AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

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.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

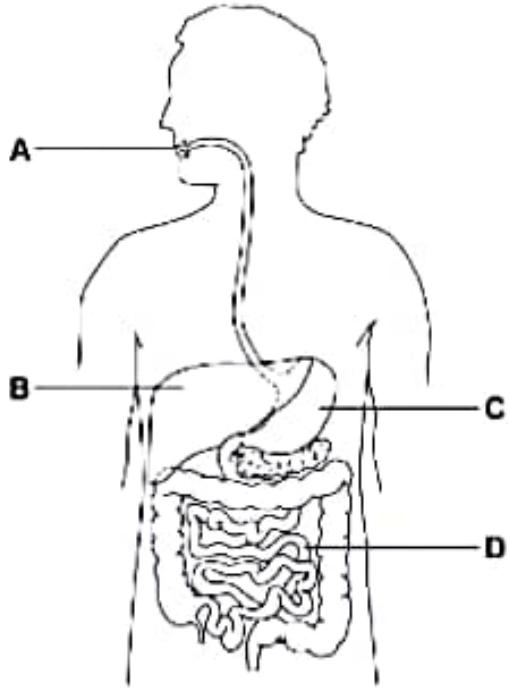
Information
- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Do not write outside the box

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 ☑

Do not write outside the box

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 optimum for enzyme to act

0 1 . 4 Which organ produces bile?

[1 mark]

Tick (✓) one box.

Large intestine

Liver ✓

Mouth

Pancreas

Question 1 continues on the next page

Do not write outside the box

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

[1 mark]

Tick (✓) **one** box.

It increases the surface area of fats. ✓

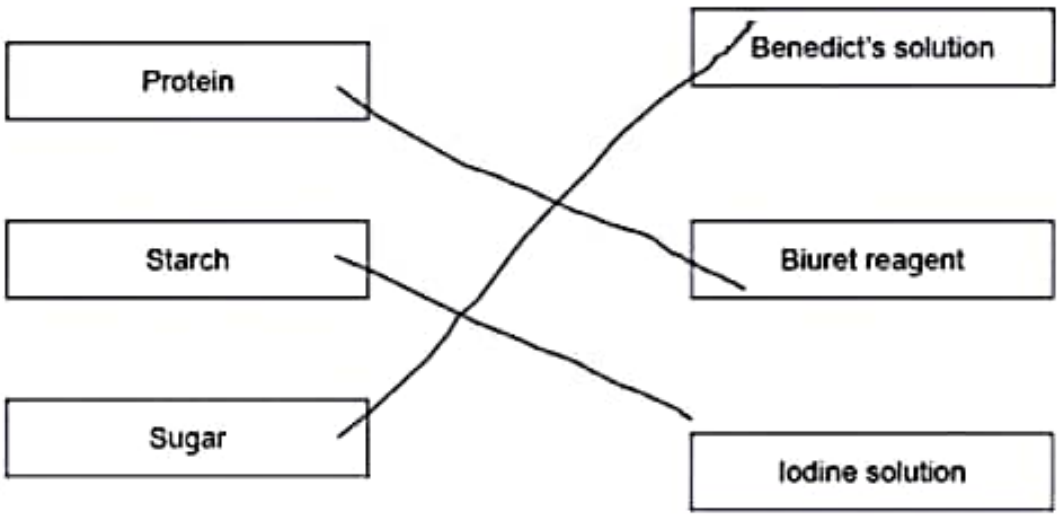
It is an enzyme that digests protein.

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]



Do not write outside the box

0 1 . 7 Give **one** safety precaution a student should take when using Benedict's solution.

