Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

# GCSE
# COMBINED SCIENCE: TRILOGY

**F**

## Foundation Tier
## Biology Paper 1F

Tuesday 15 May 2018 Afternoon Time allowed: 1 hour 15 minutes

**Materials**
For this paper you must have:
- a ruler
- a scientific calculator.

**Instructions**
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

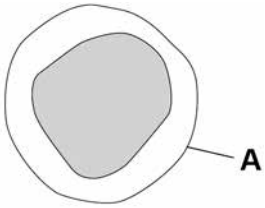
**Information**
- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

| For Examiner's Use | |
|---|---|
| Question | Mark |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| **TOTAL** | |

*Do not write outside the box*

**0 1** **Figure 1** shows one type of white blood cell.

**Figure 1**




**0 1 . 1** What is structure **A**?

**[1 mark]**

Tick **one** box.

Cell membrane ☐

Cell wall ☐

Cytoplasm ☐

Nucleus ☐

**0 1 . 2** White blood cells help to defend the body against pathogens.

How do the white blood cells do this?

**[3 marks]**

Tick **three** boxes.

Clone pathogens ☐

Engulf pathogens ☐

Produce antibiotics ☐

Produce antibodies ☐

Produce antitoxins ☐

Produce toxins ☐

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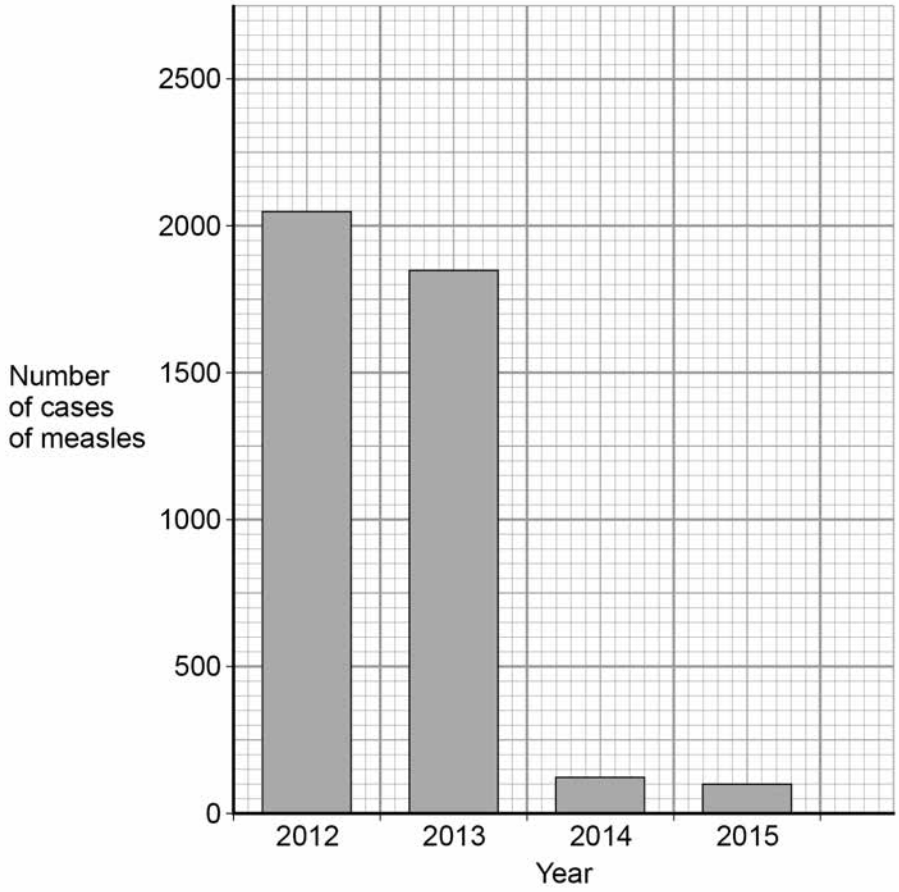
Measles is a serious disease. A person can die from measles.

**Figure 2** shows the number of cases of measles in England and Wales between 2012 and 2015

**Figure 2**




**0 1 . 3** Use **Figure 2** to calculate the decrease in the number of cases of measles between 2012 and 2015

**[2 marks]**

Answer = _____ cases

**0 1 . 4** Suggest **one** reason for the decrease in the number of cases of measles between 2012 and 2015

**[1 mark]**

**Turn over ►**

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**0 1 . 5** Antibiotics **cannot** be used to treat measles.

