DRAFT SPECIMEN MATERIAL

# GCSE
# COMBINED SCIENCE: TRILOGY

**H**

Higher Tier Paper 1: Biology 1H

Specimen 2018 Time allowed: 1 hour 15 minutes

**Materials**

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

**Instructions**
- 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.

**Information**
- There are 70 marks available on this paper.
- 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.

**Advice**
- In all calculations, show clearly how you work out your answer.



Please write clearly, in block capitals, to allow character computer recognition.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

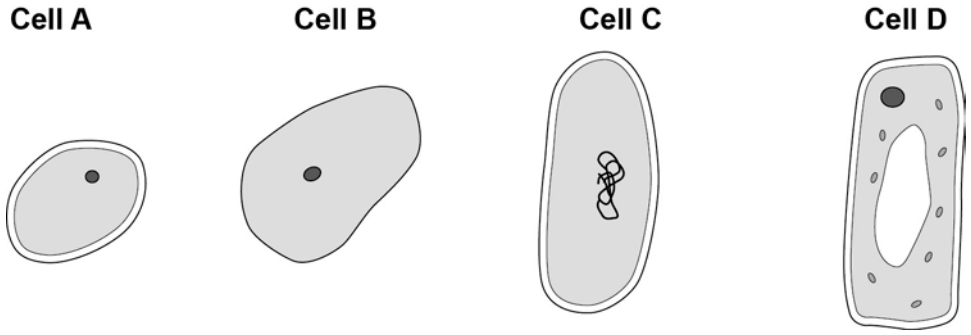
Surname

Forename(s)

Candidate signature _____

**0 1** **Figure 1** shows four different types of cell.

**Figure 1**




**0 1 . 1** Which cell is a plant cell?

Give **one** reason for your answer.

**[2 marks]**

Cell _____

Reason _____

**0 1 . 2** Which cell is an animal cell?

Give **one** reason for your answer.

**[2 marks]**

Cell _____

Reason _____

**0 1 . 3** Which cell is a prokaryotic cell?

Give **one** reason for your answer.

**[2 marks]**

Cell _____

Reason _____

**0 1 . 4** A scientist observed a cell using an electron microscope.

The size of the image was 25 mm.

The magnification was × 100 000

Calculate the real size of the cell.

Use the equation:

$$\text{magnification} = \frac{\text{image size}}{\text{real size}}$$

Give your answer in micrometres.

**[3 marks]**

Real size = _____ micrometres

**0 1 . 5** An electron microscope has a greater magnification than a light microscope.

The image formed using an electron microscope is bigger.

Explain **the other** advantage of an electron microscope compared to a light microscope.

**[2 marks]**

**Turn over for the next question**

**0 2** A scientist investigated the rate of starch digestion.

He put starch solution into a test tube and added an enzyme.

