AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
COMBINED SCIENCE: TRILOGY

F

Foundation Tier
Biology Paper 2F

Friday 7 June 2019 Afternoon 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.
- Fill in the boxes at the top of this page.
- 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.
- 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	
3	
4	
5	
6	
7	
TOTAL	

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0 1 Conditions inside the human body are controlled.

0 1 . 1 What is the control of conditions inside the body called?

[1 mark]

Tick (✓) **one** box.

Excretion ☐

Fertilisation ☐

Homeostasis ☐

Osmosis ☐

0 1 . 2 What are the **two** ways information is sent to control body conditions?

[2 marks]

Tick (✓) **two** boxes.

By antigens ☐

By hormones ☐

By muscles ☐

By nerve impulses ☐

By red blood cells ☐

0 1 . 3 One condition in the body that needs to be controlled is the level of water.

Give **one** other condition in the human body that needs to be controlled.

[1 mark]

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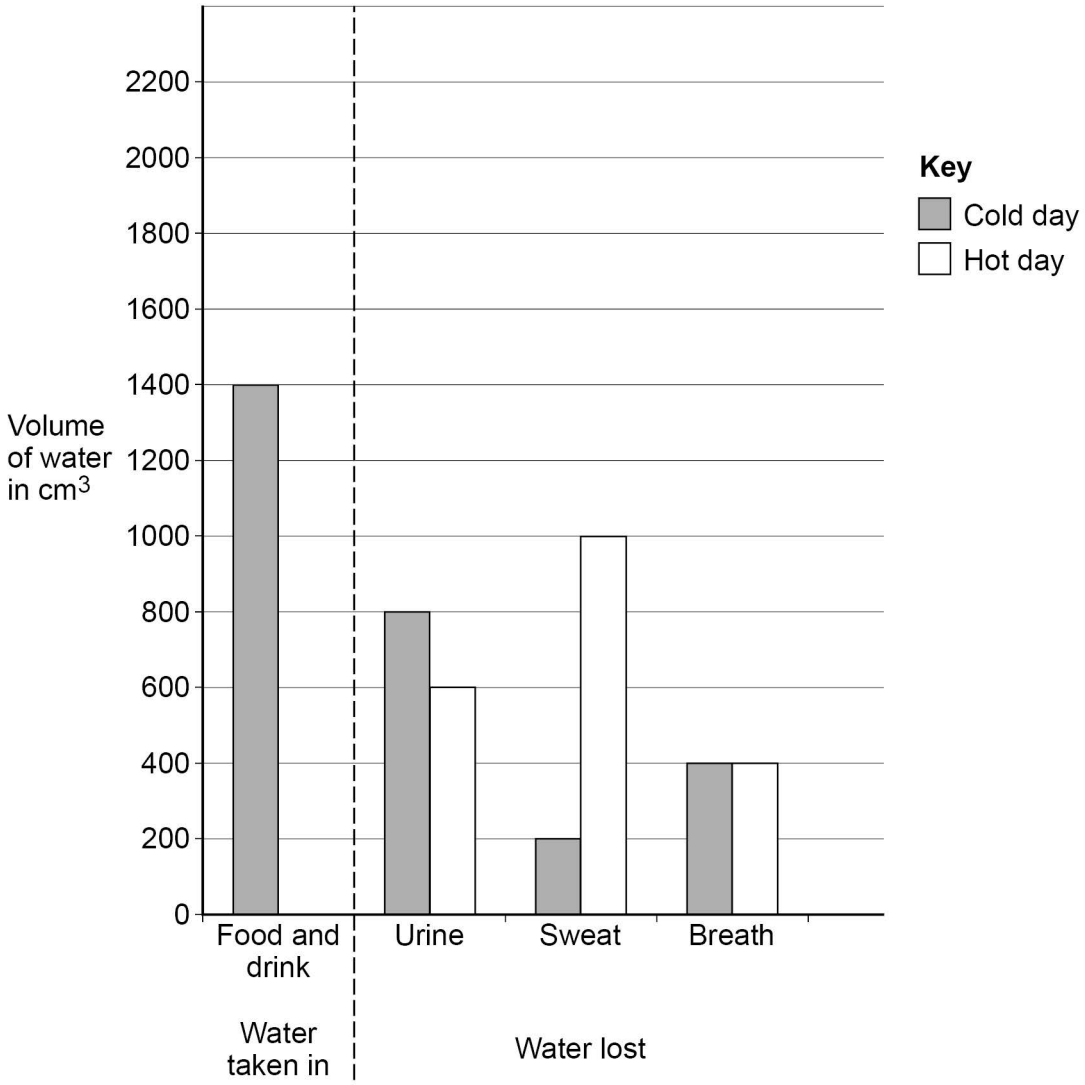
Figure 1 shows the volumes of water taken in and lost by one person.