Suggest why.

**[1 mark]**

**0 1 . 6** Gonorrhoea is a disease caused by a bacterium.

Gonorrhoea **can** be treated with antibiotics.

Give **one** other way to control the spread of gonorrhoea.

**[1 mark]**

A scientist investigated how effective different antibiotics were at killing gonorrhoea bacteria.

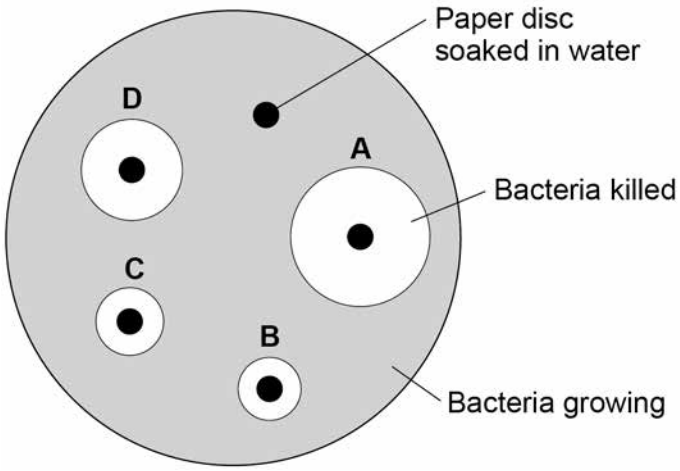
This is the method used.

1. Grow gonorrhoea bacteria on agar in a Petri dish.
2. Place one paper disc soaked in water onto the agar.
3. Place four other paper discs, each soaked in a different antibiotic, **A**, **B**, **C**, and **D**, onto the agar.
4. Use the same sized paper discs and the same concentration of each antibiotic.
5. Incubate the Petri dish for 3 days.

**Figure 3** shows the scientist's results.

A clear area around the disc means the antibiotic has killed the bacteria.

**Figure 3**



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**0 1 . 7** Give **one** control variable the scientist used.

**[1 mark]**

**0 1 . 8** Suggest why **one** disc was soaked in water.

**[1 mark]**

**0 1 . 9** Which antibiotic in **Figure 3** would be the best to treat gonorrhoea?

Give a reason for your answer.

**[2 marks]**

Antibiotic

Reason

**13**

**Turn over for the next question**

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**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE**
**ANSWER IN THE SPACES PROVIDED**

*Do not write outside the box*

**0 2** This question is about photosynthesis.

**0 2 . 1** What are the **two** products of photosynthesis?

**[2 marks]**

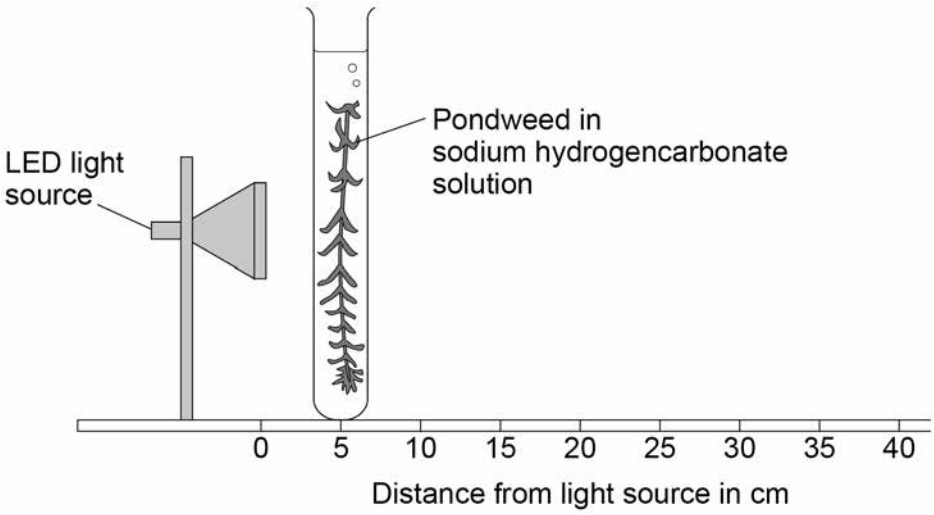
Tick **two** boxes.

