

Please write clearly in block capitals.

Centre number

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Candidate number

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Forename(s)

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Candidate signature

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I declare this is my own work.

# GCSE COMBINED SCIENCE: TRILOGY

# F

Foundation Tier  
Biology Paper 1F

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**.
- **Pencil** should only be used for drawing.
- **Fill** in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- 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	
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6	
<b>TOTAL</b>	

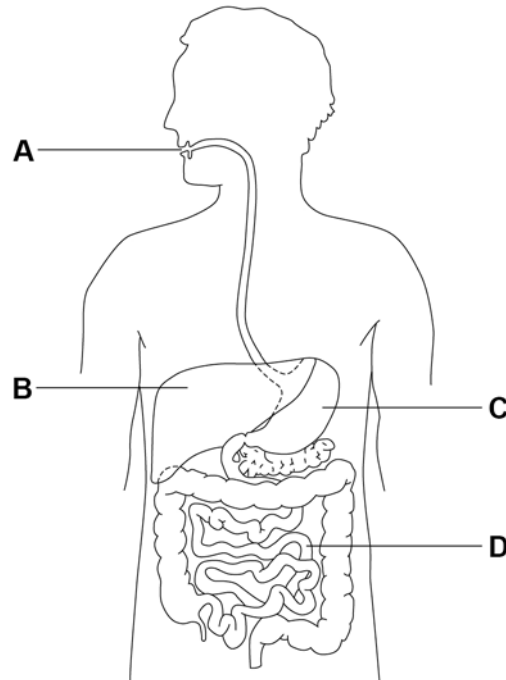


0 1

Foods are digested before they are absorbed into the blood.

**Figure 1** shows organs in the human digestive system.

**Figure 1**



0 1 . 1

Which organ is the stomach?

[1 mark]

Tick (✓) **one** box.

A       B       C       D

0 1 . 2

What type of enzyme is produced in the stomach?

[1 mark]

Tick (✓) **one** box.

Carbohydrase

Lipase

Protease



**0 1 . 3** Which term describes the pH in the stomach?

Give **one** reason why the stomach is this pH.

**[2 marks]**

Tick (✓) **one** box.

Acidic

Alkaline

Neutral

Reason \_\_\_\_\_

\_\_\_\_\_

**0 1 . 4** Which organ produces bile?

**[1 mark]**

Tick (✓) **one** box.

Large intestine

Liver

Mouth

Pancreas

**Question 1 continues on the next page**

**Turn over ►**



**0 1 . 5** How does bile help in the digestion of foods?

**[1 mark]**

Tick (✓) **one** box.

It increases the surface area of fats.

It is an enzyme that digests protein.

It makes the pH in the small intestine acidic.

A student tested different foods for the presence of protein, starch and sugar.

**0 1 . 6** Draw **one** line from each food molecule to the reagent used to test for the food molecule.

**[2 marks]**

**Food molecule**

**Reagent**

Protein

Benedict's solution

Starch

Biuret reagent

Sugar

Iodine solution



0 1 . 7

Give **one** safety precaution a student should take when using Benedict's solution.

[1 mark]

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0 1 . 8

Table 1 shows the results for one food sample.

Table 1

Test	Benedict's test	Biuret test	Iodine test
Colour after test	Red	Blue	Black

Which of the tests show positive results?

[1 mark]

Tick (✓) **one** box.

All three tests

Benedict's and Biuret tests only

Benedict's and iodine tests only

Biuret and iodine tests only

0 1 . 9

Starch molecules are **not** absorbed into the blood from the digestive system.Give **one** reason why.

[1 mark]

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11

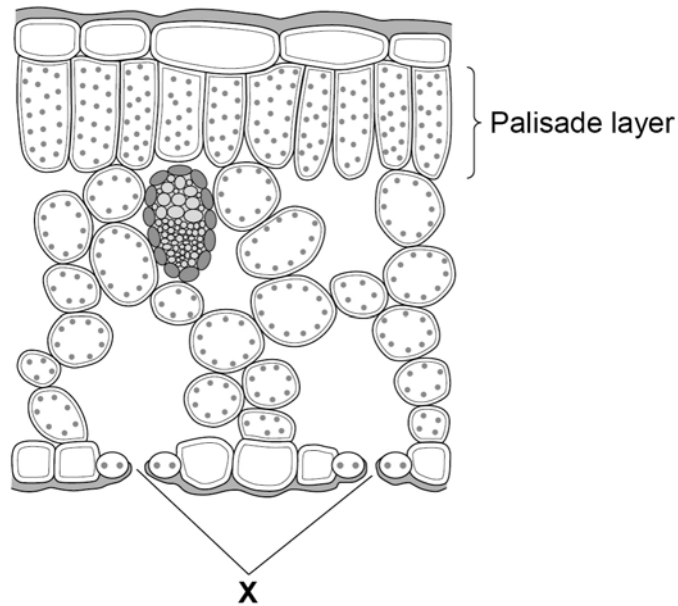
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0 2

Figure 2 shows a section through a leaf.

