A

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

GCSE

COMBINED SCIENCE: TRILOGY

Foundation Tier

Biology Paper 1F

F

8464/B/1F

Time allowed: 1 hour 15 minutes

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

JUN228464B1F01

For this paper you must have:

- **a ruler**
- **a scientific calculator**
- **the Diagram Booklet.**

INSTRUCTIONS

- **Use black ink or black ball-point pen.**
- **Pencil should only be used for drawing.**
- **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.**

DO NOT TURN OVER UNTIL TOLD TO DO SO

0 1

Foods are digested before they are absorbed into the blood.

FIGURE 1, in the Diagram Booklet, shows organs in the human digestive system.

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**

[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

[Turn over]

0 1 . 7

Give ONE safety precaution a student should take when using Benedict's solution. [1 mark]

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]

_____

_____

_____

0 2

FIGURE 2, in the Diagram Booklet, shows a section through a leaf.

0 2 . 1

Give ONE way that the palisade layer is adapted for photosynthesis. [1 mark]

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**

[Turn over]

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 = _____ mm

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

1 mm = 1000 µm

Real length = _____ µm

[Turn over]

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**

FIGURE 3, in the Diagram Booklet, shows a diagram of four cells.

Each cell is surrounded by carbon dioxide molecules.

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 _____

_____

_____

[Turn over]

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

FIGURE 4, in the Diagram Booklet, 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 _____

_____

0 2 . 7

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

1 _____

_____

_____

2 _____

_____

[Turn over]

TABLE 2 shows the results.

TABLE 2

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

0 2 . 8

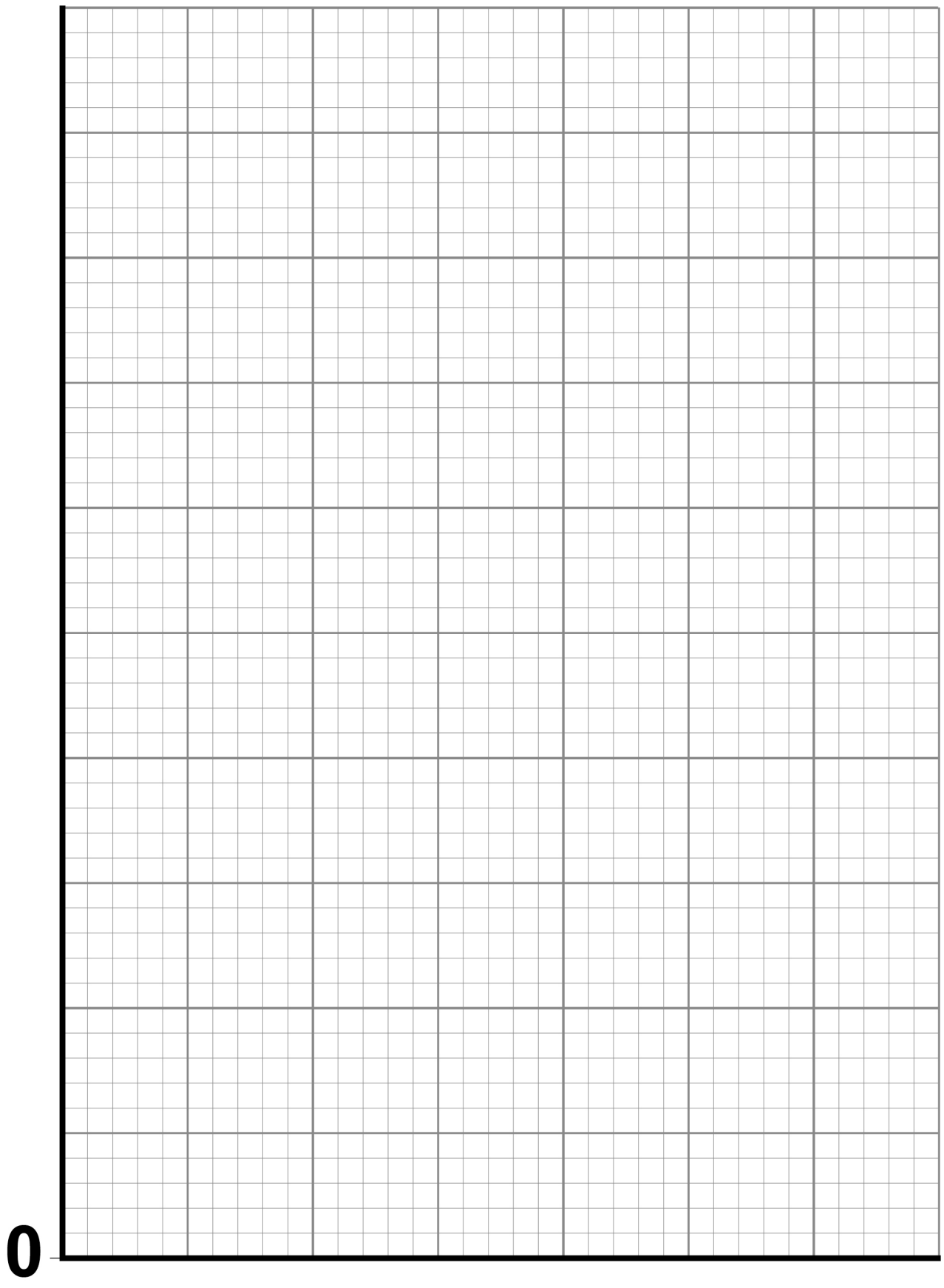
Complete FIGURE 5, on the opposite page.