- Carbon dioxide ☐
- Chlorophyll ☐
- Glucose ☐
- Oxygen ☐
- Water ☐

A student investigated the effect of light intensity on the rate of photosynthesis.

**Figure 4** shows the apparatus.

**Figure 4**




This is the method used.

1. Place the pondweed at 5 cm from the light source.
2. Measure the rate of photosynthesis by counting the number of bubbles produced in 30 seconds.
3. Repeat the investigation with the pondweed at different distances from the light source.

**Turn over ►**

*Do not write outside the box*

**0 2 . 2** How could the student measure the rate of photosynthesis more accurately?

**[2 marks]**

Tick **two** boxes.

Count the number of bubbles produced in 1 minute ☐

Measure the change in mass of the pondweed in 30 seconds ☐

Measure the volume of gas produced in 30 seconds ☐

Place the pondweed further from the light source ☐

Use water instead of sodium hydrogencarbonate solution ☐

**0 2 . 3** The LED light source does **not** get hot.

Why is this important?

**[1 mark]**

**Table 1** shows the student's results.

**Table 1**

| Distance of light source from pondweed in cm | Number of bubbles produced in 30 seconds |
|---|---|
| 5 | 40 |
| 10 | 13 |
| 15 | 5 |
| 20 | 2 |
| 25 | 1 |
| 30 | 0 |

*Do not write outside the box*

**0 2 . 4** Calculate the number of bubbles produced in 2 minutes when the light source was 10 cm from the pondweed.

**[1 mark]**

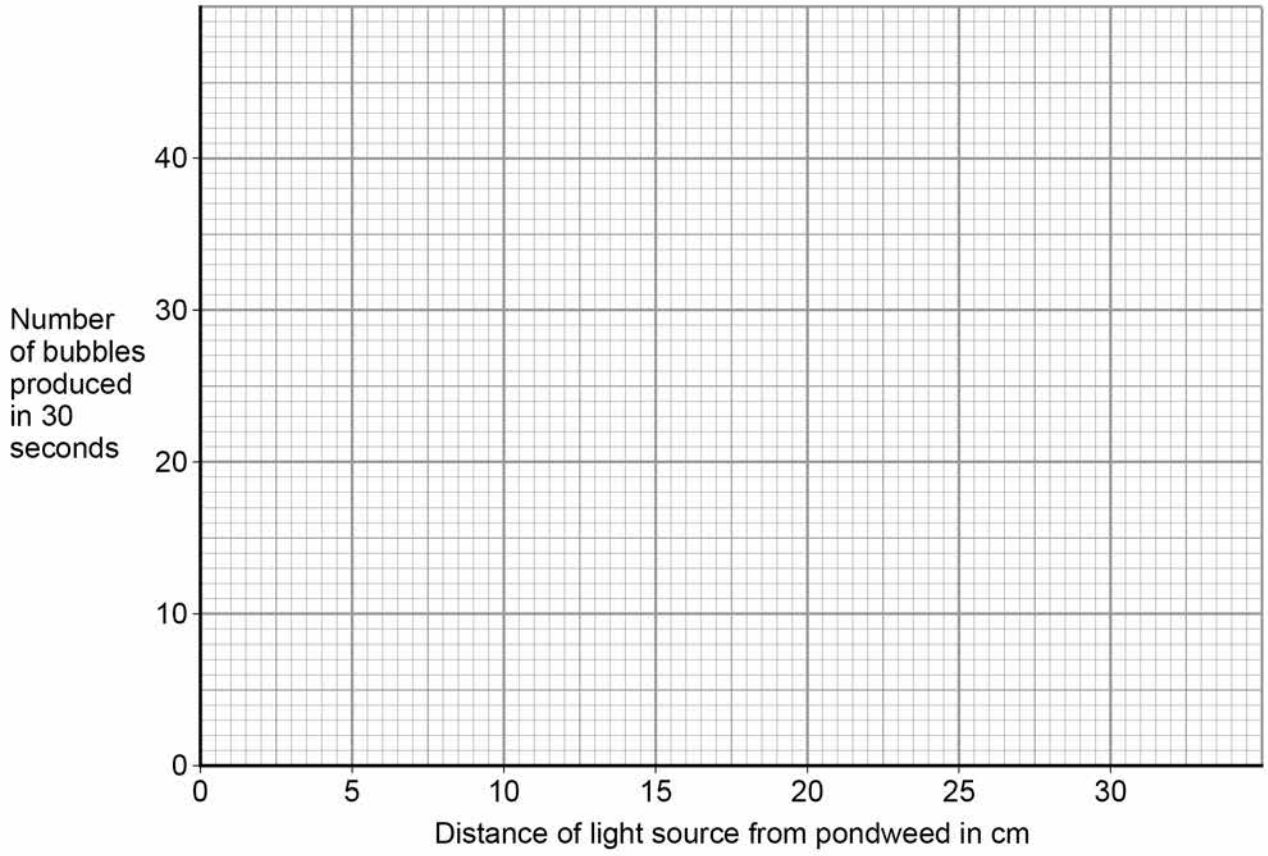
Number of bubbles produced in 2 minutes = _____