The volume for water taken in on a hot day has **not** been plotted on the bar graph.

Figure 1



0 1 . 4 The person lost 1400 cm^3 of water on the cold day.

How much extra water did they lose on the hot day?

[2 marks]

Extra volume of water lost = _____ cm^3

Turn over ►

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0 1 . 5 Explain why the volume of water lost on a hot day is higher than on a cold day.

[2 marks]

0 1 . 6 A boy drank 750 cm^3 of water.

His total intake of water for that day was 3000 cm^3

Calculate the percentage of the boy's total intake that the 750 cm^3 represents.

[2 marks]

Percentage = _____ %

10

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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0 2 Some students estimated the population of daisy plants in a field.

This is the method used.

1. Place a quadrat randomly on the field.
2. Count and record the number of daisy plants in the quadrat.
3. Repeat steps 1 and 2 another four times.

0 2 . 1 How could the students have made sure the quadrats were placed randomly?

[1 mark]

0 2 . 2 Describe the piece of equipment called a quadrat.

[1 mark]

Table 1 shows the results.

Table 1

Quadrat number	Number of daisy plants
1	8
2	11
3	4
4	6
5	16
Mean	**X**

0 2 . 3 Calculate mean value **X**.

[1 mark]

X = _____ daisy plants

Do not write outside the box

0 2 . 4 The field is a rectangle 100 m wide and 150 m long.

Calculate the area of the field.

[1 mark]

Area = _____ m^2

0 2 . 5 The quadrat used by the students had an area of 1.0 m^2

Estimate the population of daisy plants in the field.

Use your answers to Question **02.3** and Question **02.4**

[2 marks]

Estimated population = _____ daisy plants

0 2 . 6 More daisy plants grew in some parts of the field compared to other areas of the field.

Give **two** biotic factors that may affect where daisy plants grow in the field.

[2 marks]

1 _____

2 _____

0 2 . 7 The students noticed that the daisy plants growing near a building were smaller.

Explain why smaller daisy plants grew near the building.

[2 marks]

10

Turn over ►

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0 3 Animals have adaptations to survive in their environment.

These adaptations may be structural, behavioural or functional.

0 3 . 1 Draw **one** line from each animal adaptation to the type of adaptation it is.

[2 marks]

Animal adaptation	**Type of adaptation**
 Male palm cockatoos use sticks to beat on hollow branches to attract females.	Structural
 The harmless hornet moth has black and yellow stripes to look like a bee or wasp.	Behavioural
 Sea spiders have automatic muscle contractions that move oxygen around their bodies.	Functional

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Plants also have adaptations.

Orchid plants have adaptations which make them one of the most successful plant groups.

Orchids rely on insects for pollination.

Figure 2 shows an orchid.

Figure 2

0 3 . 2 Which **two** features help orchids survive?

[2 marks]

Tick (✓) **two** boxes.

- Brightly coloured flowers ☐
- Large quantities of pollen ☐
- No scent ☐
- Oval shaped leaves ☐
- Small leaves ☐

Turn over ►

Do not write outside the box

Many orchid species grow in tropical rainforest ecosystems.

0 3 . 3 What name describes the variety of all the different species found in an ecosystem?

[1 mark]

Tick (✓) **one** box.

- Biodiversity ☐
- Evolution ☐
- Feeding relationship ☐
- Habitat ☐

0 3 . 4 Some species of orchid may become extinct because of deforestation.

Give **one** reason why tropical rainforests are being cut down.

[1 mark]

_____

0 3 . 5 Give **one** factor that might cause a species of orchid to become extinct.

Do **not** refer to deforestation in your answer.

[1 mark]

_____

Scientists have analysed the entire genetic material of one species of orchid.

0 3 . 6 What chemical is the genetic material made from?

[1 mark]

_____

0 3 . 7 What is the name for the entire genetic material of an organism?

[1 mark]

_____

9

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0 4 A cat breeder noticed that four kittens from one Siamese cat mother had a new blue colour at the tip of their tails.

0 4 . 1 What has caused the new colour to appear?

[1 mark]

Tick (✓) **one** box.

Fertilisation ☐

Mitosis ☐

Mutation ☐

0 4 . 2 The cat breeder wants to use selective breeding so that all new kittens have blue tail tips.

Describe the process of selective breeding the cat breeder could use.

[3 marks]

0 4 . 3 Suggest **one** reason why the cat breeder wants to have all new kittens with the blue tail tips.