**0 2 . 1** Name **one** enzyme that digests starch.

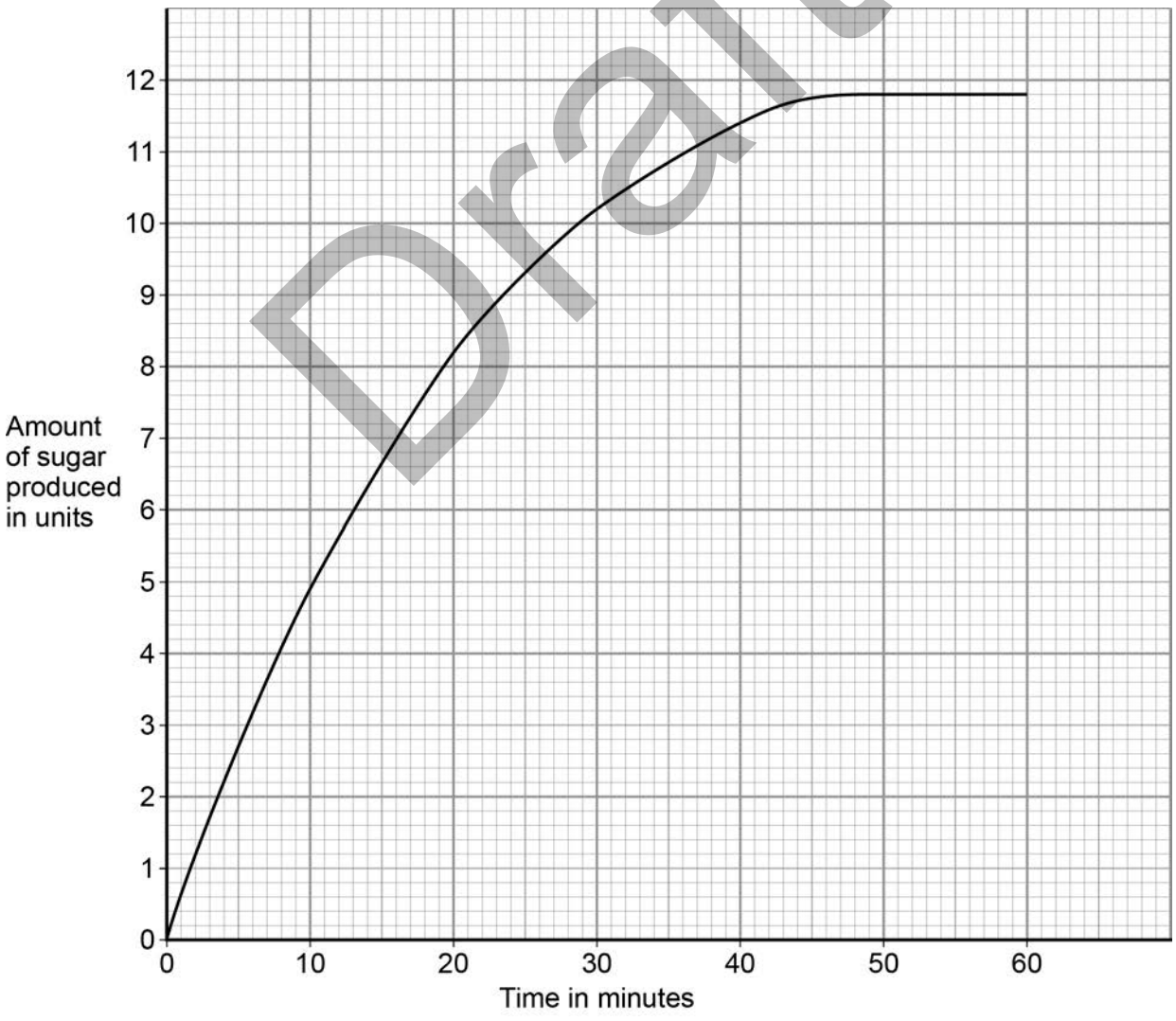
**[1 mark]**

The scientist:

- put the test tube into a water bath at 25 °C
- measured the amount of sugar produced every minute.

His results are shown in **Figure 2**.

**Figure 2**



**0 2 . 2** After how many minutes did the reaction stop?

**[1 mark]**

_____ minutes

**0 2 . 3** Why did the reaction stop?

**[1 mark]**

Tick **one** box.

- All the enzyme was used up ☐
- All the starch was used up ☐
- All the sugar was used up ☐
- 60 minutes was not enough time ☐

**0 2 . 4** Calculate the mean rate of sugar produced per minute during the first 10 minutes.

**[2 marks]**

_____

_____

Mean rate = _____ units per minute

**0 2 . 5** The scientist repeated the investigation at 37 °C.

Draw a line on **Figure 2** to show the results he would get.

**[2 marks]**

**Question 2 continues on the next page**

**0 2 . 6** The same investigation was done at 65 °C.

Explain why **no sugar** was produced.

**[3 marks]**

**Turn over for the next question**

**0 3 . 1** The heart is often described as a **double pump**.

Describe why.