**0 2 . 5** Plot the data from **Table 1** on **Figure 5**

Draw a line of best fit.

**[3 marks]**

**Figure 5**




**0 2 . 6** Give **one** conclusion that can be made from these results.

**[1 mark]**

10

**Turn over ►**

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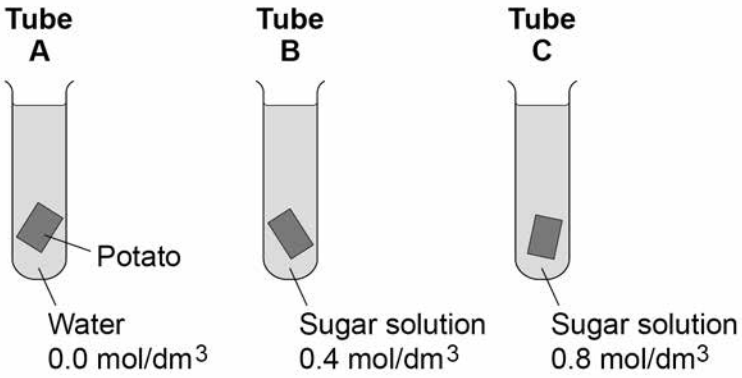
**0 3** A student investigated the effect of different concentrations of sugar solution on pieces of potato.

This is the method used.

1. Cut three pieces of potato to the same length.
2. Dry each piece on a paper towel.
3. Weigh each piece.
4. Place each piece in a different concentration of sugar solution.
5. Leave all three pieces for 2 hours.
6. Remove the three pieces of potato from the solutions.
7. Dry each piece on a paper towel.
8. Measure the length and mass of each piece of potato.

**Figure 6** shows how the investigation was set up.

**Figure 6**




**0 3 . 1** Why did the student dry each piece of potato before weighing it?

**[1 mark]**

*Do not write outside the box*

**0 3 . 2** What **two** changes would you expect in the potato in **tube A** after 2 hours?

**[2 marks]**

Tick **two** boxes.

Breaks into pieces ☐

Decrease in hardness ☐

Decrease in size ☐

Increase in mass ☐

Increase in length ☐

**0 3 . 3** Complete the sentences.

**[3 marks]**

Water moves into and out of cells by a process called _____ .

Water would move _____ the potato cells in **tube A**.

The solution outside the potato in **tube A** is at a _____ concentration than the solution inside the potato cells.

**0 3 . 4** The potato in **tube B** did **not** change.

Give **one** conclusion that can be made from this observation.

**[1 mark]**

_____

_____

**Question 3 continues on the next page**

*Do not write outside the box*

**0 3 . 5** **Figure 7** shows the root of a germinating seed.

**Figure 7**

Describe **two** ways the root is adapted to absorb water efficiently.