[1 mark]

wear goggles

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]

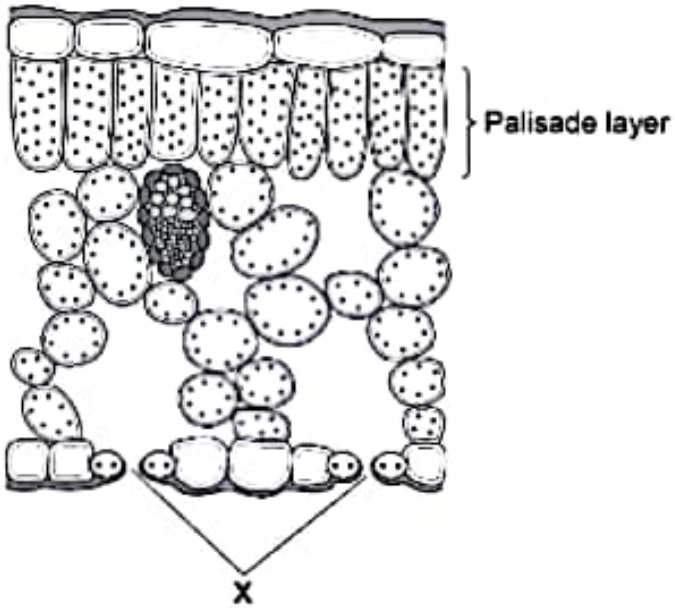
starch is insoluble

11

Do not write outside the box

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]

Cell contains mainy chloroplasts

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 ☐

Do not write outside the box

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 ×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]

real length = 28 / 400

Real length = 0.07 mm

Convert the real length of the cell from millimetres to micrometres (μm).

1 mm = 1000 μm

0.07×1000

Real length = 70 μm

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 (✓) one box.

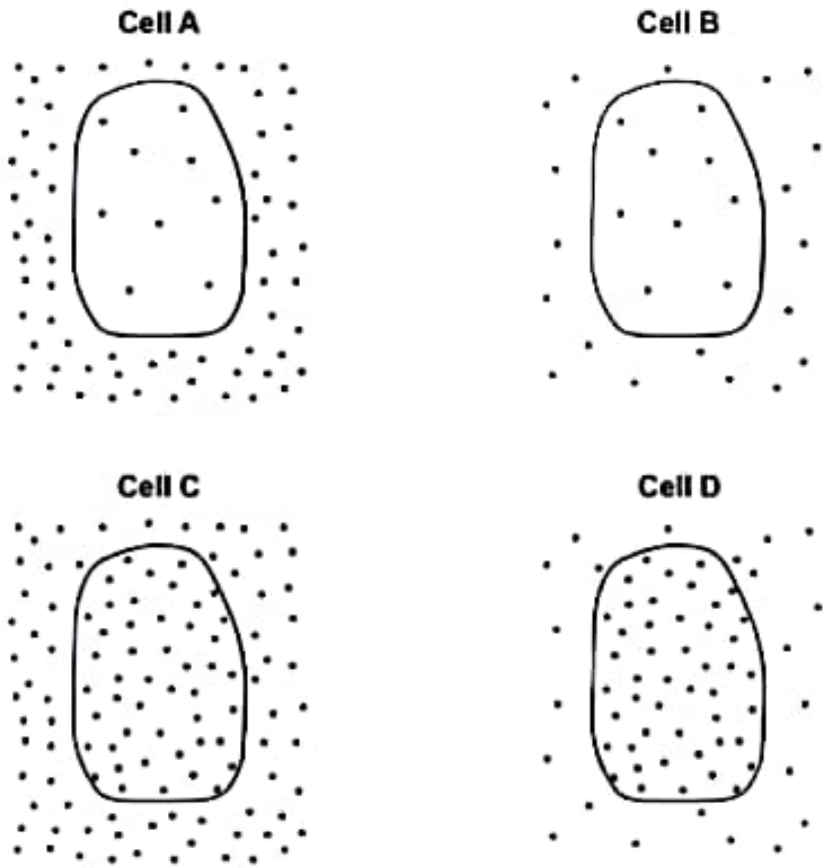
- Active transport ☐
- Diffusion ☑
- Osmosis ☐

Do not write outside the box

Figure 3 shows a diagram of four cells.

Each cell is surrounded by carbon dioxide molecules.