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



[Turn over]

REPEAT OF TABLE 2

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

0 2 . 9

Look at TABLE 2, on the opposite page.

What colour of light should be used to grow plants in a greenhouse? [1 mark]

Tick (✓) ONE box.

☐ **Blue**

☐ **Green**

☐ **Red**

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]

0 3 . 3

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

BLANK PAGE

[Turn over]

0 3 . 4

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

On the opposite page, draw ONE line from each method of control to the explanation of how it works. [2 marks]

METHOD OF CONTROL	EXPLANATION
	Creates a barrier to the movement of pathogens
Remove and burn infected leaves	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

[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]

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

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**

[Turn over]

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]

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]

[Turn over]

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]

_____

_____

_____

FIGURE 6, in the Diagram Booklet, 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.

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 = _____

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]

[Turn over]

0 4 . 8

Give ONE conclusion from the data in FIGURE 6, in the Diagram Booklet. [1 mark]

0 4 . 9

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

Suggest TWO reasons why. [2 marks]

1

2 _____

_____

_____

10

[Turn over]

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]

0 5 . 3

What is the name of the first antibiotic developed? [1 mark]

[Turn over]

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

FIGURE 7, in the Diagram Booklet, shows how the concentration of live bacteria in the child's body changed when taking the course of antibiotics.

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]

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**

[Turn over]

0 5 . 6

Suggest why doctors do NOT give antibiotics to patients with minor infections. [1 mark]

FIGURE 8, in the Diagram Booklet, shows blood viewed using a microscope.

0 5 . 7

A vaccine will stimulate the production of antibodies.

Which part of the blood in FIGURE 8, in the Diagram Booklet, produces antibodies? [1 mark]

Tick (✓) ONE box.

- ☐ **A**
- ☐ **B**
- ☐ **C**
- ☐ **D**

[Turn over]

0 5 . 8

Which part of the blood in FIGURE 8, in the Diagram Booklet, starts the clotting process? [1 mark]

Tick (✓) ONE box.

- ☐ **A**
- ☐ **B**
- ☐ **C**
- ☐ **D**

9

BLANK PAGE

[Turn over]

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

_____

_____

_____

Largest _____

FIGURE 9, in the Diagram Booklet, shows how a fertilised egg cell can produce specialised cells.

0 6 . 2

Name PROCESS A. [1 mark]

---

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 = _____

[Turn over]

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, in the Diagram Booklet, represents a cell cycle for a human embryonic cell.

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.

0 6 . 6

FIGURE 11, in the Diagram Booklet, shows the mean height of boys and of girls from birth to age 18 years.

Compare the growth of boys with the growth of girls.

Use data from FIGURE 11 in your answer. [6 marks]

[Turn over]

0 6 . 7

Give ONE way that cell division by mitosis is important in FULLY GROWN animals. [1 mark]

END OF QUESTIONS

14

Additional page, if required.

Write the question numbers in the left-hand margin.

Additional page, if required.

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Write the question numbers in the left-hand margin.

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For Examiner's Use	
Question	Mark
1	
2	
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