**[2 marks]**

1 _____

_____

2 _____

_____

**9**

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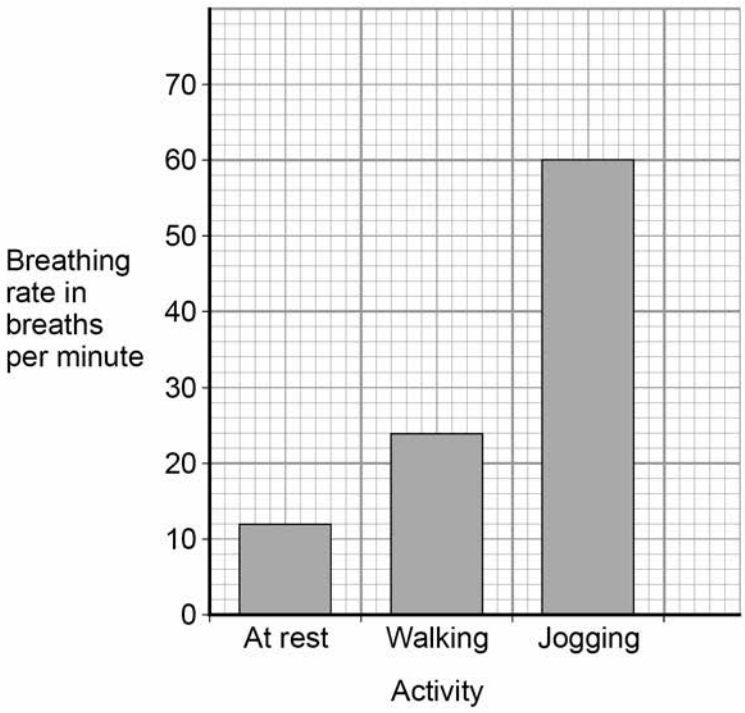
**0 4** Exercise can improve health.

A student measured her breathing rate at rest, when walking and when jogging.

**Figure 8** shows her results.

**Figure 8**




**0 4 . 1** Compare the breathing rates when doing the **three** different activities.

Use values from **Figure 8** in your answer.

**[3 marks]**

**Question 4 continues on the next page**

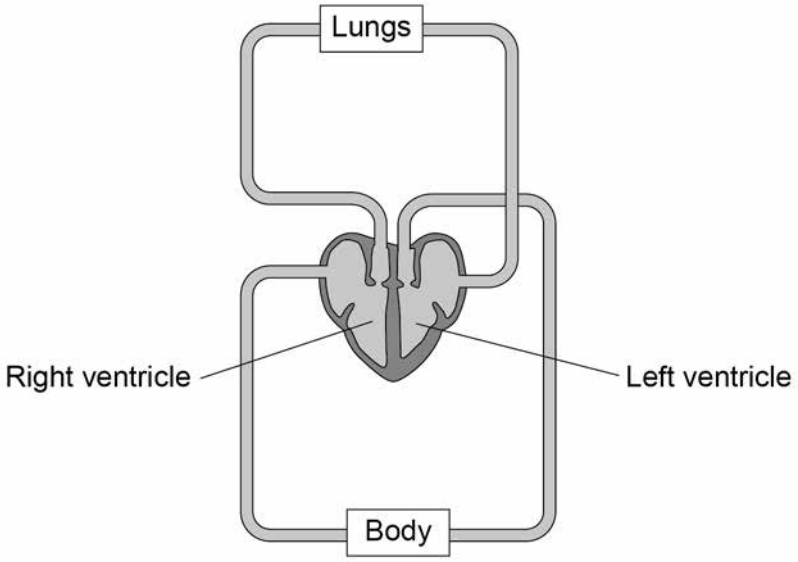
*Do not write outside the box*

**0 4 . 2** Explain why the breathing rate changes when doing different activities.

**[3 marks]**

**Figure 9** shows the heart in the circulatory system.

**Figure 9**




**0 4 . 3** The heart is a double pump.

Describe what this means.

Use **Figure 9** to help you.

**[2 marks]**

*Do not write outside the box*

**0 4 . 4** The wall of the left ventricle is much thicker than the wall of the right ventricle.

Suggest **one** reason for this.

**[1 mark]**

**0 4 . 5** People are encouraged to exercise after recovering from a heart attack.

Suggest **one** reason why.