Figure 3



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 ☐

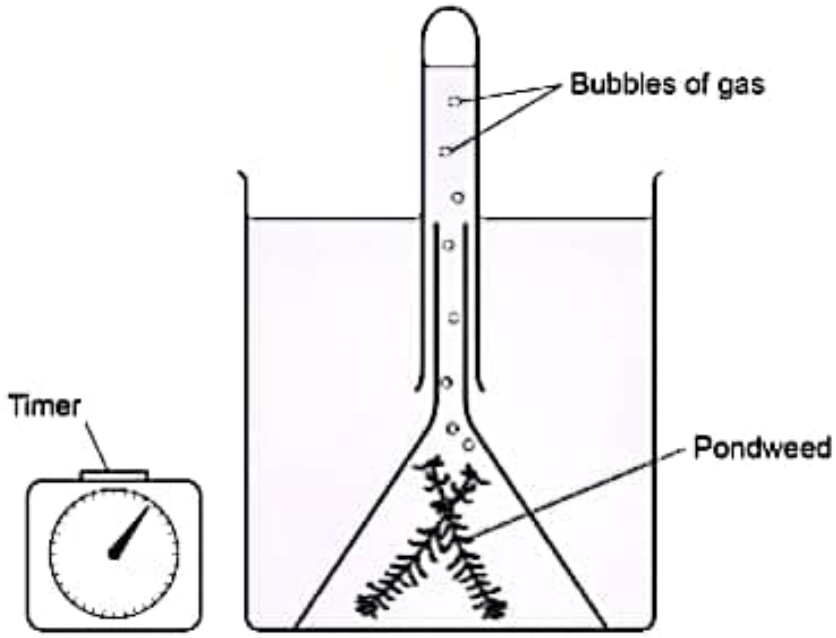
Reason Steeper diffusion gradient

Do not write outside the box

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.

Figure 4



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 Amount of bubbles

2 Time

Question 2 continues on the next page

Do not write outside the box

0 2 . 7 Give two variables the student should keep the same in this investigation.

[2 marks]

1 Temperature of water

2 Light intensity

Table 2 shows the results.

Table 2

Colour of light	Rate of photosynthesis in arbitrary units
Blue	9
Green	1
Red	8

Do not write outside the box

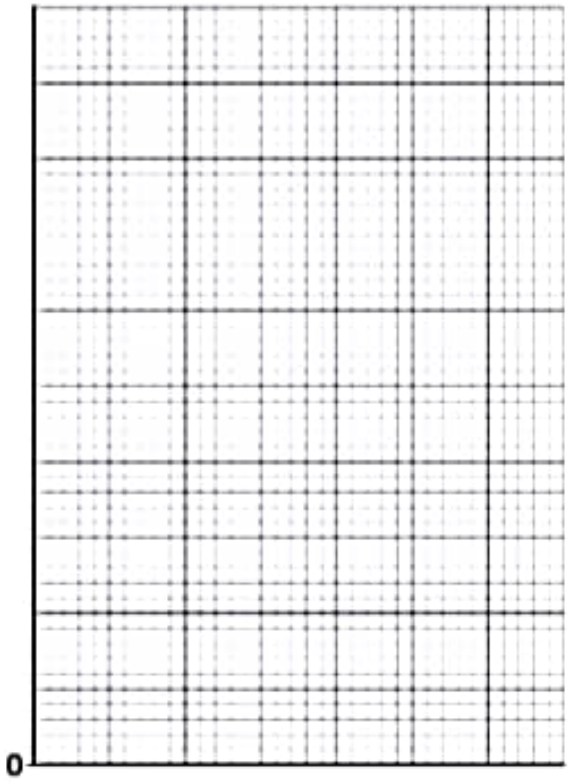
0 2 . 8 Complete **Figure 5**.

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

Do not write outside the box

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]

Chlorophyll has been broken down

0 3 . 3 Explain why plants with yellow leaves grow slowly.

