



Surname _____

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Centre Number _____

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Candidate Signature _____

**GCSE
COMBINED SCIENCE: SYNERGY**

H

**Higher Tier Paper 1 Life and environmental sciences
8465/1H**

Tuesday 14 May 2019

Afternoon

Time allowed: 1 hour 45 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]



J U N 1 9 8 4 6 5 1 H 0 1

For this paper you must have:

- **a ruler**
- **a protractor**
- **a scientific calculator**
- **the periodic table (enclosed)**
- **the Physics Equations Sheet (enclosed).**



INSTRUCTIONS

- Use black ink or black ball-point pen.
- Answer ALL questions in the spaces provided. Do not write on blank pages.
- 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 100.
- 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



Answer ALL questions in the spaces provided.

0 1

Grey wolves ('Canis lupus') can be found in the USA.

0 1 . 1

Give the genus name of the grey wolf. [1 mark]

0 1 . 2

Describe how biological classification systems have changed over time. [4 marks]



0 1 . 3 Population and community are terms used to describe the organisms in an area.

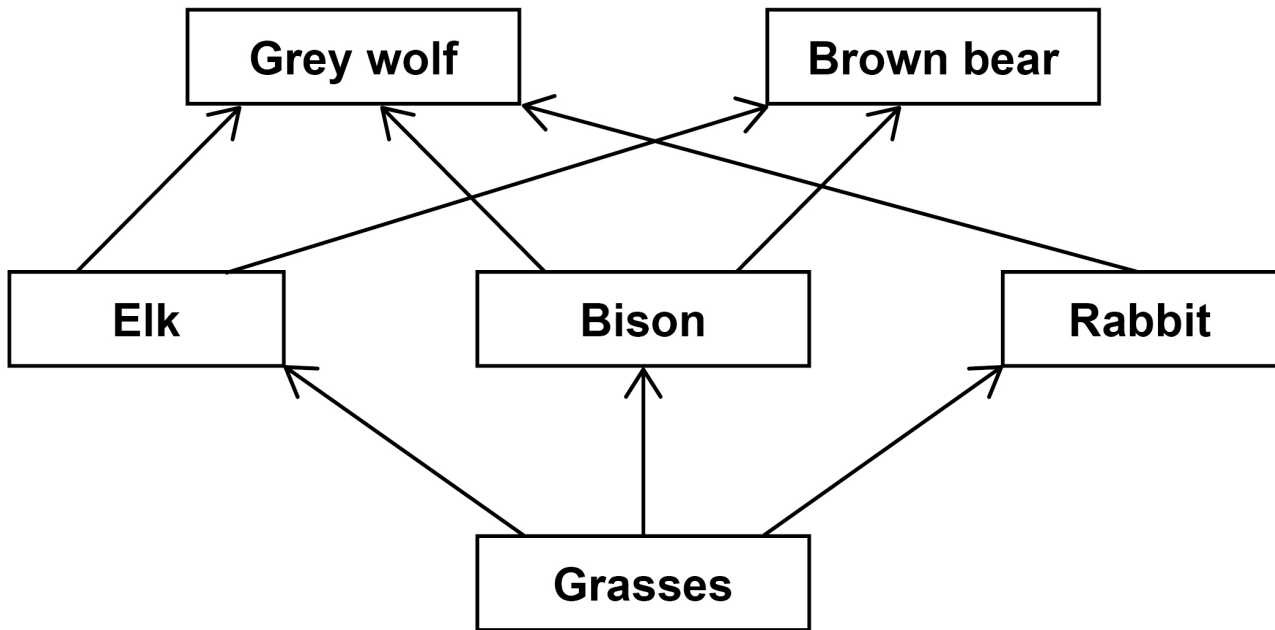
Describe the difference between the terms population and community. [2 marks]

[Turn over]



FIGURE 1 shows part of a food web.

FIGURE 1



0 1 . 4 Look at FIGURE 1.

Explain how killing all the grey wolves could affect the populations of the other organisms.

[6 marks]

[Turn over]





In Yellowstone Park in the USA, grey wolves were hunted and killed until there were none left by 1926.

Grey wolves were reintroduced to Yellowstone Park in 1995.

The wolves came from several family groups in different parts of Canada.

0 1 . 5 Why should scientists select animals from more than one area for reintroduction programmes? [1 mark]

Tick (✓) ONE box.