**[2 marks]**

In coronary heart disease layers of fatty material build up inside the coronary arteries.

The arteries become narrow so less blood reaches the heart muscle cells.

This can cause a heart attack.

**0 3 . 2** What drug can be given to slow down the build-up of fatty material in the arteries?

**[1 mark]**

**0 3 . 3** The coronary arteries can be kept open using a mechanical device inserted into the artery.

What is this mechanical device called?

**[1 mark]**

**0 3 . 4** Name the **four** main parts of the blood.

Give a function of **each** component.

**[4 marks]**

Part of the blood _____

Function _____

_____

Part of the blood _____

Function _____

_____

Part of the blood _____

Function _____

_____

Part of the blood _____

Function _____

_____



**Turn over for the next question**

**0 4** Plants photosynthesise to make food.

**0 4 . 1** What is the word equation for photosynthesis?

**[1 mark]**

Tick **one** box.

carbon dioxide + glucose ⟶ oxygen + water ☐

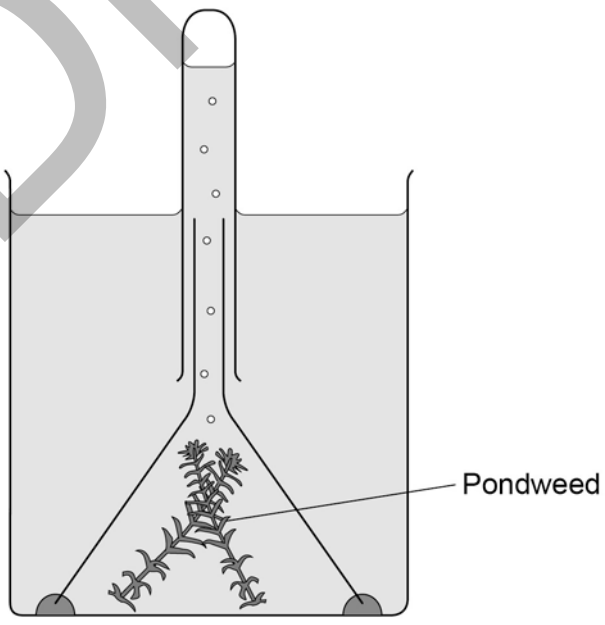
glucose + oxygen ⟶ carbon dioxide + water ☐

oxygen + water ⟶ carbon dioxide + glucose ☐

water + carbon dioxide ⟶ oxygen + glucose ☐

**0 4 . 2** **Figure 3** shows some of the apparatus that can be used to measure the rate of photosynthesis.

**Figure 3**



The rate of photosynthesis in the pondweed is affected by light intensity.

Describe a method you could use to investigate this.

You should include:

- what you would measure
- variables you would control.