Figure 2



0 2 . 1

Give **one** way that the palisade layer is adapted for photosynthesis.

[1 mark]

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0 2 . 2

Gases pass into and out of the leaf through small pores in the surface of the leaf.

What are the small pores labelled **X** called?

[1 mark]

Tick (✓) **one** box.

Guard cells

Stomata

Xylem vessels



0 2 . 3

A student viewed a section of a leaf using a microscope.

The student measured the length of one of the palisade cells.

The cell image measured 28 mm in length when viewed at a magnification of  $\times 400$

Calculate the real length of the palisade cell in millimetres (mm).

Use the equation:

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

[3 marks]

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Real length = \_\_\_\_\_ mm

Convert the real length of the cell from millimetres to micrometres ( $\mu\text{m}$ ).

1 mm = 1000  $\mu\text{m}$

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Real length = \_\_\_\_\_  $\mu\text{m}$

0 2 . 4

Carbon dioxide can move into and out of cells.

What is the process by which carbon dioxide can move into and out of cells?

[1 mark]

Tick ( $\checkmark$ ) **one** box.

Active transport

Diffusion

Osmosis

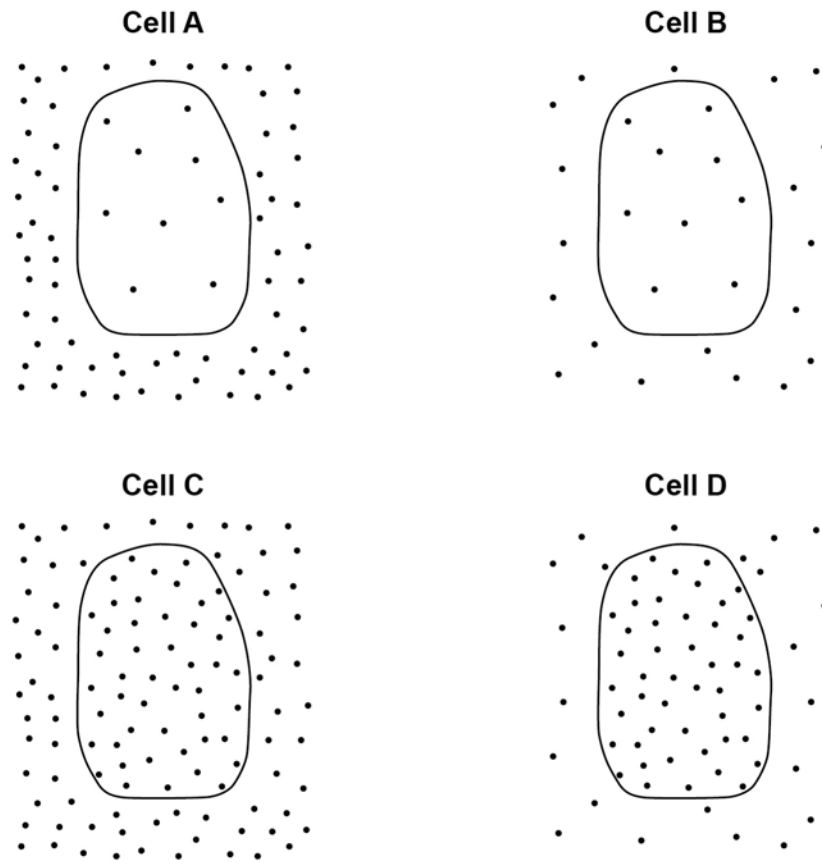
Turn over ►



**Figure 3** shows a diagram of four cells.

Each cell is surrounded by carbon dioxide molecules.

**Figure 3**



**Key**

• Carbon dioxide molecule

**0 2 . 5** Which cell will carbon dioxide move into at the fastest rate?

Give a reason for your answer.

**[2 marks]**

Tick (✓) **one** box.