To reduce the effect of inbreeding

To choose similar characteristics

To reduce genetic diversity

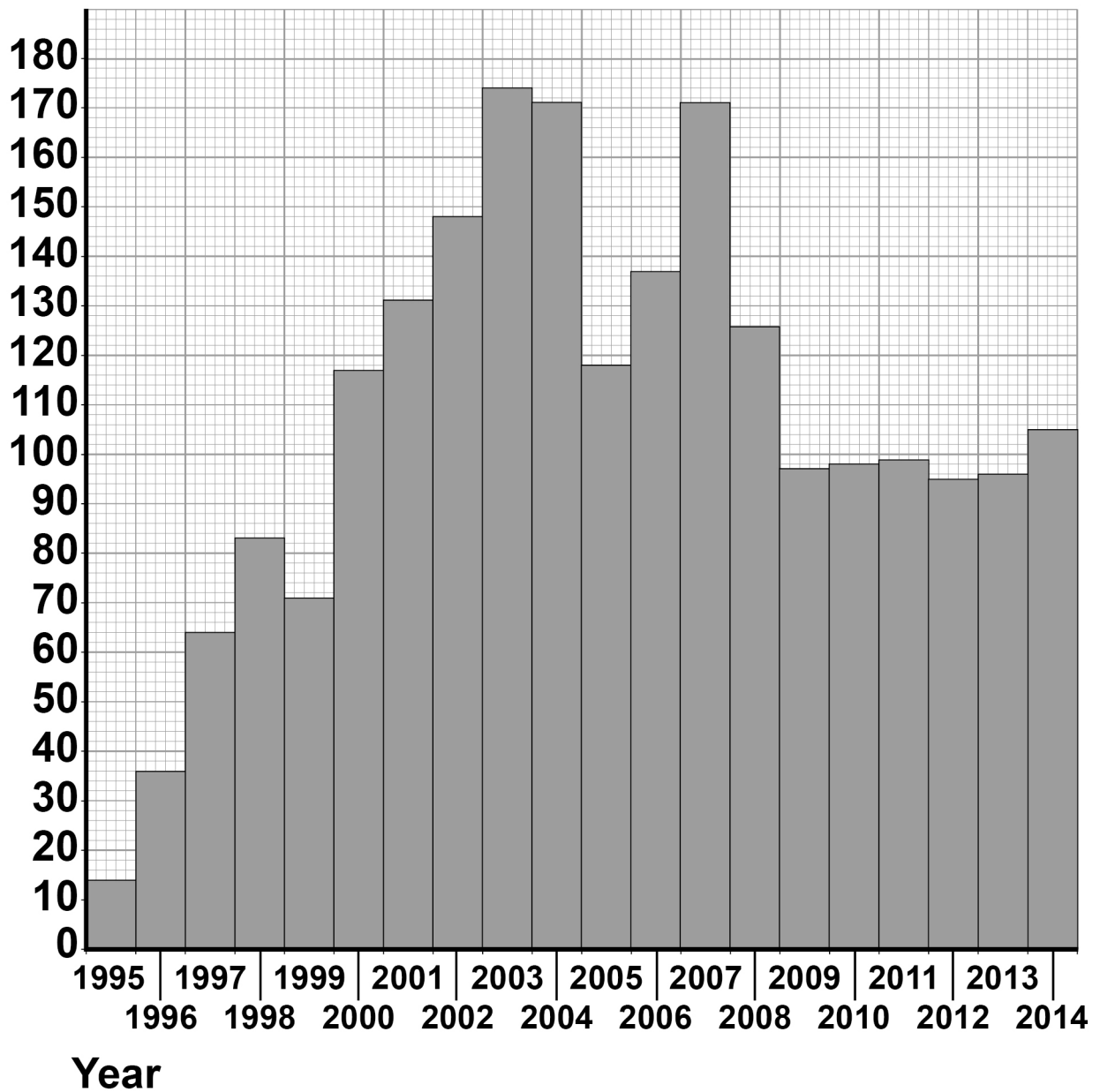
[Turn over]



FIGURE 2 shows the change in the population of grey wolves in Yellowstone Park since 1995.

FIGURE 2

**Population
of grey
wolves**



0 1 . 6 The wolf population in 2014 was greater than the wolf population in 1995.

Calculate how many times greater. [1 mark]

Number of times greater = _____

0 1 . 7 Scientists now believe the population of wolves in Yellowstone Park is NOT likely to decrease to zero.

Describe how the data since 2009 support this belief. [1 mark]

[Turn over]

16



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0 2**Polonium is an element with 33 isotopes.****0 2 . 1****What is the difference between isotopes of the same element? [1 mark]****Tick (✓) ONE box.****The number of electrons****The number of neutrons****The number of protons****[Turn over]**

0 2 . 2 An isotope of polonium is ${}_{84}^{210}\text{Po}$ (polonium-210).

Polonium-210 emits alpha radiation.

Alpha particles can be represented by the symbol ${}_{2}^{4}\text{He}$

An alpha particle consists of sub-atomic particles.

What are these sub-atomic particles? [2 marks]

Tick (✓) TWO boxes.