**[6 marks]**

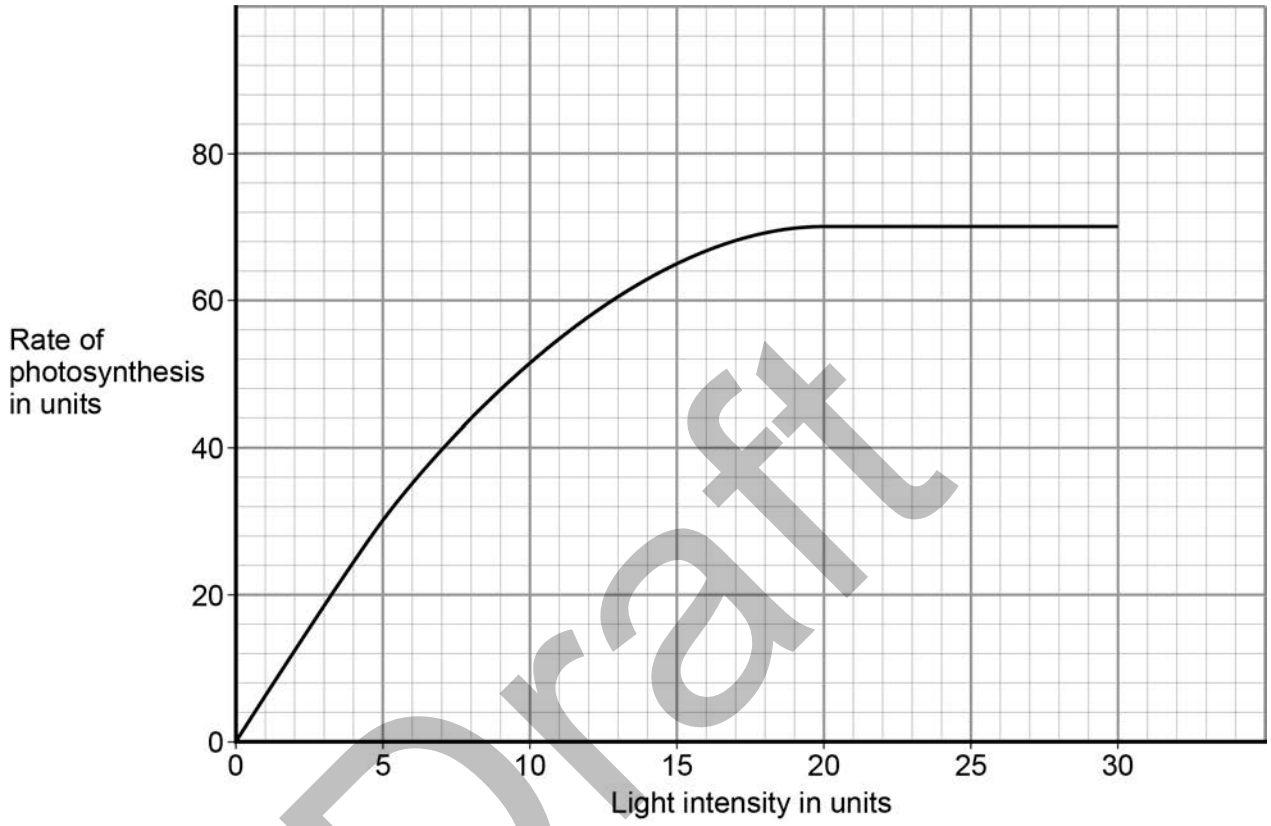


**Question 4 continues on the next page**

A scientist carried out a similar investigation.

Her results are shown in **Figure 4**.

**Figure 4**






**0 4 . 3** The scientist said:

**'Light is not a limiting factor at a light intensity of 25 units.'**

Give evidence from **Figure 4** to support this statement.

**[1 mark]**

**0 4 . 4** What could be limiting the rate of photosynthesis at a light intensity of 25 units?

Give **one** factor.