A  B  C  D

Reason \_\_\_\_\_

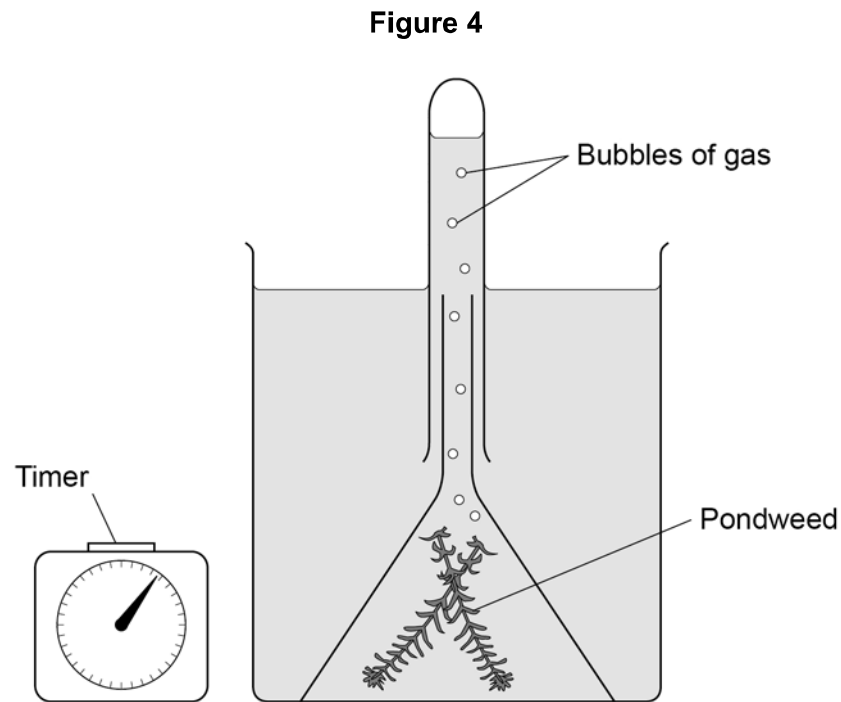
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A student investigated the effect of different colours of light on the rate of photosynthesis.

**Figure 4** shows some of the apparatus the student used.



The student placed the apparatus in blue light, then in green light and then in red light.

The student measured the rate of photosynthesis in each colour of light.

**0 2 . 6** What **two** measurements should the student make to calculate the **rate** of photosynthesis?

**[2 marks]**

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_

**Question 2 continues on the next page**

**Turn over ►**



0 2 . 7

Give **two** variables the student should keep the same in this investigation.**[2 marks]**

1 \_\_\_\_\_

2 \_\_\_\_\_

**Table 2** shows the results.**Table 2**

<b>Colour of light</b>	<b>Rate of photosynthesis in arbitrary units</b>
Blue	9
Green	1
Red	8



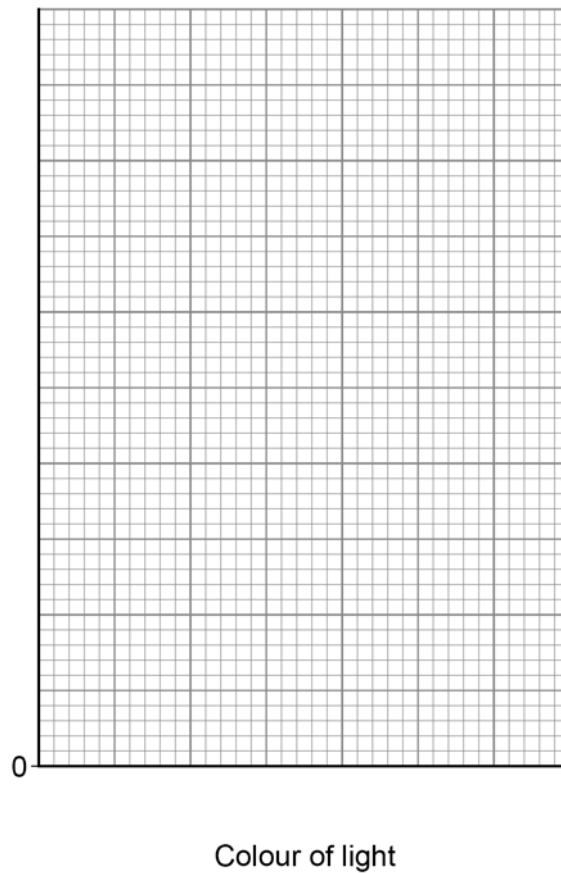
**0 2 . 8** Complete **Figure 5**.