Electrons

Gamma rays

Neutrons

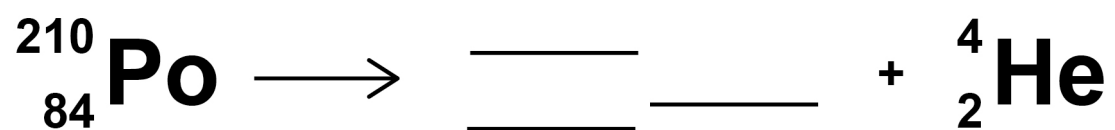
Protons

X-rays



0 2 . 3 Complete the nuclear equation to show the radioactive decay of polonium-210

Use the periodic table to help you. [3 marks]



[Turn over]

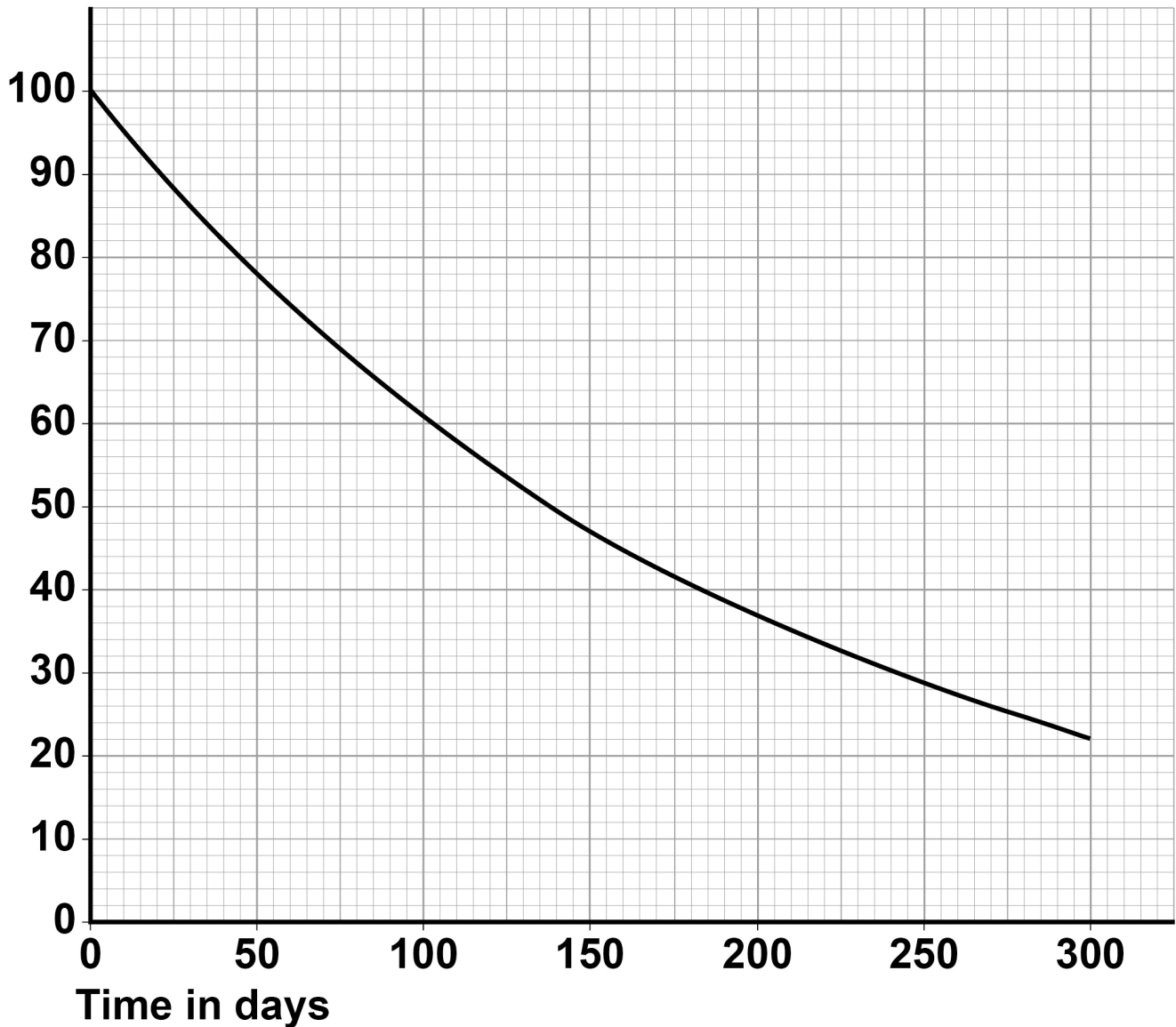


02.4 A sample of polonium-210 decays.

FIGURE 3 shows how the percentage of polonium-210 nuclei remaining varies with time.

FIGURE 3

Percentage of
polonium-210
nuclei
remaining



Determine the half-life of polonium-210 [1 mark]

Half-life = _____ days

[Turn over]



0 2 . 5 Another isotope of polonium, polonium-206, has a half-life of 8.8 days.