[1 mark]

Do not write outside the box

0 4 . 4 Siamese cats can suffer from heart defects.

Why might there be more Siamese cats with heart defects amongst the kittens with blue tail tips?

[1 mark]

Tick (✓) **one** box.

They are clones ☐

They are formed by mitosis ☐

They are formed by sexual reproduction ☐

They are produced by inbreeding ☐

With each pregnancy, the cat breeder expected that:

- 50% of the kittens would be male
- 50% of the kittens would be female.

The sex chromosomes in cats are inherited in the same way as in humans.

The sex chromosomes are X and Y.

0 4 . 5 Give the combination of sex chromosomes present in a male cat and in a female cat.

[1 mark]

Male cat _____

Female cat _____

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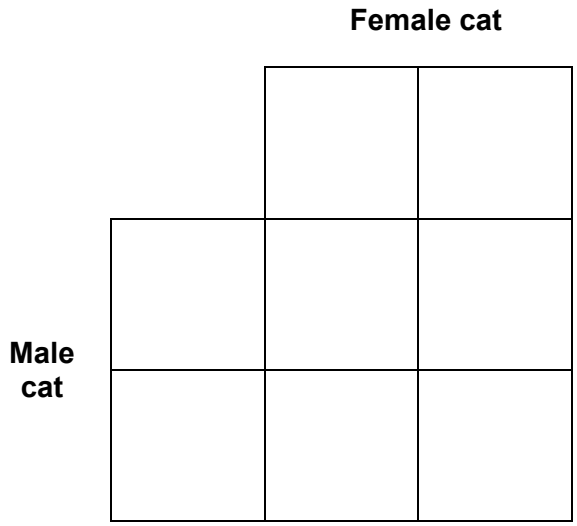
0 4 . 6 The cat breeder expected 50% male kittens and 50% female kittens.

Complete the Punnett square in **Figure 3** to show why.

[2 marks]

Figure 3



0 4 . 7 In the first pregnancy there was one male kitten and three female kittens.

Give the reason why there were **not** two kittens of each sex.

[1 mark]

10

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0 5 **Figure 4** shows a food chain in a garden.

Figure 4

bean plant → blackfly → spider → blackbird

0 5 . 1 Which term describes the spider in this food chain?

[1 mark]

Tick (✓) **one** box.

Primary consumer ☐

Producer ☐

Secondary consumer ☐

Tertiary consumer ☐

0 5 . 2 Many of the spiders in the garden died.

What is likely to happen to the number of blackflies in the garden?

[1 mark]

Tick (✓) **one** box.

Decrease ☐

Increase ☐

Stay the same ☐

0 5 . 3 Give a reason for your answer to Question **05.2**

[1 mark]

_____

_____

Turn over ►

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Table 2 shows the estimated biomass of organisms in the garden.

Table 2

Organism	Biomass in g
Bean plants	225
Blackflies	115
Spiders	65
Blackbirds	10

0 5 . 4 What conclusion can be made about biomass in food chains?

[1 mark]

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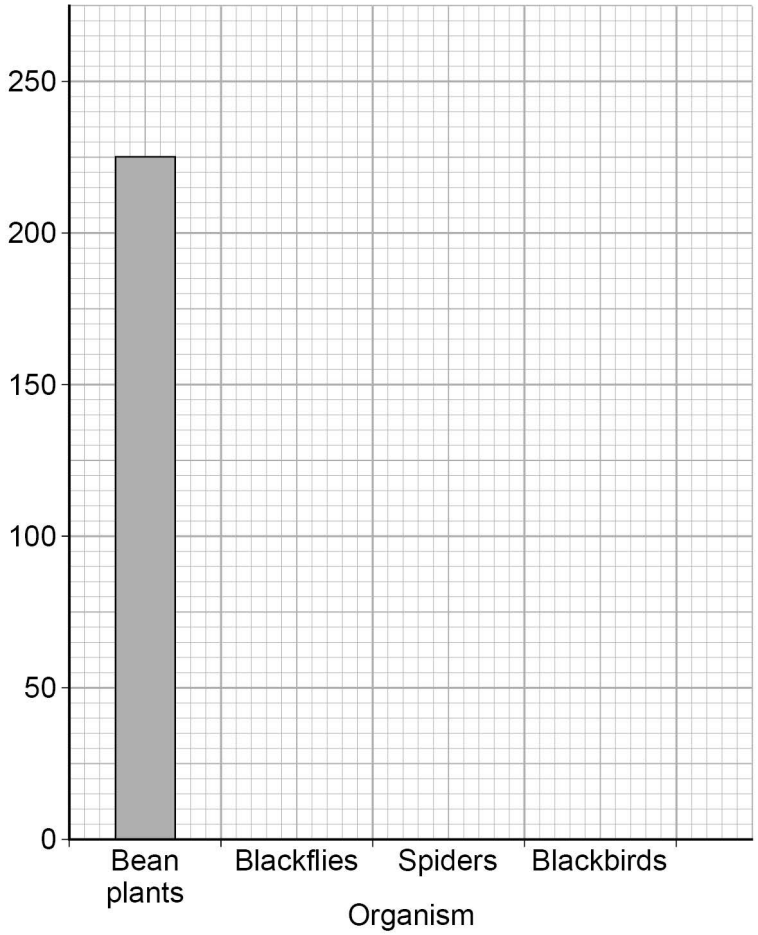
0 5 . 5 Complete **Figure 5**.