You should:

- label the y-axis
- use a suitable scale
- plot the data from **Table 2** as a bar chart
- label each bar.

**[4 marks]**

**Figure 5**



**0 2 . 9** Look at **Table 2**.

What colour of light should be used to grow plants in a greenhouse?

**[1 mark]**

Tick (✓) **one** box.

Blue

Green

Red

**17**

**Turn over ►**



**0 3**

This question is about disease.

Rose black spot is a disease where black spots develop on the leaves of rose plants.

**0 3 . 1**

What type of pathogen causes rose black spot disease?

**[1 mark]**Tick (✓) **one** box.

Bacterium

Fungus

Protist

Virus

**0 3 . 2**Plants with rose black spot disease often have **yellow** leaves.Suggest **one** reason why the leaves are **yellow** instead of green.**[1 mark]**

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**0 3 . 3**Explain why plants with **yellow** leaves grow slowly.**[2 marks]**

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0 3 4

The spread of rose black spot can be controlled using different methods.

Draw **one** line from each method of control to the explanation of how it works.

[2 marks]

**Method of control****Explanation**

Remove and burn  
infected leaves

Creates a barrier to the  
movement of pathogens

Pathogens are killed

Water the roots of  
the plant only, **not** the  
leaves

Reduces the chance of  
pathogens being spread  
by water droplets

Reduces the temperature  
so pathogens reproduce  
less

**Question 3 continues on the next page**

**Turn over ►**



**0 3 . 5** Tobacco plants may become infected with a pathogen called TMV.

What type of pathogen is TMV?

[1 mark]

Tick (✓) **one** box.

Bacterium

Fungus

Protist

Virus

Malaria is a disease caused by a protist.

**0 3 . 6** How is the malaria pathogen transferred to humans?

[1 mark]

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**0 3 . 7** How can the spread of malaria pathogens be reduced?

[1 mark]

Tick (✓) **one** box.

Avoid sexual contact

Cook food thoroughly

Drain water from swamps

Use a tissue when sneezing

**9**



**Turn over for the next question**

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0 4

Cigarette smoking is the main cause of cancer in the UK.

0 4 . 1

Mutations in cells cause cancer.

Where in a cell do mutations happen?

**[1 mark]**Tick (✓) **one** box.

Cell membrane

Cytoplasm

Nucleus

0 4 . 2

Why do some cancers develop into large tumours?

**[1 mark]**Tick (✓) **one** box.

Cells never stop dividing

Cell respiration is slowed down

Enzyme activity is stopped





Cigarette smoking has been linked to many different types of cancer.

**0 4 . 3** Lung cancer is the most common type of cancer caused by smoking.

Suggest **one** reason why.

[1 mark]

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---

**0 4 . 4** A person with lung cancer can develop secondary cancers in other parts of the body.

Describe how this can happen.

[1 mark]

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**0 4 . 5** Sometimes a person may need a lung transplant.

The National Health Service (NHS) will **not** offer a lung transplant to a person who smokes.

Suggest **one** reason why.

[1 mark]

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**Question 4 continues on the next page**