**[1 mark]**

**Turn over for the next question**

**0 5** Malignant tumours are called cancers.

**0 5 . 1** Describe how a tumour can spread to different parts of the body.

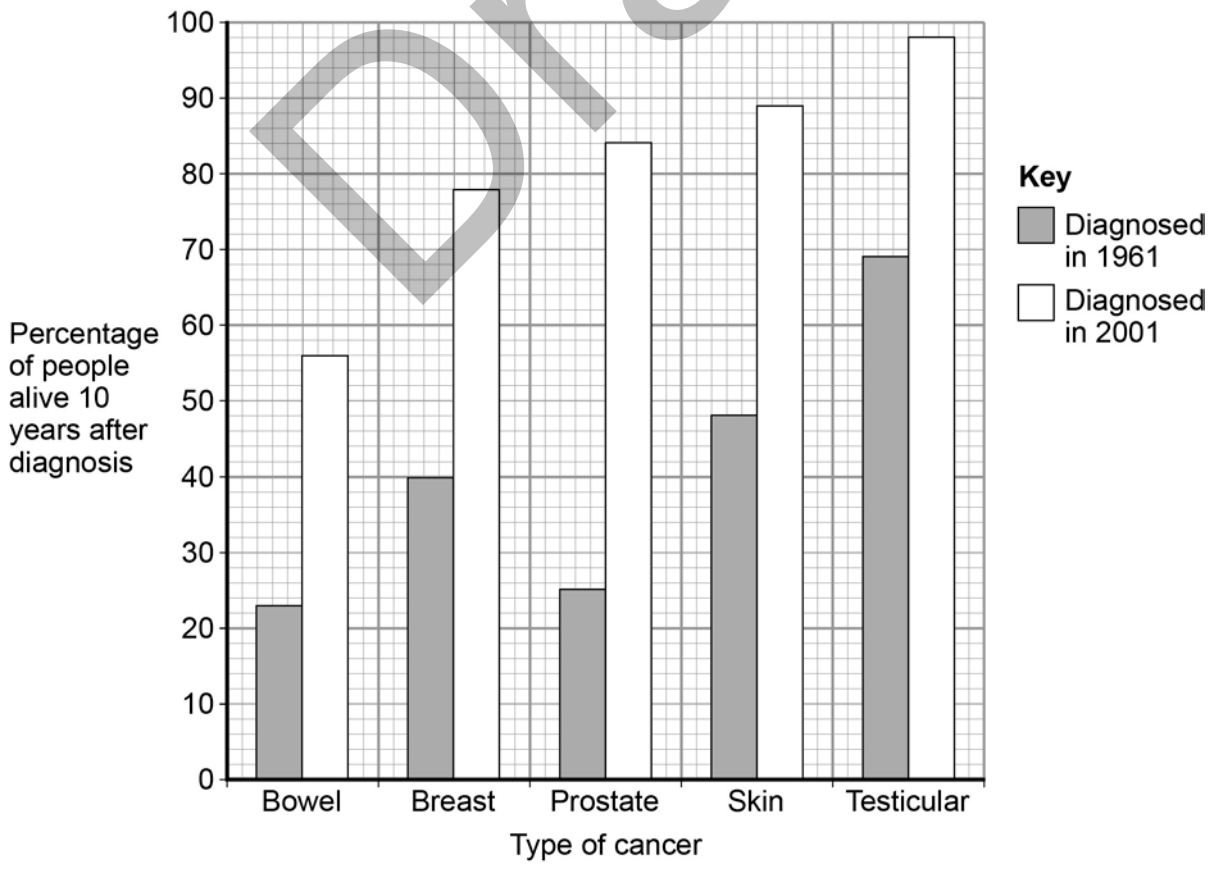
**[2 marks]**

Survival rates for people with cancer have improved a lot.

Some people who are alive 10 years after diagnosis are considered to be cured.

Look at **Figure 5** shows data for people diagnosed with cancer in 1961 and 2001.

**Figure 5**



**0 5 . 2** Look at the data in **Figure 5** for testicular and bowel cancer diagnosed in 2001.

The percentage of people alive after 10 years **is greater** for testicular cancer compared to bowel cancer.

Determine how many times greater.

**[2 marks]**

Percentage greater = _____ times

**0 5 . 3** Look at the data in **Figure 5** for bowel and prostate cancer.

Compare the survival rates for bowel and prostate cancer.

Suggest reasons for the comparisons you have made.

**[4 marks]**



**Turn over for the next question**

**0 6** In 2014 there was an outbreak of Ebola virus disease (EVD) in Africa.

At the time of the outbreak there were:

- no drugs to treat the disease
- no vaccines to prevent infection.

**0 6 . 1** By March 2015 there were an estimated 9850 deaths worldwide from EVD.

The number of deaths is an estimate.

Suggest why it is **not** an exact number.

**[1 mark]**

**0 6 . 2** Why were antibiotics **not** used to treat EVD?

**[1 mark]**

After the outbreak began, drug companies started to develop drugs and vaccines for EVD.

The drug has to be thoroughly tested and trialled before it is licensed for use.