You should:

- label the y-axis
- plot the data from **Table 2**.

[3 marks]

Figure 5



0 5 . 6 Explain why a garden is **not** a stable community.

[2 marks]

9

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0 6 Some students investigated the effect of drinking caffeine on reaction time.

They used a drink containing 32.25 mg of caffeine per 100 cm^3

This is the method used.

1. Divide the students into four groups, **A**, **B**, **C** and **D**.
2. Measure and record the reaction time of each student using the ruler-drop test.
3. Students in:
   - group **A** drink 200 cm^3 of water
   - group **B** drink 200 cm^3 of the caffeine drink
   - group **C** drink 400 cm^3 of the caffeine drink
   - group **D** drink 600 cm^3 of the caffeine drink.
4. Repeat step 2 after 15 minutes.

0 6 . 1 Describe how to do the ruler-drop test.

[3 marks]

Question 6 continues on the next page

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0 6 . 2 **Table 3** shows the mass of caffeine taken in by each student.

Table 3

Group	Mass of caffeine in mg
A	0
B	64.5
C	129.0
D	**X**

Calculate value **X**.

[1 mark]

X = _____ mg

0 6 . 3 Why did group **A** drink water instead of the caffeine drink?

[1 mark]

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Table 4 was used to convert the results of the ruler-drop test into reaction times.

Table 4

Distance in cm	Reaction time in s	Distance in cm	Reaction time in s
2	0.064	28	0.239
4	0.090	30	0.247
6	0.111	32	0.256
8	0.128	34	0.263
10	0.143	36	0.271
12	0.156	38	0.278
14	0.169	40	0.286
16	0.181	42	0.293
18	0.192	44	0.300
20	0.202	46	0.306
22	0.212	48	0.313
24	0.221	50	0.319
26	0.230	52	0.326

0 6 . 4 Estimate the reaction time for a student who recorded a distance of 23 cm

[1 mark]