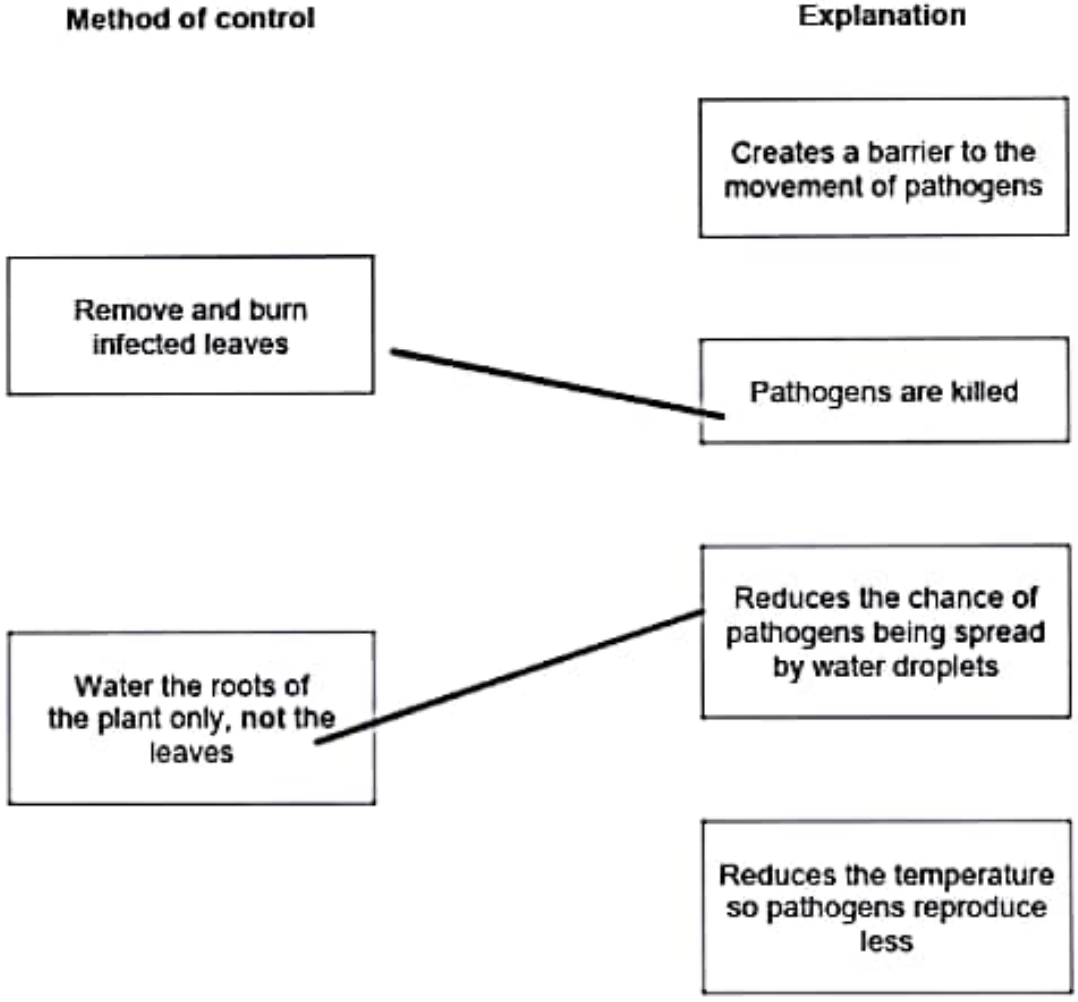
[2 marks]

As less light is absorbed by them so the rate of photosynthesis is reduced .

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]



Question 3 continues on the next page

Do not write outside the box

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]

By mosquitoe bite

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

Do not write outside the box

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 ☐

Do not write outside the box

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]

Chemical enters the lungs first

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]

Cancer cells transported in the blood

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]

