Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

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4117974062

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **May/June 2023**

1 hour

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Any blank pages are indicated.

DC (LK/SG) 316021/3

1 A student investigated the nutrient content of three types of drink:

- drink **A**
- drink **B**
- drink **C**.

The student used these methods for the three tests on each of the drinks:

Test 1 Testing for reducing sugars:

- Label three test-tubes **A**, **B** and **C**.
- Put 1 cm^3 of drink **A** into test-tube **A**.
- Put 1 cm^3 of drink **B** into test-tube **B**.
- Put 1 cm^3 of drink **C** into test-tube **C**.
- Add 1 cm^3 of Benedict's reagent to each test-tube.
- Put all three test-tubes into a hot water-bath.
- Start the stop-clock and leave the test-tubes in the water-bath for five minutes.
- After five minutes, remove the test-tubes from the water-bath.
- Observe and record the colours in each test-tube.

Test 2 Testing for starch:

- Place two drops of each drink onto a white tile.
- Add two drops of iodine solution to each drink sample.
- Observe and record the colours on the tile for each sample.

Test 3 Testing for protein:

- Label three test-tubes **A**, **B** and **C**.
- Put 1 cm^3 of drink **A** into test-tube **A**.
- Put 1 cm^3 of drink **B** into test-tube **B**.
- Put 1 cm^3 of drink **C** into test-tube **C**.
- Add 1 cm^3 of biuret reagent to each drink sample.
- Observe and record the colours in each test-tube.

(a) The student's observations are shown in Fig. 1.1.

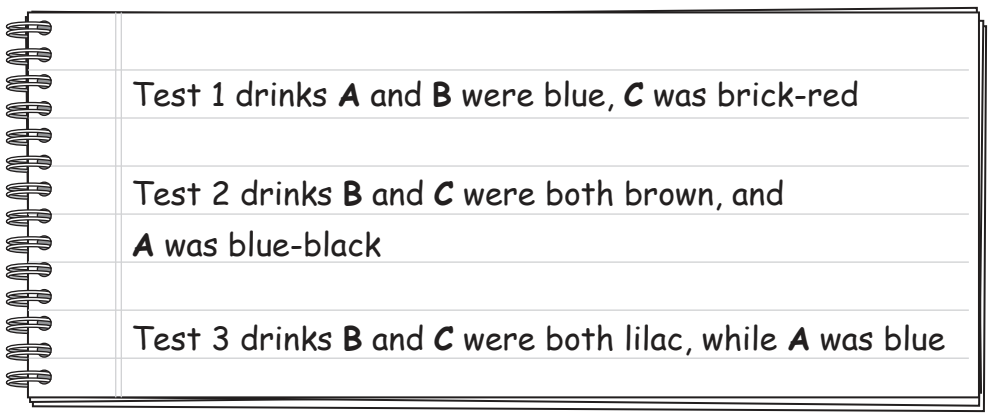

Fig. 1.1

(i) Prepare a table to record the **colours observed** by the student for all three tests for each drink.

Do **not** include conclusions in your table.

[4]

(ii) State which nutrients are present in each drink.

drink **A** .....

drink **B** .....

drink **C** .....

[3]

(iii) Identify **one** safety hazard associated with **Test 1**.

.....

.....

..... [1]

(b) The vitamin C content and the fat content of three other drinks **D**, **E** and **F** were determined.

It was found that:

- drink **D** contained vitamin C
- drink **E** contained fat
- drink **F** contained vitamin C and fat.

(i) State the reagent used when testing for vitamin C.

..... [1]

(ii) Describe the method for the emulsion test for fats.

.....

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.....

.....

..... [2]

(iii) The results for **one** of the drinks are shown in Table 1.1.

Table 1.1

test	observation
vitamin C	the solution is colourless
fat	a white emulsion has formed

Identify the drink from the results provided in Table 1.1.

drink ..... [1]

(iv) Explain how you identified the drink from the results provided in Table 1.1.

.....

.....

..... [1]

(c) Three types of food contain different concentrations of the enzyme catalase.

Catalase catalyses the breakdown of hydrogen peroxide to release water and oxygen gas:

hydrogen peroxide $\longrightarrow$ water + oxygen

The production of oxygen gas can be used to measure the activity of the enzyme.

Plan an investigation to compare the concentrations of catalase in the three types of food.

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..... [6]

[Total: 19]

2 **(a)** The nutrient content of foods can affect a person's bones.

In a study, the diet and bone density of 120 women were monitored for two years. The women were all between 50 and 70 years of age.

The scientists:

- calculated the mean daily calcium intake for each woman
- measured the change in density of one of their bones by using X-ray scans.