Testing, trialling and licensing new drugs usually takes several years.

**0 6 . 3** Draw **one** line from each word about drug testing to the definition of the word.

**[2 marks]**

| Word about drug testing | Definition |
|---|---|
| Dose | Side effects making the person ill |
| Efficacy | The concentration of the drug to be used and how often the drug should be given |
| Toxicity | Whether the drug works to treat the illness |

**0 6 . 4** The results of drug testing and drug trials are studied in detail by other scientists.

Then the results can then be published by the drug company.

Suggest **one** reason why the results are studied by other scientists.

**[1 mark]**

**Question 6 continues on the next page**

The number of deaths from EVD continued to increase.

The World Health Organization (WHO) decided it was ethical to use unlicensed drugs.

The WHO said unlicensed drugs could only be given to people who gave their permission.

Also, any results had to be shared with other researchers and drug companies.

Some vaccines had shown positive results in animal testing, but the vaccines had not been tested and trialled in humans.

The supplies of the vaccine were low.

At first the vaccines were only used for health workers.

**0 6 . 5** How would the use of a vaccine **reduce the spread** of EVD?

**[2 marks]**

**0 6 . 6** Evaluate the use of unlicensed drugs and vaccines during the EVD outbreak.

Give a conclusion.

**[6 marks]**



**Turn over for the next question**

**0 7** A student investigated the effect of pond organisms on the amount of carbon dioxide in their surroundings.

The student set up six boiling tubes as shown in **Figure 6**.

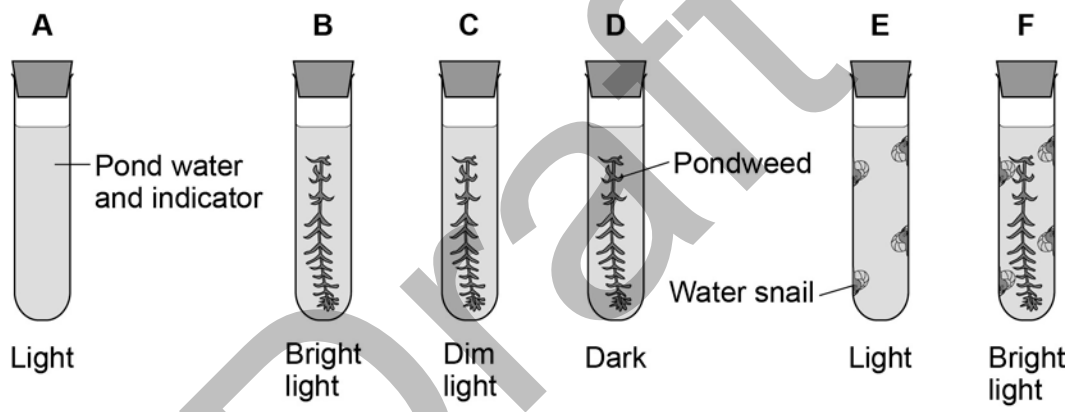
They were left for 2 days.

Each boiling tube contained pond water with an indicator.

The indicator was pink at the start of the investigation.

- If the amount of carbon dioxide in the water increased the indicator turned yellow.
- If the amount of carbon dioxide in the water decreased the indicator turned purple.

**Figure 6**






**0 7 . 1** What is the purpose of boiling tube **A**?

**[2 marks]**

**0 7 . 2** In which boiling tube would the indicator be the **most yellow** after 2 days?

Explain your answer.

**[3 marks]**

Boiling tube _____

Explanation _____

_____

_____

**0 7 . 3** The colour of the indicator in boiling tube **C** had not changed after 2 days.

Suggest why.

**[1 mark]**

_____

_____

**Turn over for the next question**

**0 8** Plants need nitrate ions in order to make proteins.

A plant is growing in soil flooded with water.

Explain why the plant cannot absorb enough nitrate ions.

**[5 marks]**



**END OF QUESTIONS**

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