Smoking will damage the new lungs

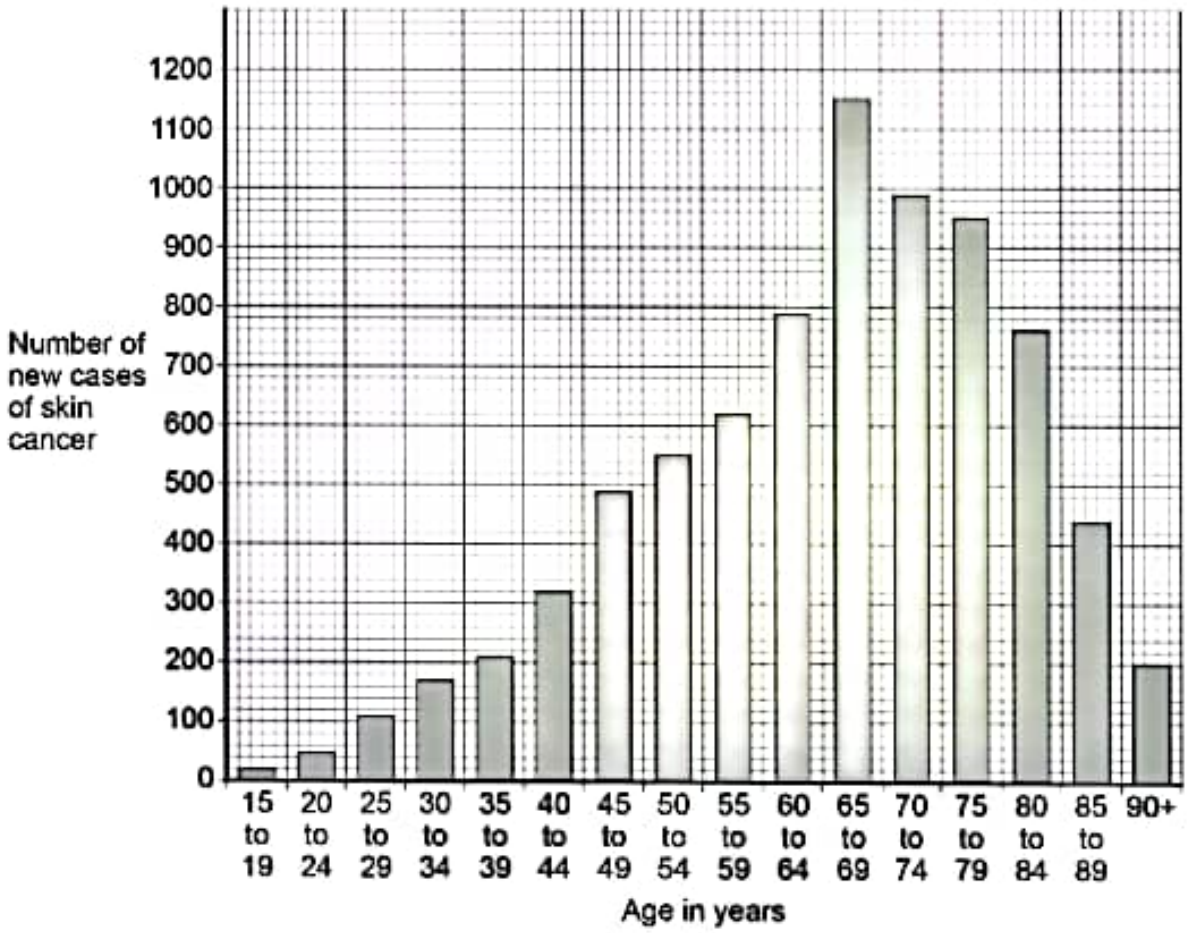
Question 4 continues on the next page

Do not write outside the box

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]

Number of new cases = 300

Do not write outside the box

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]

• little exposure to ionising radiation

0 4 . 8 Give **one** conclusion from the data in **Figure 6**.

[1 mark]

most new cases each year are in males / people aged 65–69 (years)

0 4 . 9 Survival rates for all types of cancers have improved over the last 20 years.

Suggest **two** reasons why.

[2 marks]

1 improved treatment

2 Earlier diagnosis

10

Turn over for the next question

Do not write outside the box

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]

Fever

Question 5 continues on the next page

Do not write outside the box

0 5 . 3 What is the name of the first antibiotic developed?

