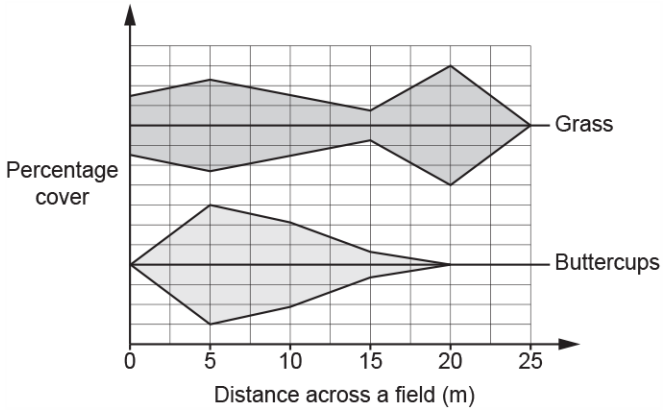
Monitoring & Maintaining the Environment (H)

1. Which of these is an example of ecotourism?

A Setting up monkey parks in the UK.
B Allowing people to sponsor endangered animals.
C Encouraging people to view animals in their natural environment.
D Educating children about the benefits of conservation.

Your answer ☐ **[1]**

2. A group of students collected some measurements from a field.
They plotted the measurements on this graph.



Which technique have the students used to collect the data?

A Capture-recapture
B Random quadrats
C Scaling up
D Transect line with quadrats

Your answer ☐ **[1]**

3. The table shows changes in the forest cover in some continents of the world.

Continent	Total forest cover (millions of hectares)		
	1990	**2000**	**2005**
Africa	699	656	635
Asia	574	567	572
Europe	989	998	1001
South America	891	853	832

What is the approximate percentage decrease in the area of South America covered by forest between **1990** and **2005**?

A 0.9%
B 1.1%
C 6.6%
D 7.1%

Your answer ☐ **[1]**

4. A scientist is estimating the number of rabbits in a field.

He has eight different estimates, 12, 12, 13, 15, 17, 19, 22 and 26.

Which is the median value for his estimates?

A 8
B 12
C 16
D 17

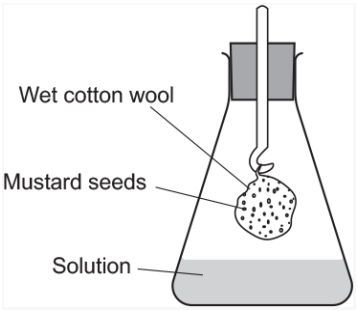
Your answer ☐ **[1]**

5 (a). A student investigates the effect of acid rain on seed growth.

She dips some cotton wool in 20 cm^3 of water. She then puts 20 mustard seeds onto the cotton wool and places it inside a flask. The student puts the remaining water into the flask with the cotton wool.

She repeats this four more times, each time using different solutions of water and dilute sulfuric acid.

One of the flasks is shown in the diagram.



After **8 days** she counts how many of the seeds have germinated.

The table shows her results.

Volume of water in flask (cm^3)	Volume of dilute sulfuric acid in flask (cm^3)	Number of seeds that germinated
20	0	18
16	4	15
8	12	13
4	16	6
0	20	2

What is the dependent variable in this investigation?

_____ **[1]**

(b). State why the student changed the volume of water in each flask.

_____ **[1]**

(c). The student kept each flask at the same temperature during the experiment to make it a fair test. Explain **one** other reason why she kept each flask at the same temperature.

_____ **[1]**

(d). Explain what this experiment shows about the effect of acid rain on seed germination.

_____

_____

_____ **[2]**

(e). The student used a formula to describe the germination of seeds called the viability index (**VI**).

i. For the seeds in 20 cm^3 of sulfuric acid, the mean root length was 5 mm and the mean shoot length was 2 mm.

Calculate **VI** for these seeds.

Use the equation:
VI = mean root length × mean shoot length × percentage of seeds that germinated

Answer = _____ **[2]**

ii. Using **VI** is a better way of comparing the effects of acid rain than just using the number of seeds germinated.

Explain why.

_____

_____

_____

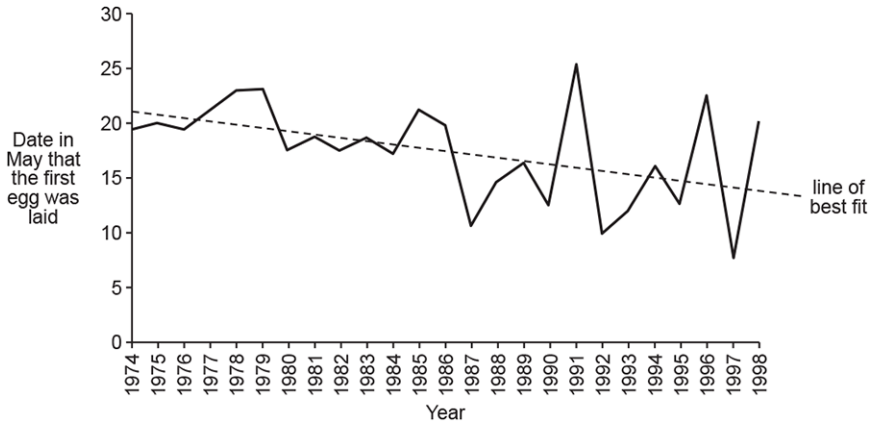
_____ **[2]**

6. Blue tits are small birds seen in gardens.

Blue tits usually lay their eggs in the month of May.

For many years, the scientists have recorded the first day that an egg was laid.

This data is shown in the graph.



The scientists made this explanation for the results:

The results are due to climate change.

Suggest arguments **for** and **against** this possible explanation.

Use information from the graph in your answer.