Reaction time = _____ s

Question 6 continues on the next page

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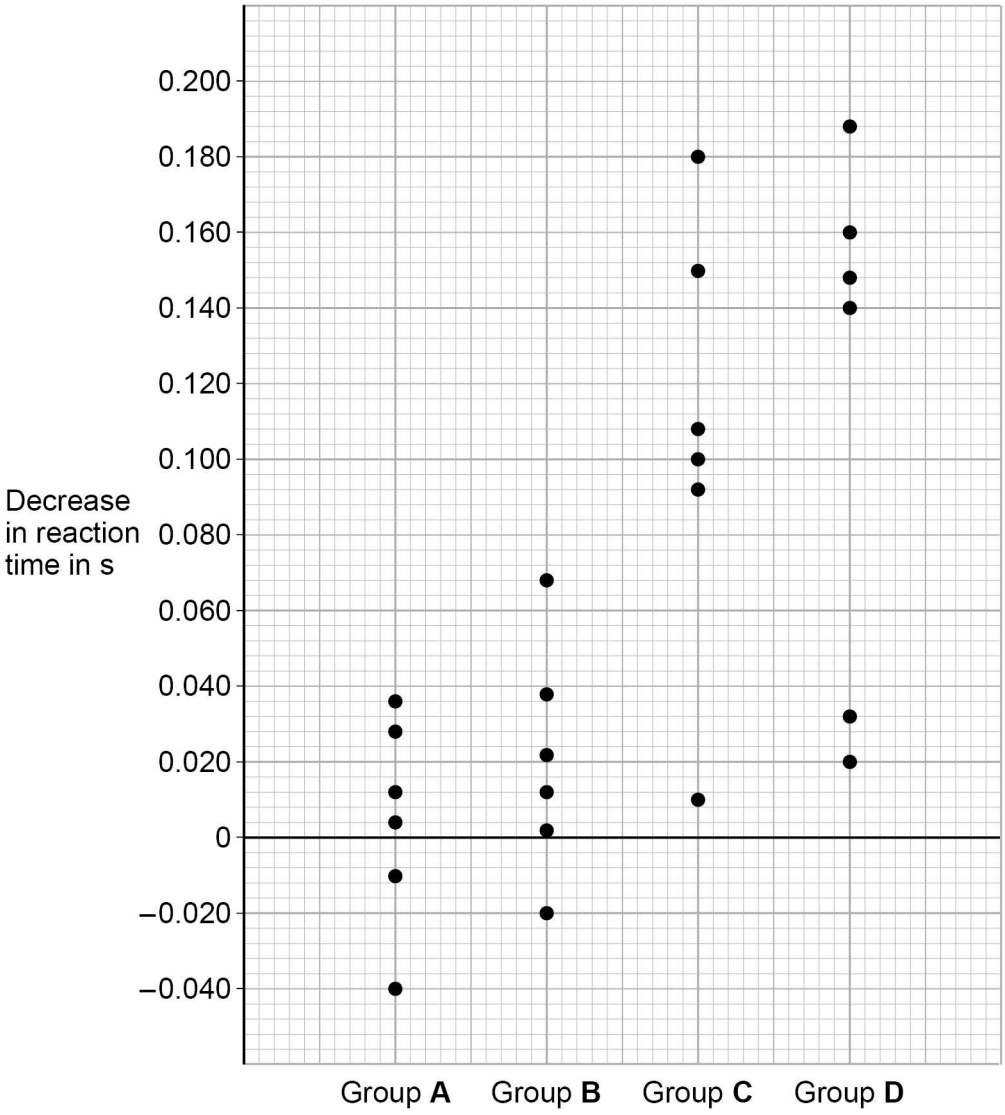
Students calculated the decrease in their reaction time after the drink compared with before the drink.

Figure 6 shows the results for each student.

Figure 6



0 6 . 5 Describe the effect of the mass of caffeine taken in on the decrease in reaction time.

[1 mark]

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0 6 . 6 For three students the decrease in reaction time was negative.

Give the reason why the value was negative.

[1 mark]

0 6 . 7 What is the range of results for group **C**?

[1 mark]

0 6 . 8 Suggest **two** variables that should have been controlled in this investigation.

[2 marks]

1

2

0 6 . 9 Explain why the ruler-drop test does **not** involve a reflex action.

[2 marks]

13

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0 7 There has been a rapid increase in the percentage of carbon dioxide in the atmosphere since 1960.

0 7 . 1 Carbon dioxide is a greenhouse gas that contributes to global warming.

Name **one** other greenhouse gas.

[1 mark]

0 7 . 2 Global warming causes climate change.

Give **two** effects of climate change.

[2 marks]

1

2

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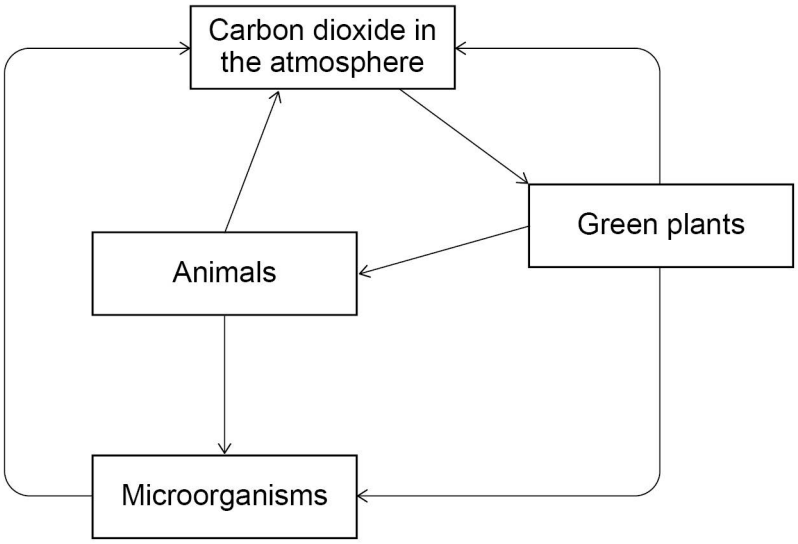
0 7 . 3 Plants take in carbon dioxide from the atmosphere.

Figure 7 shows part of the carbon cycle.

Figure 7



Describe how carbon from the atmosphere is cycled through living organisms.

[6 marks]

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END OF QUESTIONS

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