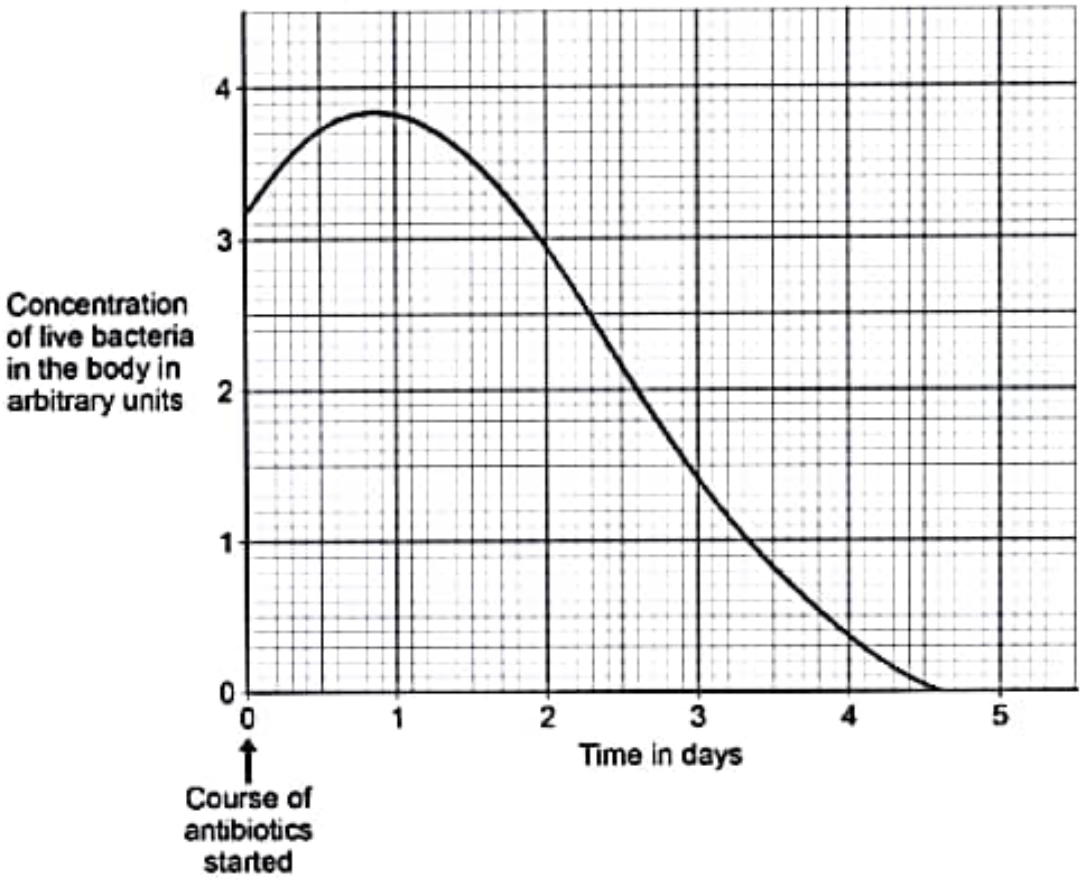
[1 mark]

Penicillin

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



Do not write outside the box

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]

only a few bacteria killed so live bacteria continued to reproduce

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]

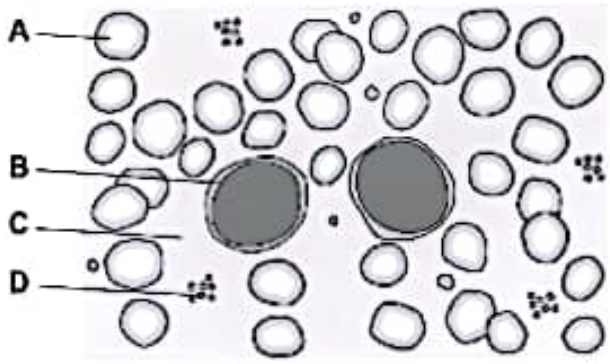
To reduce antibiotics resistance in bacteria