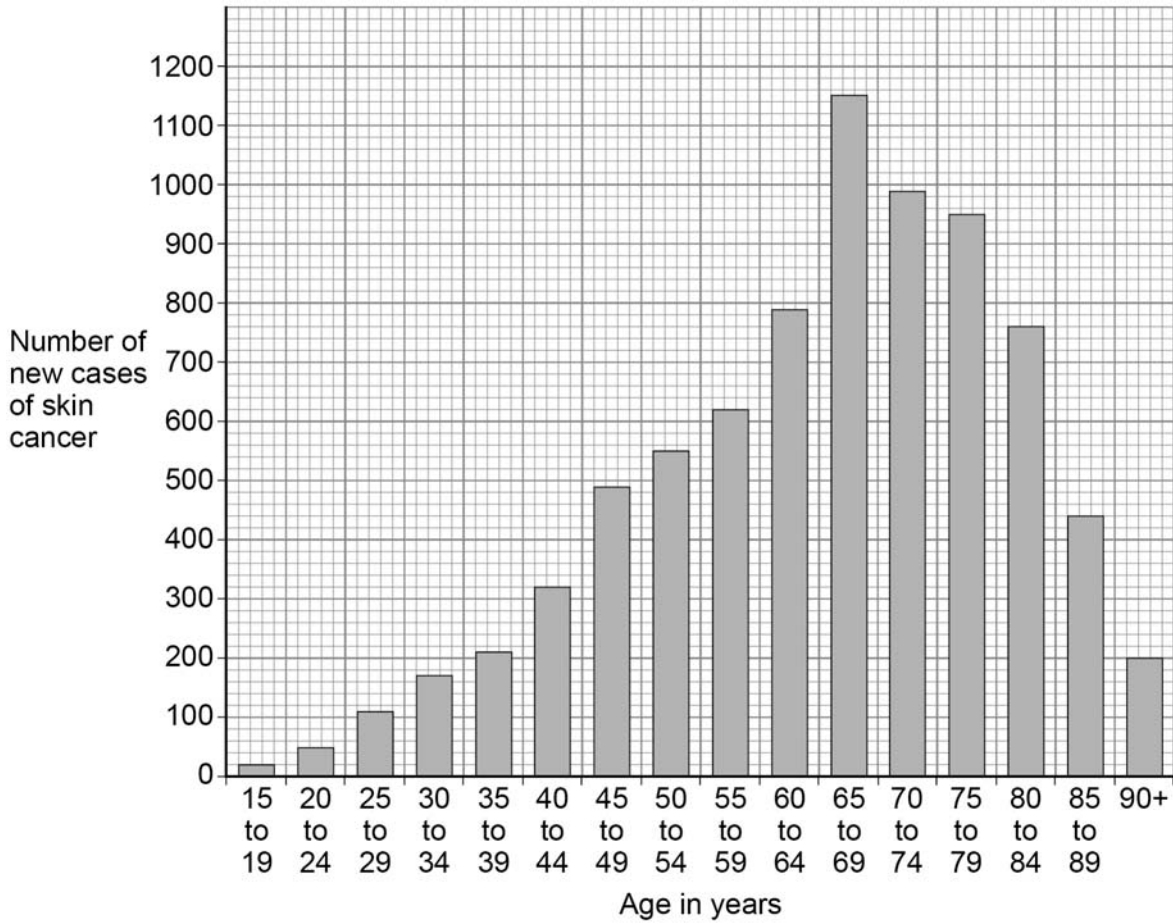
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**Figure 6** shows data about skin cancer in males for different age groups in the UK.

The data shows the number of new cases of skin cancer in one year.

**Figure 6**



**0 4 . 6**

How many more new cases of skin cancer are there in males aged 40 to 44 than in males aged 15 to 19?

**[1 mark]**

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Number of new cases = \_\_\_\_\_



0 4 . 7

There are no new cases of skin cancer diagnosed in males younger than 15 years of age.

Suggest **one** reason why.

[1 mark]

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0 4 . 8

Give **one** conclusion from the data in **Figure 6**.

[1 mark]

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0 4 . 9

Survival rates for **all** types of cancers have improved over the last 20 years.

Suggest **two** reasons why.

[2 marks]

1 \_\_\_\_\_

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2 \_\_\_\_\_

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10

**Turn over for the next question**

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0 5

Bacteria can cause a variety of diseases in humans.

0 5 . 1

What are **two** similarities between a bacterial cell and an animal cell?

[2 marks]

Tick (✓) **two** boxes.

Both have a cell membrane.

Both have a cell wall.

Both have a nucleus.

Both have cytoplasm.

Both have plasmids.

0 5 . 2

Salmonella food poisoning is caused by bacteria in food.

Give **one** symptom of salmonella food poisoning.Do **not** refer to vomiting or diarrhoea in your answer.

[1 mark]

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Question 5 continues on the next page