A 5.0 mg sample of polonium-206 was left to decay.

Calculate what mass of polonium-206 remained after 44 days. [2 marks]

Mass of polonium-206 after 44 days =

_____ mg



0 2 . 6 If polonium-210 were to enter the body, the alpha radiation it emits would cause harm.

Explain why alpha radiation emitted inside the body is harmful. [2 marks]

0 2 . 7 Isotopes that emit alpha radiation can be transported safely in a glass bottle.

Suggest why. [1 mark]

[Turn over]

12



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03

Lipids are an essential part of our diet.

03

1

Describe how a student could test a food for lipids and the positive result for the test.

[2 marks]

Test for lipids

Positive result for lipids

A high concentration of cholesterol in the blood has been linked with coronary heart disease (CHD).

03

2

Name the type of drug used to reduce the concentration of cholesterol in the blood.

[1 mark]

[Turn over]



03.3 A new CHD drug has been trialled to reduce the concentration of cholesterol in the blood.

Patients were given the new CHD drug or a placebo.

One possible side effect of the new CHD drug is an increased risk of diabetes.

TABLE 1 shows some of the results.

TABLE 1

	Group 1: NEW CHD DRUG	Group 2: PLACEBO
Number of patients	12 562	12 541
Number of patients developing diabetes during the trial	636	606



Calculate the difference between the percentage of patients developing diabetes in group 1 compared to group 2.

Give your answer to 3 significant figures.

[4 marks]

Difference = _____ %

[Turn over]



03.5 Give **THREE** factors doctors should consider when they plan to use a new drug with a patient.

Do NOT refer to cost in your answer. [3 marks]

1 _____

2 _____

3 _____

[Turn over]

