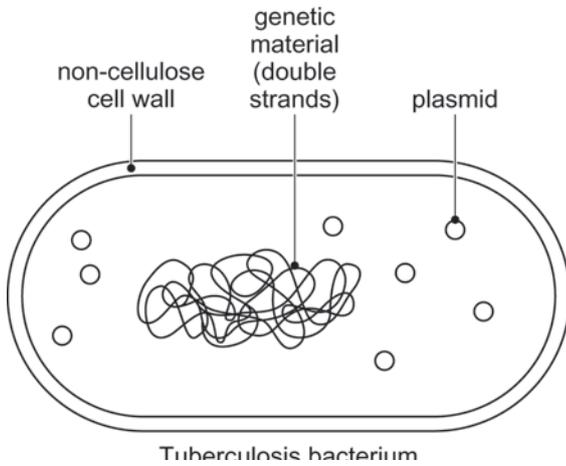
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32GBY2123

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



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Look at the diagrams.

(a) Give 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]

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| Marks | Remark |
| | |



- 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 |

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.

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

 _____ [1]



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



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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 |

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| Marks | Remark |
| | |

www.xtrapapers.com

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

[3]

(b) (i) Name the variation shown by these results.

[1]

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

[1]

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

[1]

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|-------------------|--------|
| | |
| Total Question 13 | |
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| Question Number | Marks |
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