**[1 mark]**

**10**

**Turn over for the next question**

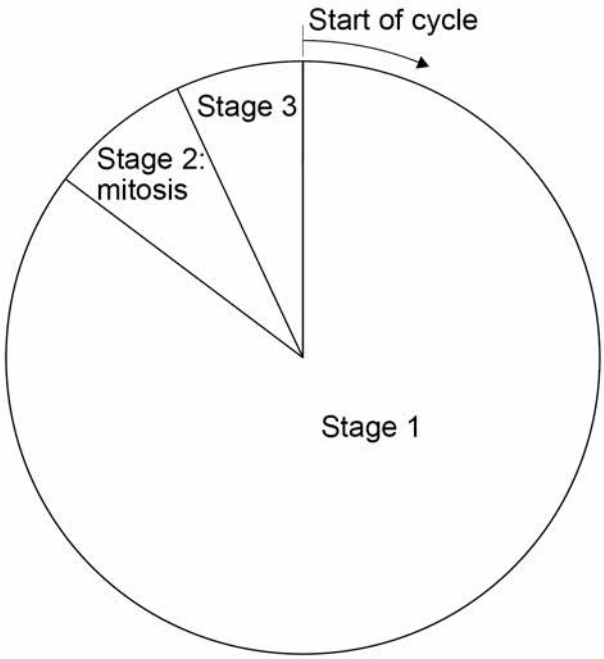
*Do not write outside the box*

**0 5** Cells divide in a series of stages called the cell cycle.

Stage 2 of the cycle is mitosis.

**Figure 10** shows a simplified cell cycle for a human body cell.

**Figure 10**




**0 5 . 1** Draw **one** line from each stage in the cell cycle to what happens during that stage.

**[2 marks]**

| Stage in the cell cycle | What happens during that stage |
|---|---|
| Stage 1 | Nucleus divides |
| Stage 2 | Cell divides into two |
| Stage 3 | Copies of the DNA are made |

*Do not write outside the box*

**0 5 . 2** The mass of DNA in a human body cell at the start of the cell cycle is 6 picograms.

What mass of DNA will be in each of the new cells produced by this cell division?

**[1 mark]**

Tick **one** box.

- 3 picograms ☐
- 6 picograms ☐
- 9 picograms ☐
- 12 picograms ☐

**0 5 . 3** Stem cells are undifferentiated cells.

Which statement about stem cells is correct?

**[1 mark]**

Tick **one** box.

- Animal stem cells are found in meristems ☐
- Animal stem cells divide by meiosis ☐
- Meristem cells in plants can differentiate throughout the life of the plant ☐
- Meristem cells in plants can only differentiate into one type of cell ☐

**Question 5 continues on the next page**

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Stem cells from human embryos can differentiate into most types of human cell.

Research is being done into the use of embryonic stem cells in medical treatments.

The long-term effects of using embryonic stem cells in patients are not well understood.

In therapeutic cloning, human embryos are produced using a donated human egg cell and a cell from the patient.

- The embryo produced contains the same genetic information as the patient.
- Stem cells are taken from the embryo and stimulated to divide to form cells the patient needs.
- The embryo is then destroyed.

**0 5 . 4** Suggest **two** advantages of therapeutic cloning.

**[2 marks]**

1 _____

_____

2 _____

_____

**0 5 . 5** Suggest **two** disadvantages of therapeutic cloning.

**[2 marks]**

1 _____

_____

2 _____

_____

**8**

*Do not write outside the box*

**0 6** This question is about cell structures.

**0 6 . 1** Draw **one** line from each cell structure to the type of cell where the structure is found.

**[2 marks]**

| Cell Structure | Type of cell where the structure is found |
|---|---|
| Nucleus | Prokaryotic cells |
| Permanent vacuole | Plant cells only |
| Plasmid | Eukaryotic cells |

**Question 6 continues on the next page**

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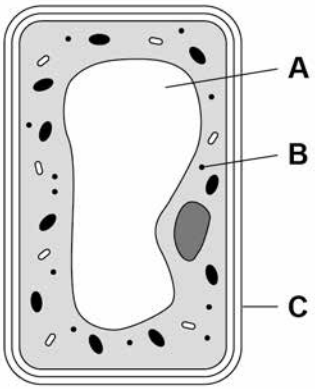
**0 6 . 2** **Figure 11** shows a plant cell.

**Figure 11**




What are the names of structures **A**, **B** and **C**?