Turn over ►



0 5 3

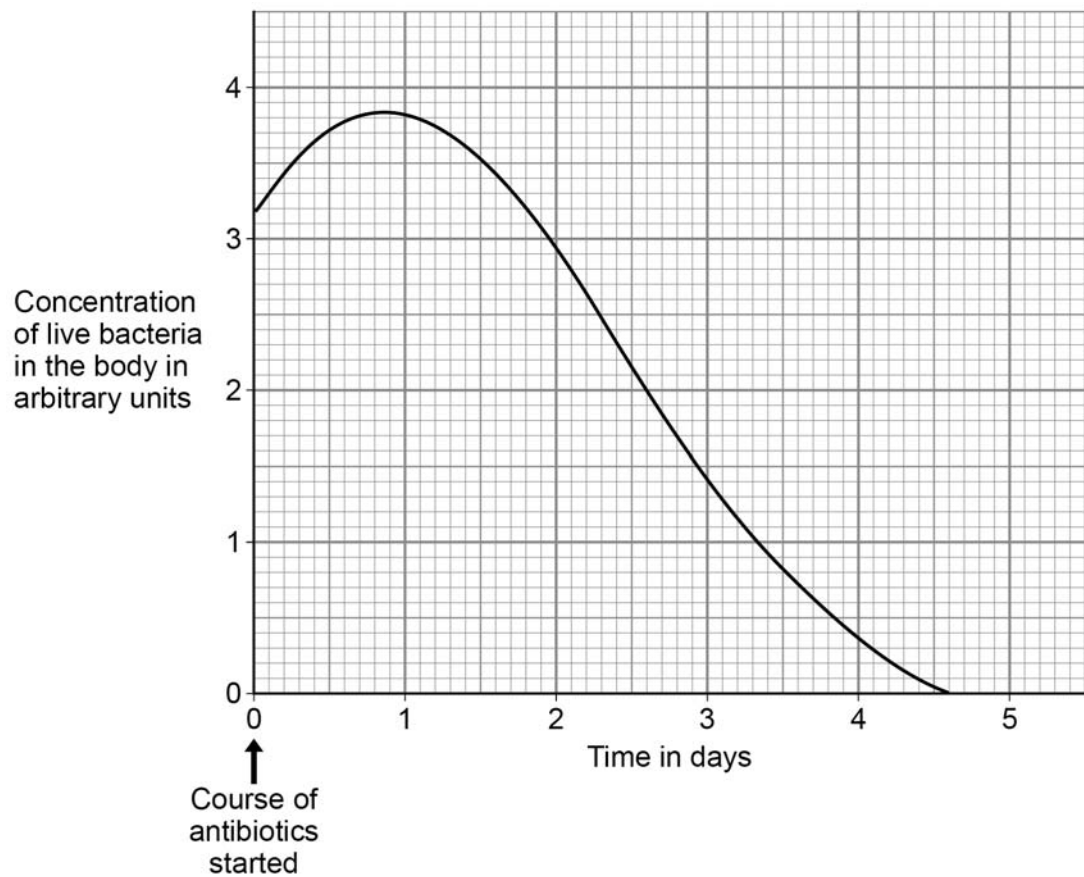
What is the name of the first antibiotic developed?

[1 mark]

A child with a severe bacterial infection was given a course of antibiotics.

**Figure 7** shows how the concentration of live bacteria in the child's body changed when taking the course of antibiotics.

**Figure 7**



**0 5 . 4** The concentration of live bacteria in the body continued to increase after starting the course of antibiotics.

Suggest **one** reason why.

[1 mark]

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**0 5 . 5** After 3 days of taking the antibiotic:

- the child felt better
- there were still bacteria in the child's body.

Why did the child feel better?

[1 mark]

Tick (✓) **one** box.

Bacteria had become immune to the antibiotic.

The child had become resistant to the bacteria.

There were fewer toxins in the body than at day 0

**0 5 . 6** Suggest why doctors do **not** give antibiotics to patients with minor infections.

[1 mark]

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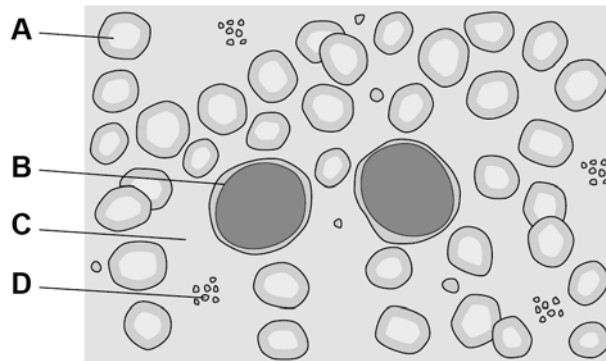
Question 5 continues on the next page

Turn over ►



Figure 8 shows blood viewed using a microscope.

Figure 8



0 5 . 7 A vaccine will stimulate the production of antibodies.

Which part of the blood in **Figure 8** produces antibodies?

[1 mark]

Tick (✓) **one** box.

A       B       C       D

0 5 . 8 Which part of the blood in **Figure 8** starts the clotting process?

[1 mark]

Tick (✓) **one** box.