Question 5 continues on the next page

Do not write outside the box

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 ☑

9

Do not write outside the box

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]

cell	chromosome	gene	nucleus

Smallest

GENE

CHROMOSOMES

NUCLEUS

CELL

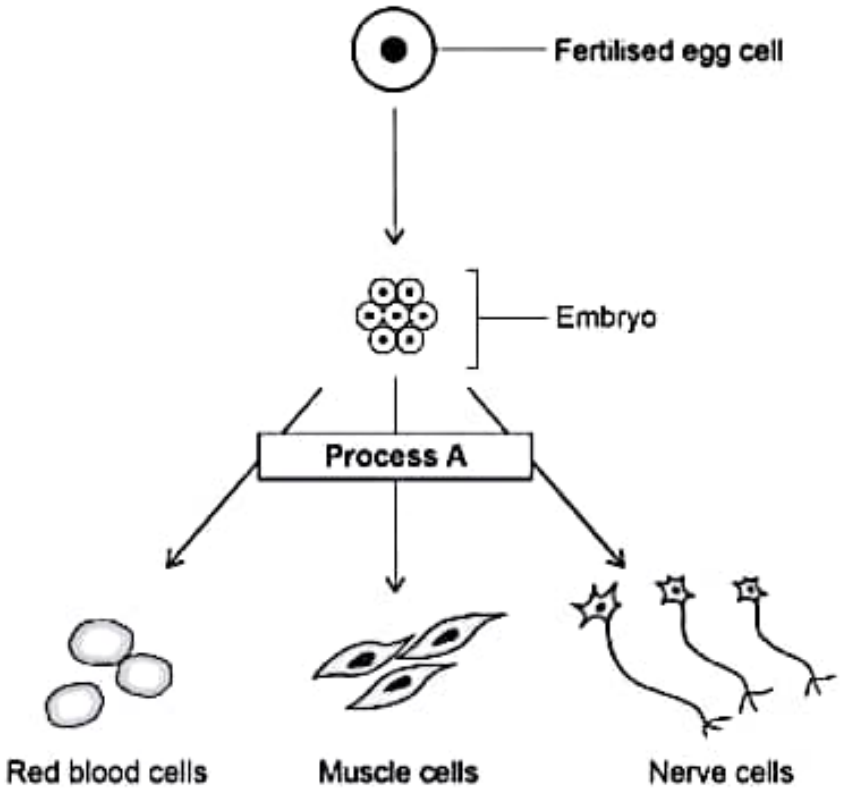
Largest

Question 6 continues on the next page

Do not write outside the box

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

Figure 9



0 6 . 2 Name Process A.

[1 mark]

Differentiation

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

[1 mark]

Number of cell divisions = 4

Do not write outside the box

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

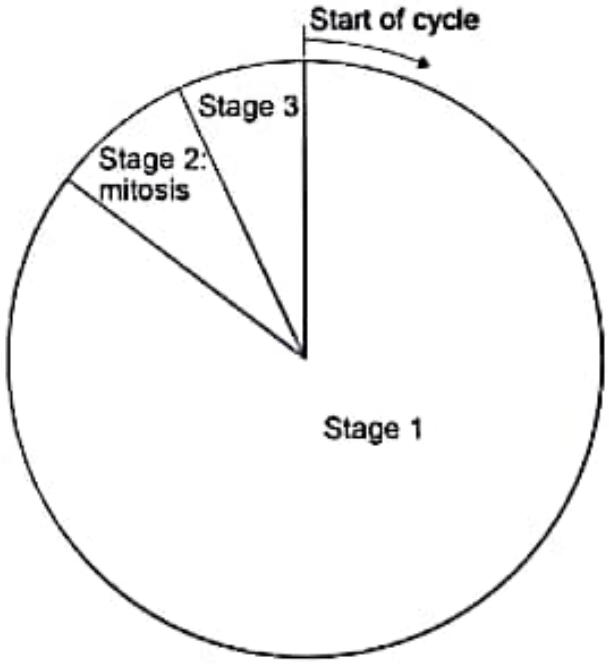
How many chromosomes will there be in each of the embryo cells?