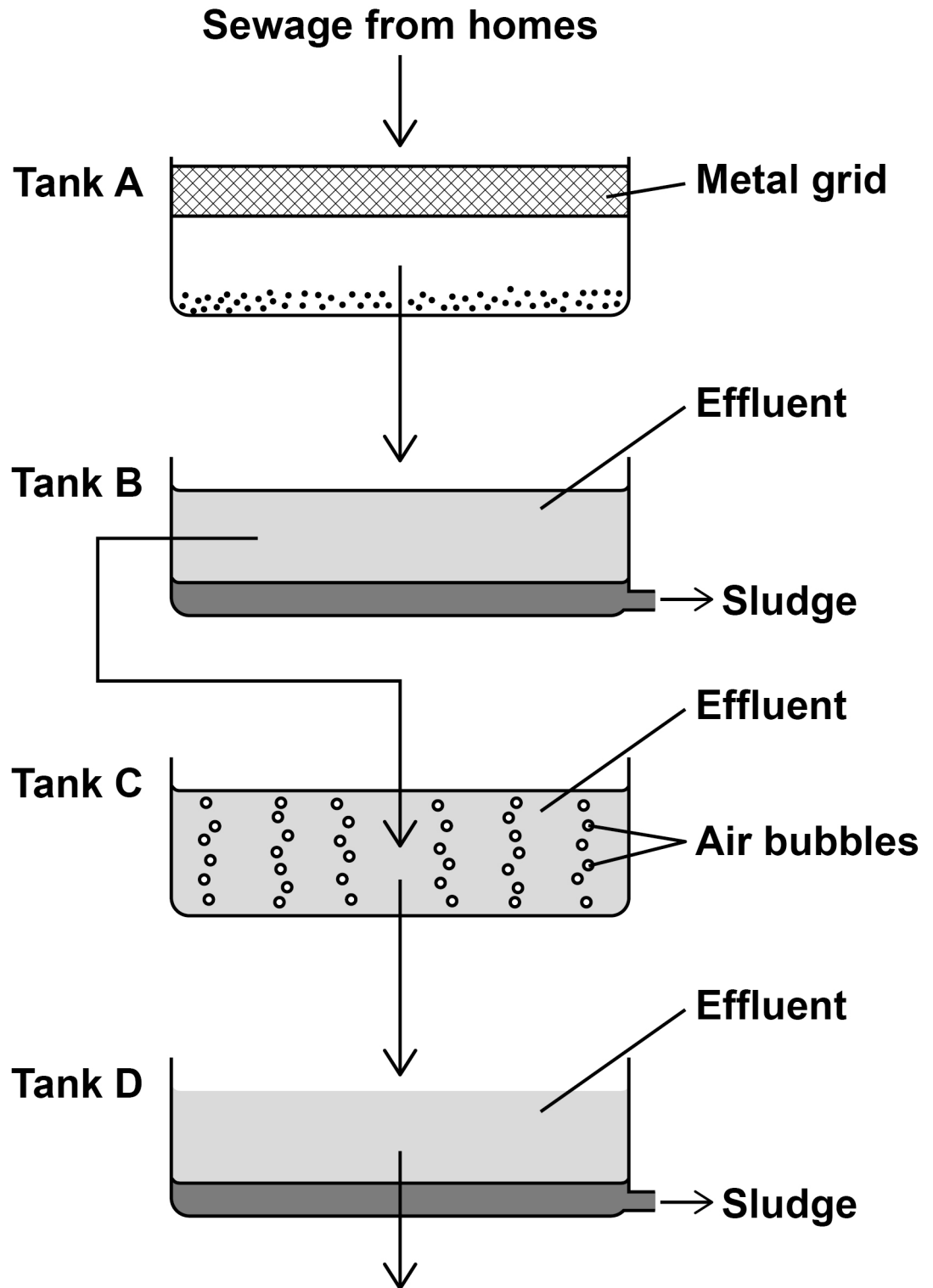
14



04

FIGURE 4 shows part of the process of sewage treatment.

FIGURE 4



04.1 Name the TWO processes happening in tank A.
[2 marks]

1 _____

2 _____

[Turn over]



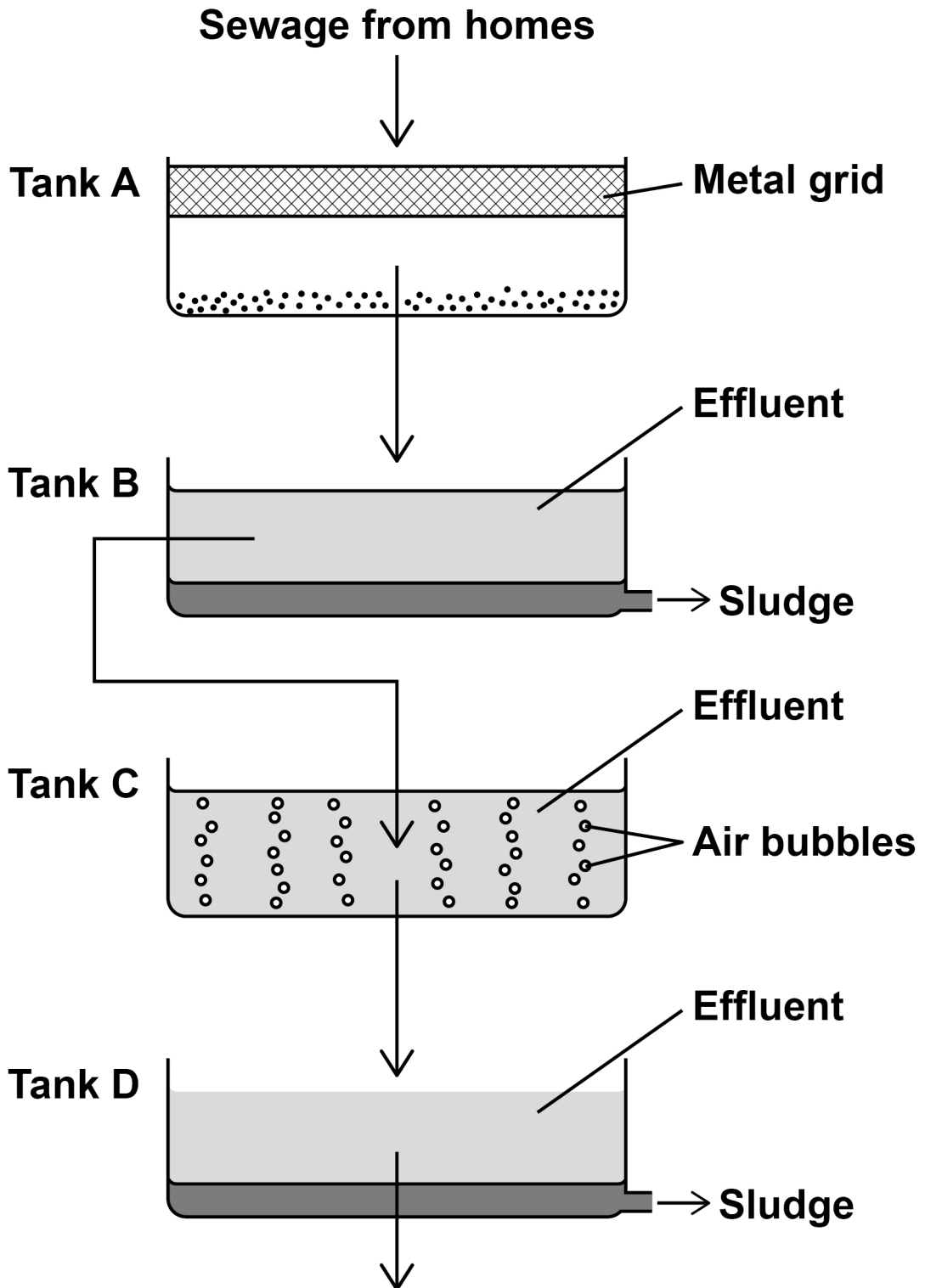
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04.2 Explain the processes happening in tank C.
[4 marks]

[Turn over]

Repeat of FIGURE 4



0 4 . 3 The water from tank D is sterilised.