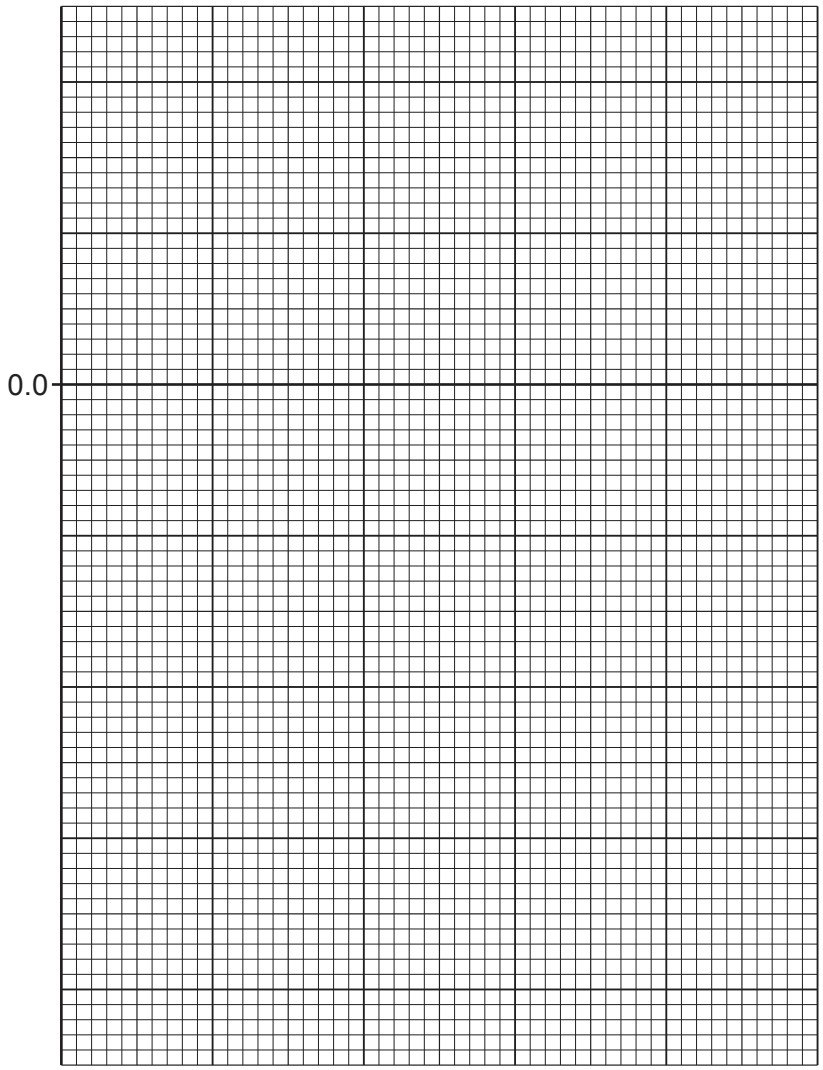
The results for five of the women are shown in Table 2.1.

Table 2.1

mean daily calcium intake for each woman / mg per day	mean change in bone density / mg per cm^2 per year
250	–8.6
750	–5.4
1250	–1.2
1750	+1.2
2250	+4.2

(i) Plot a line graph on the grid of the data in Table 2.1.

One axis has been started for you.



[4]

(ii) State **two** conclusions for the data in your graph.

1 .....

.....

.....

2 .....

.....

.....

[2]

(iii) Identify the independent variable in this investigation.

..... [1]

(iv) Describe **two** variables that the scientists should have considered when selecting women for the study.

1 .....

.....

2 .....

.....

[2]

(v) Suggest a reason for a large number of women (120) being included in the study.

.....

.....

..... [1]

(vi) State **one** way this study is **not** representative of the population.

.....

.....

..... [1]

(vii) A student stated that more women were losing bone mass than were gaining bone mass.

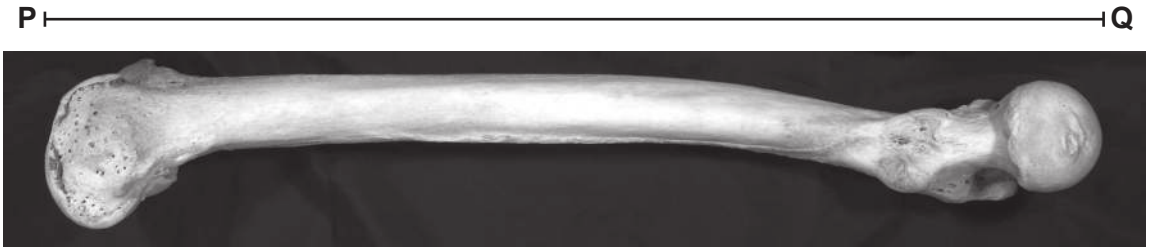
Explain why this statement may **not** be correct for the data in this study.

.....

.....

..... [1]

(b) Fig. 2.1 is a photograph of a femur, which is a bone in the leg.



magnification ×0.3

Fig. 2.1

(i) Make a large drawing of the bone shown in Fig. 2.1.

[4]

(ii) The length of line **PQ** represents the length of the femur in Fig. 2.1.

Measure the length of line **PQ** on Fig. 2.1.

length of line **PQ** on Fig. 2.1 ..... mm

Use your measurement and the formula to calculate the actual length of the bone.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ} \text{ on Fig. 2.1}}{\text{actual length of the bone}}$$

Give your answer to **three** significant figures.

Space for working.

..... mm
[3]

(iii) Fig. 2.2 shows a bone from a person who had vitamin D deficiency.

magnification ×0.3

Fig. 2.2

State **two** ways the bone in Fig. 2.2 is different from the bone in Fig. 2.1.

1 .....

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2 .....

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[2]

[Total: 21]

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