[1 mark]

46

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 DNA replicates

Stage 2 Two nuclei are formed

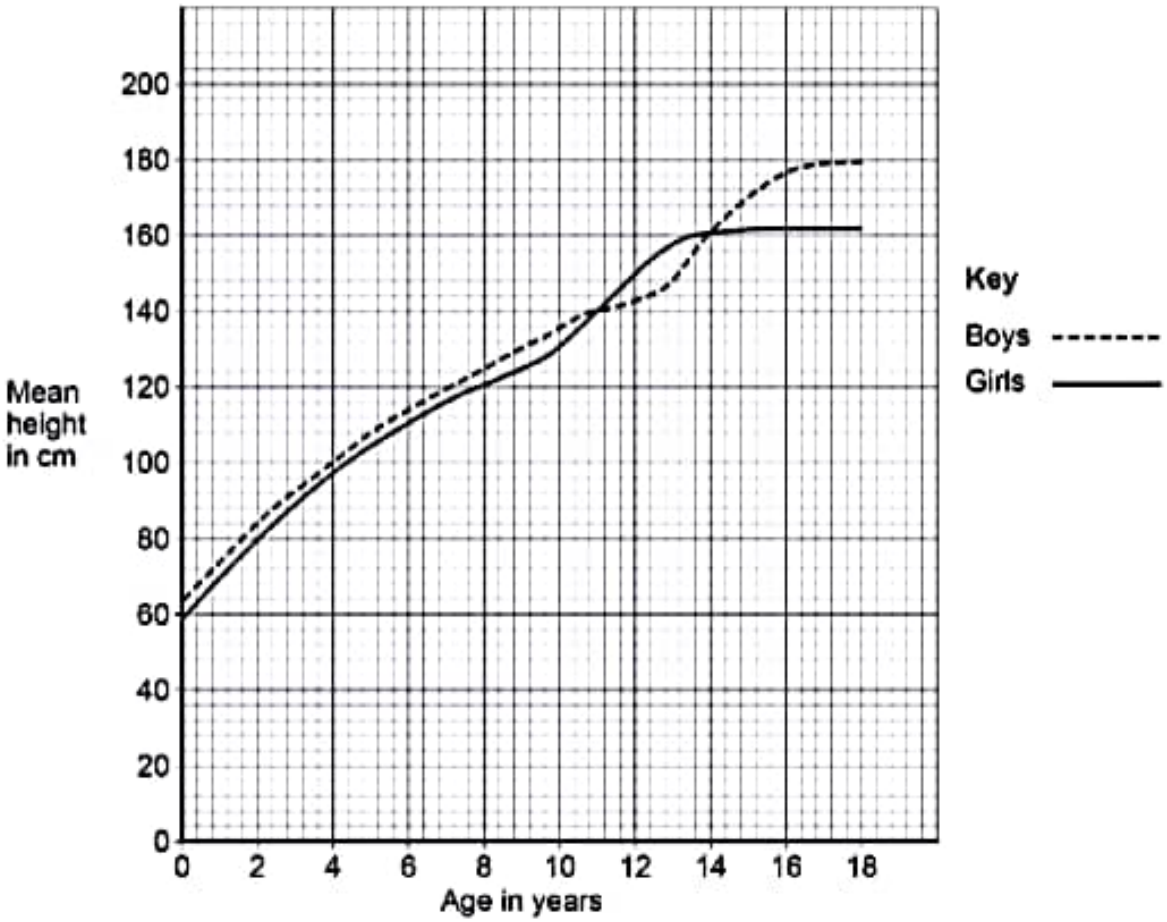
Stage 3 two cells are formed

Do not write outside the box

Cell division is important in the growth of multicellular organisms.

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

Figure 11



Do not write outside the box

Compare the growth of boys with the growth of girls.

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

[6 marks]

General comparisons:
- boys height at birth (slightly) greater than girls height
- boys are (slightly) taller than girls up to age 11
- correct height comparisons eg boys are approximately 4 / 5 cm taller than girls up to age 11
- girls and boys are the same height at age 11
- girls are taller than boys between age 11 and age 14
- girls and boys are the same height at age 14
- boys are taller than girls above age 14
- correct height comparisons eg boys are 5 to 18 cm taller than girls above age 14
- boys (eventually) grow taller than girls
- boys carry on growing for a longer time than girls
- girls stop growing age 13 / 14 / 15 and boys stop growing age 17 / 18

0 6 . 7 Give **one** way that cell division by mitosis is important in **fully grown** animals.

[1 mark]

Replacement of cells

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END OF QUESTIONS