Why is the water from tank D sterilised?
[1 mark]

0 4 . 4 Seawater can be desalinated by distillation.

Name ONE other method of desalination.
[1 mark]

[Turn over]



0 **4** . **5** Describe a method to measure the concentration of dissolved solids in a sample of seawater. [6 marks]

[Turn over]

14



0 5

Scientists investigated the temperature changes when gaseous substances cool.

TABLE 2 shows the results for substance A.

TABLE 2

Time in seconds	Temperature in °C
0	400
60	357
120	357
180	223
240	92
300	-39
360	-39



05.1 Complete FIGURE 5.

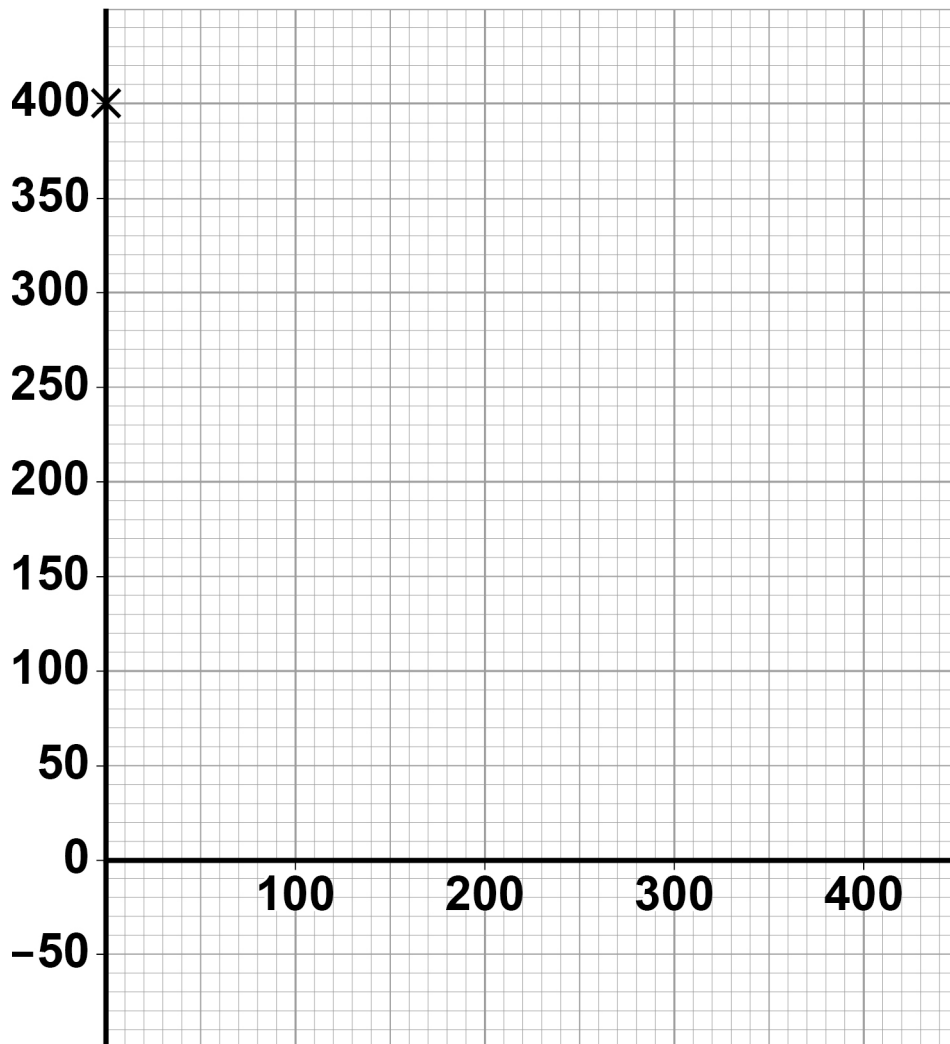
You should:

- plot the data for substance A from TABLE 2. The first result has been plotted.
- join the data points for substance A with straight lines.