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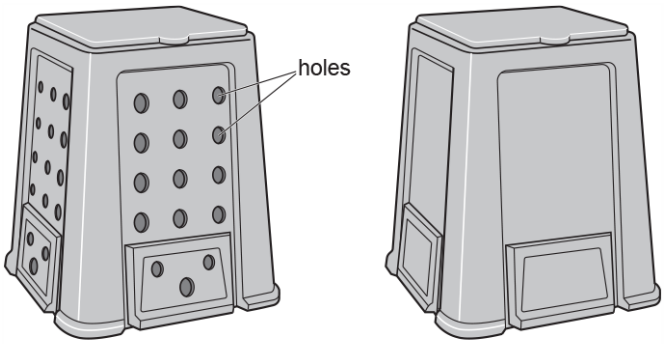
[4]

7 (a). Gardeners often turn dead plant material from their garden into compost. They then add this compost to the soil where they are growing plants.

Compost can be made in a composting bin. In the bin **aerobic bacteria** turn dead plant material into compost.

Some people use a different way of making compost, called bokashi. In this process the compost is made **anaerobically.**

The drawings show a normal composting bin and a bokashi bin.



Normal composting bin Bokashi bin

Explain the difference in the design of the two composting bins.

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[2]

(b). Scientists investigate the two methods of making compost.

This is their method:

- Take one large pile of dead plant material
- Divide the material into two samples of equal mass
- Place one sample into the normal composter and place one sample into the bokashi composter
- Measure the temperature in each composter every 10 days
- After 40 days, measure the mass of the compost.

Write down **one** way that the scientists make sure that they can draw valid conclusions.

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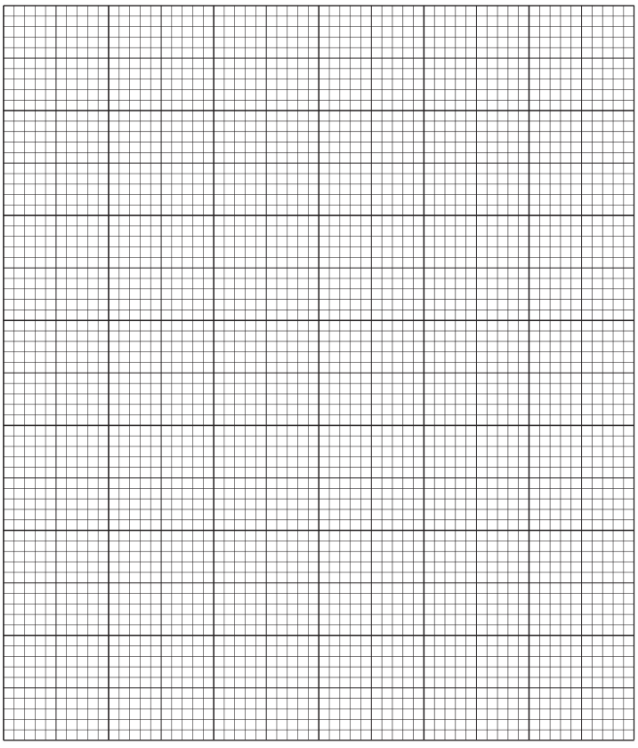
[1]

(c). Table 18.1 shows the scientists' temperature readings.

	Temperature of the compost (°C)	
Time (days)	normal compost	bokashi compost
0	26	26
10	70	27
20	53	29
30	42	31
40	28	28

Table 18.1

i. Plot the scientists' results on the grid for normal and bokashi compost, and draw **two** curves of best fit.



[5]

ii. Explain why the temperature of the compost in the **normal** bin changed as shown in the graph.

---**[2]**

iii. Explain the difference in the temperature changes between the aerobic normal compost and the anaerobic bokashi compost.

---**[2]**

(d). Table 18.2 shows the scientists' results for the mass of the compost.

	Normal compost	**Bokashi compost**
Mass at start (kg)	1500	1500
Mass after 40 days (kg)	750	1100

Table 18.2

A gas is given off in the formation of the compost. This causes most of the decrease in mass.

i. The percentage decrease in the mass of the normal compost is 50%.

Calculate the percentage decrease in the mass of the bokashi compost.

Give your answer to **2** significant figures.

Percentage decrease = ... % **[3]**

ii. The scientists concluded that the bokashi method of composting might be better for the environment.

Use your answer from part **(i)** to justify the scientists' conclusion.

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[2]

8. A student investigates the plants growing underneath a tree.

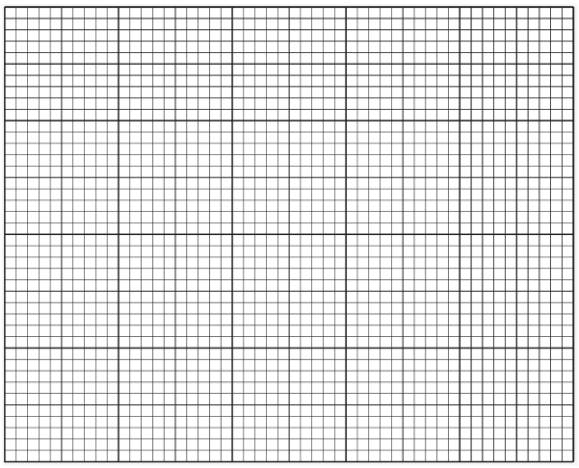
He lays out a tape measure on the ground, starting at the tree. He then places a quadrat on the ground.

He measures the percentage of the ground in the quadrat that is covered by plants. He repeats this every metre away from the tree.

The table shows his results.

Distance from the tree (m)	**Percentage of ground covered by plants (%)**
1	10
2	15
3	18
4	22
5	50
6	58
7	62
8	64

Plot a graph of the student's results and draw a line of best fit.



[5]

END OF QUESTION PAPER