A       B       C       D





**0 6**

This question is about cell division.

**0 6 . 1**

Write the biological structures from the box in the correct order of size.

**[1 mark]**

<b>cell</b>	<b>chromosome</b>	<b>gene</b>	<b>nucleus</b>
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Smallest



Largest

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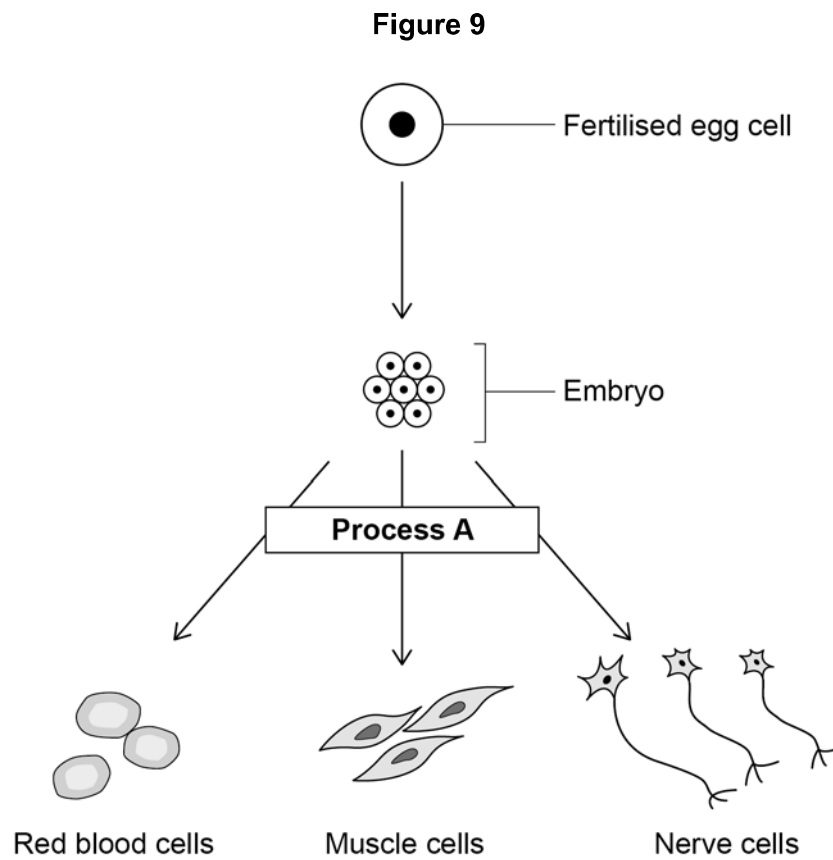
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**Question 6 continues on the next page****Turn over ►**

**Figure 9** shows how a fertilised egg cell can produce specialised cells.



**0 6 . 2** Name **Process A**.

[1 mark]

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**0 6 . 3** How many cell divisions are needed to form a 16-cell embryo from the original fertilised egg cell?

[1 mark]

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Number of cell divisions = \_\_\_\_\_



0 6 . 4 In humans a fertilised egg cell contains 23 pairs of chromosomes.

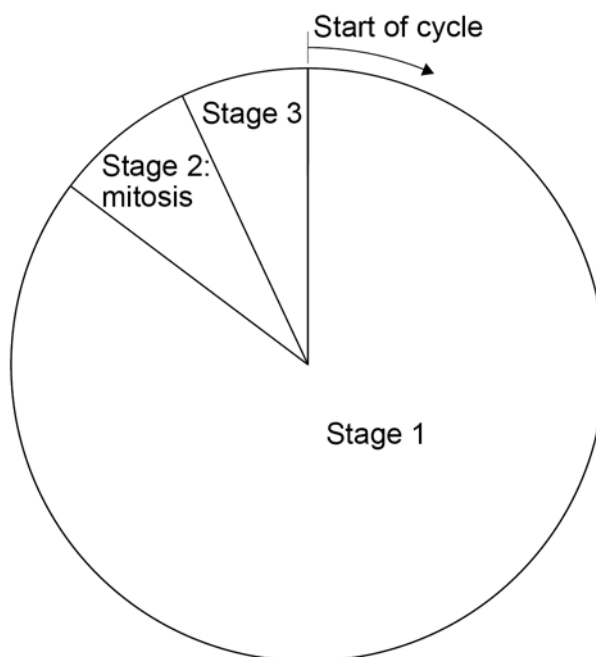
How many chromosomes will there be in each of the embryo cells?