[3 marks]

FIGURE 5

Temperature
in °C



Time in seconds

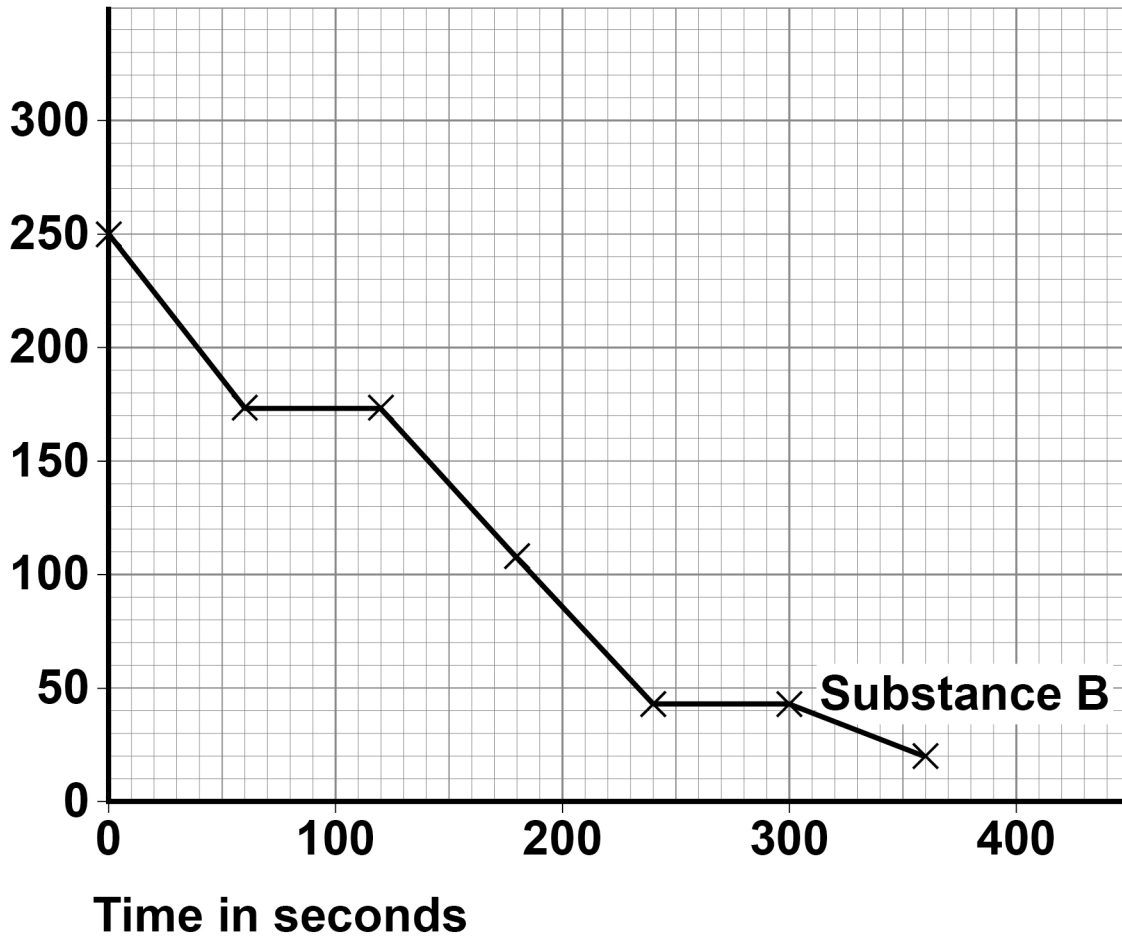
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FIGURE 6 shows the results for substance B.

FIGURE 6

Temperature
in °C



0 5 . 2 How does **FIGURE 6** show that substance **B** is a pure substance? [1 mark]

0 5 . 3 Determine the melting point of substance **B**.

Use **FIGURE 6**. [1 mark]

Melting point = _____ °C

[Turn over]



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0 6

Field studies can be used to investigate the abundance and distribution of a species.

0 6

. 1

Define the following biological words. [2 marks]

Abundance

Distribution

[Turn over]

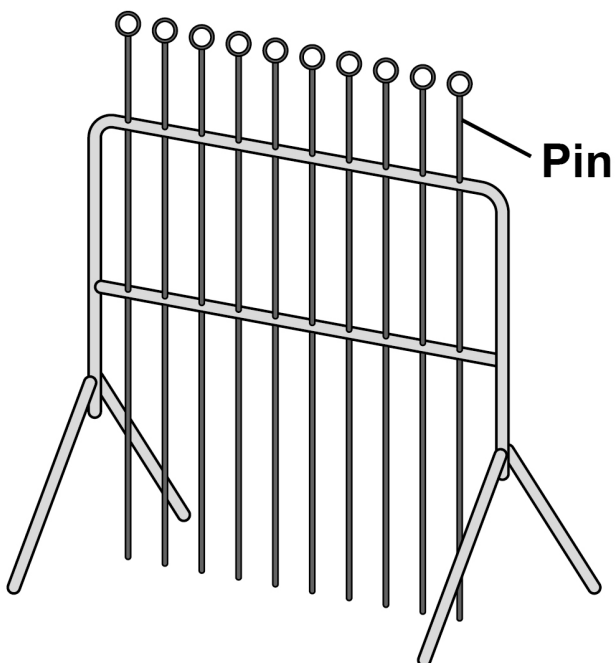


Quadrats can be used to estimate the percentage cover of plants in an area.