**[1 mark]**

Tick **one** box.

| Structure A | Structure B | Structure C | |
|---|---|---|---|
| Chloroplast | Vacuole | Cell wall | |
| Nucleus | Chloroplast | Cell membrane | |
| Vacuole | Mitochondrion | Cell membrane | |
| Vacuole | Ribosome | Cell wall | |

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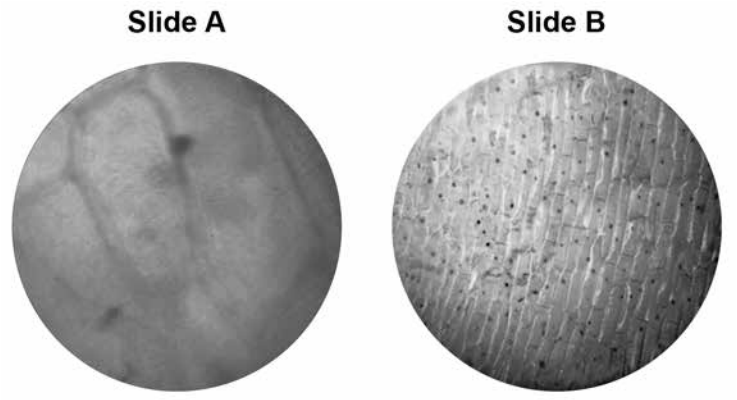
A student observed slides of onion cells using a microscope.

**Figure 12** shows two of the slides the student observed.

**Figure 12**




The cells on the slides are **not** clear to see.

**0 6 . 3** Describe how the student should adjust the microscope to see the cells on **Slide A** more clearly.

**[1 mark]**

**0 6 . 4** Describe how the student should adjust the microscope to see the cells on **Slide B** more clearly.

**[2 marks]**

**Question 6 continues on the next page**

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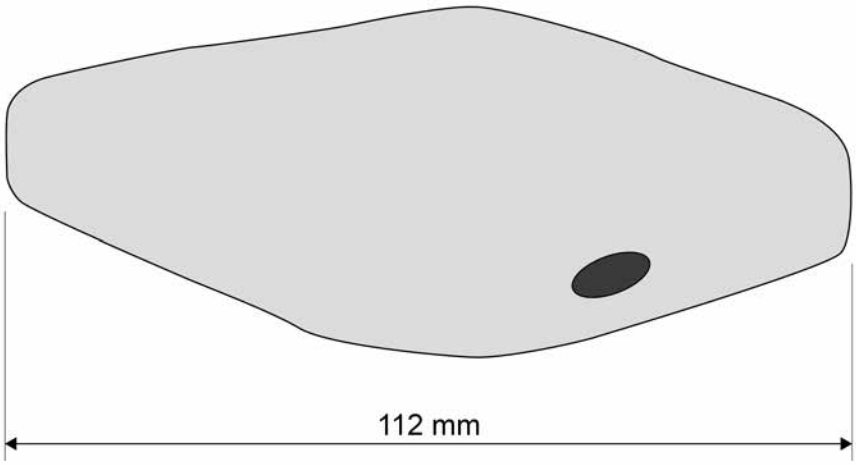
**0 6 . 5** The student made the necessary adjustments to get a clear image.

**Figure 13** shows the student's drawing of one of the cells.

**Figure 13**




The real length of the cell was 280 micrometres (μm).

Calculate the magnification of the drawing.

**[3 marks]**

Magnification = × _____

9

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**0 7** Coronary heart disease (CHD) is a non-communicable disease.

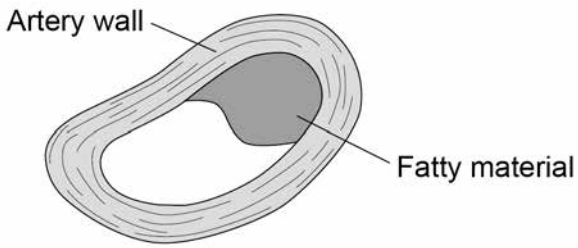
CHD is caused when fatty material builds up in the coronary arteries.

**0 7 . 1** Explain what a non-communicable disease is.

**[2 marks]**

**Figure 14** shows a coronary artery of someone with CHD.

**Figure 14**




**0 7 . 2** Explain how CHD can cause a heart attack.

**[3 marks]**

**Question 7 continues on the next page**

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**0 7 . 3** Explain how lifestyle and medical risk factors increase the chance of developing CHD.
**[6 marks]**

**11**

**END OF QUESTIONS**