[1 mark]

---

0 6 . 5 Figure 10 represents a cell cycle for a human embryonic cell.

Figure 10



Describe **one** change in the cell that occurs during **each** of the stages of the cell cycle.

[3 marks]

Stage 1 \_\_\_\_\_

\_\_\_\_\_

Stage 2 \_\_\_\_\_

\_\_\_\_\_

Stage 3 \_\_\_\_\_

\_\_\_\_\_

Turn over ►

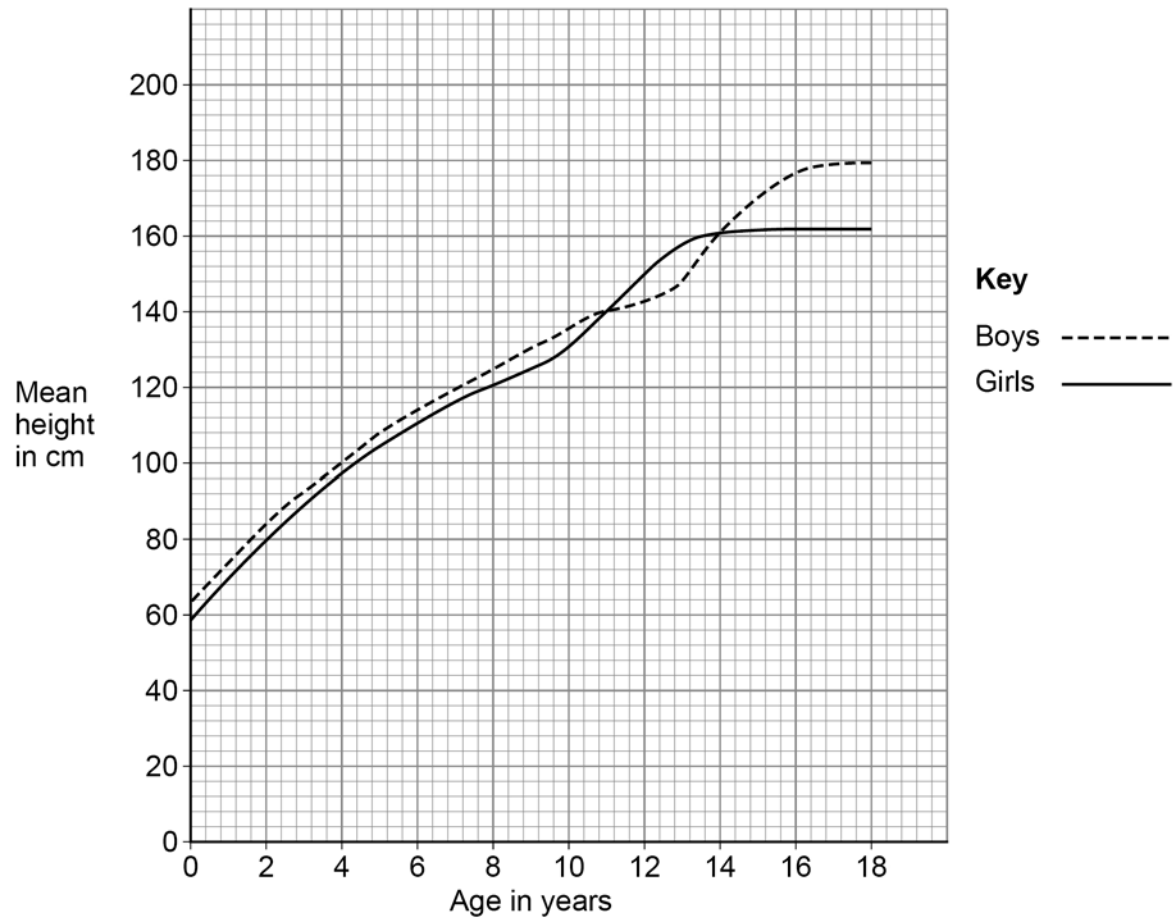


Cell division is important in the growth of multicellular organisms.

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**0 6 . 6** **Figure 11** shows the mean height of boys and of girls from birth to age 18 years.

**Figure 11**



Compare the growth of boys with the growth of girls.

Use data from **Figure 11** in your answer.

**[6 marks]**

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**0 6 . 7**

Give **one** way that cell division by mitosis is important in **fully grown** animals.

**[1 mark]**

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**14**

**END OF QUESTIONS**



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3 2



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