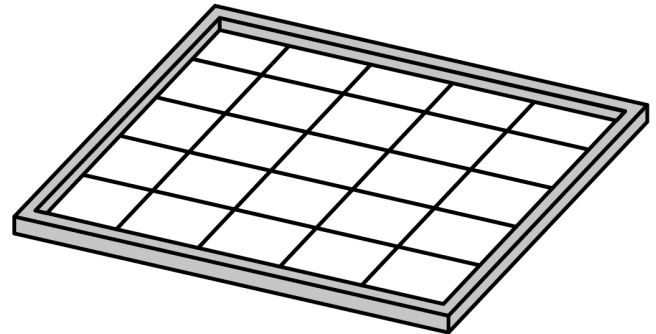
A point quadrat can be used instead of a square quadrat.

FIGURE 7 shows a point quadrat and a square quadrat.

FIGURE 7



POINT QUADRAT



SQUARE QUADRAT

When using a point quadrat, any plant species touching a pin is recorded.



- 06.3** The percentage cover of each species can be estimated using the equation:

percentage cover =

$$\frac{\text{number of times a pin touches a species}}{\text{total number of pins used}} \times 100$$

30 students each collected results from 80 pins. The students then put all their results into one results table.

Dandelions had a mean percentage cover of 6.25%.

Calculate the number of times dandelions touched a pin. [3 marks]



Number of times dandelions touched a pin =

06.4 Describe why this investigation would only give an estimate of the percentage cover of dandelions. [1 mark]

[Turn over]



06.5 Point quadrats give a more accurate estimate of percentage cover than square quadrats.

**What is a DISADVANTAGE of using point quadrats rather than square quadrats?
[1 mark]**

Tick (✓) ONE box.

Results collected using point quadrats are more biased

Plants at all heights are recorded

Point quadrats need a judgement of percentage cover

Rare species are less likely to be sampled

07

FIGURE 8 shows a sealed balloon containing helium.

FIGURE 8



07.1 The balloon is squashed so its volume decreases.

No helium enters or leaves the balloon.

What happens to the density of the helium in the balloon? [1 mark]

[Turn over]



08

Hormones can have effects on the body far from the gland that releases the hormone.

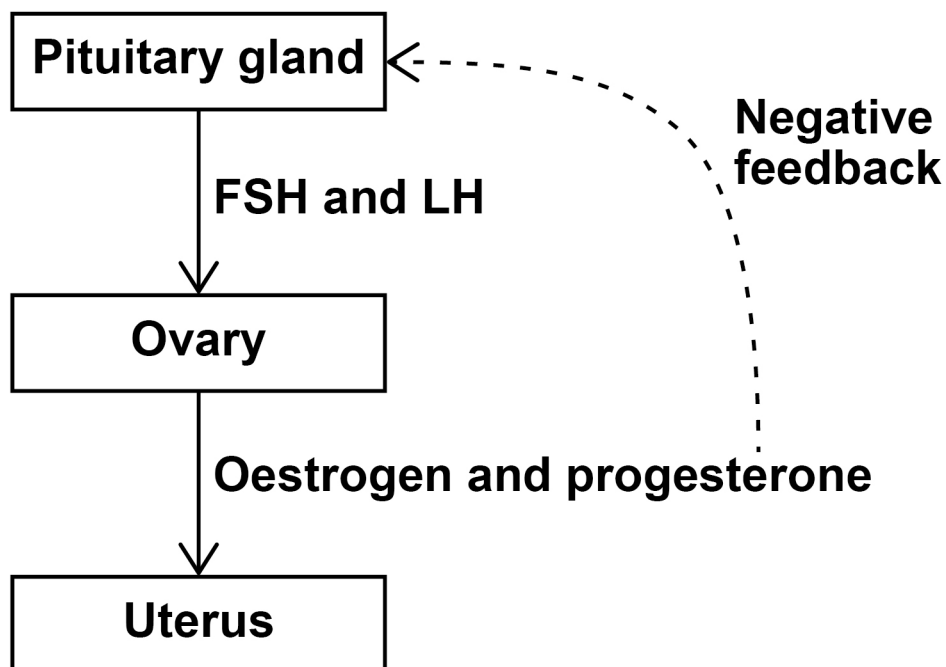
08

.1

Name the system in the body that releases hormones. [1 mark]

FIGURE 9 shows part of the hormonal control of the menstrual cycle.

FIGURE 9



0 8 . 2 Describe how FSH and LH travel from the pituitary gland to the ovaries. [1 mark]

0 8 . 3 Explain how the body regulates the production of oestrogen and progesterone for most of the menstrual cycle.

**Use the information shown in FIGURE 9.
[3 marks]**

[Turn over]





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For Examiner's Use	
Question	Mark
1	
2	
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6	
7	
8	
TOTAL	

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