



# Sample Questions

**BOOKLET 2**

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GCSE Biology/Combined Science Sample Questions

0 1

Plants transport water and mineral ions from the roots to the leaves.

0 1 . 1

Plants move mineral ions from a low concentration in the soil to a high concentration in the root cells.

Name the process that plants use to move these minerals into root cells.

[1 mark]

Shade **one** answer.

Active transport

Diffusion

Evaporation

Osmosis

0 1 . 2

Name the plant tissue that transports water and mineral ions from the roots to the leaves.

[1 mark]

Plants lose water through the stomata in the leaves.

The epidermis can be peeled from a leaf.

The stomata can be seen using a light microscope.

**Table 1** shows the data Mel collected from five areas on one leaf.

**Table 1**

Leaf sample	Number of stomata	
	Upper surface	Lower surface
1	0	44
2	1	41
3	1	40
4	2	42
5	1	39
<b>Mean</b>	<b>1</b>	<b>X</b>

GCSE Biology/Combined Science Sample Questions

**0 1** . **3** Describe how Mel might have carried out this experiment to collect this data.

**[3 marks]**

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**0 1** . **4** What is the median number of stomata on the upper surface of the leaf?

**[1 mark]**

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**0 1** . **5** Work out the mean number of stomata at **X** in **Table 1**.

Give your answer to 2 significant figures.

**[2 marks]**

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Mean number of stomata = \_\_\_\_\_

**0 1** . **6** Explain the **advantage** to the plant of having very few stomata on the upper surfaces of the leaf.

**[2 marks]**

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0 2

Photosynthesis is the process used by plants to make glucose.

0 2 . 1

Complete the word equation for photosynthesis.

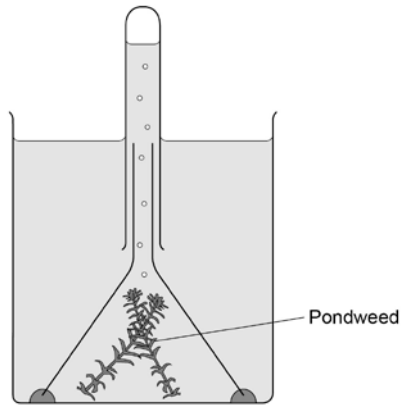
[1 mark]



0 2 . 2

**Figure 8** shows apparatus that can be used to measure the rate of photosynthesis.

**Figure 8**



Write a method to describe how you could investigate the effect of light intensity on the rate of photosynthesis by the pondweed.

You should include:

- how you would use the apparatus
- what you would measure
- variables you would control.

[6 marks]

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Ying carried out a similar investigation.

Her results are shown in **Table 3**.

**Table 3**

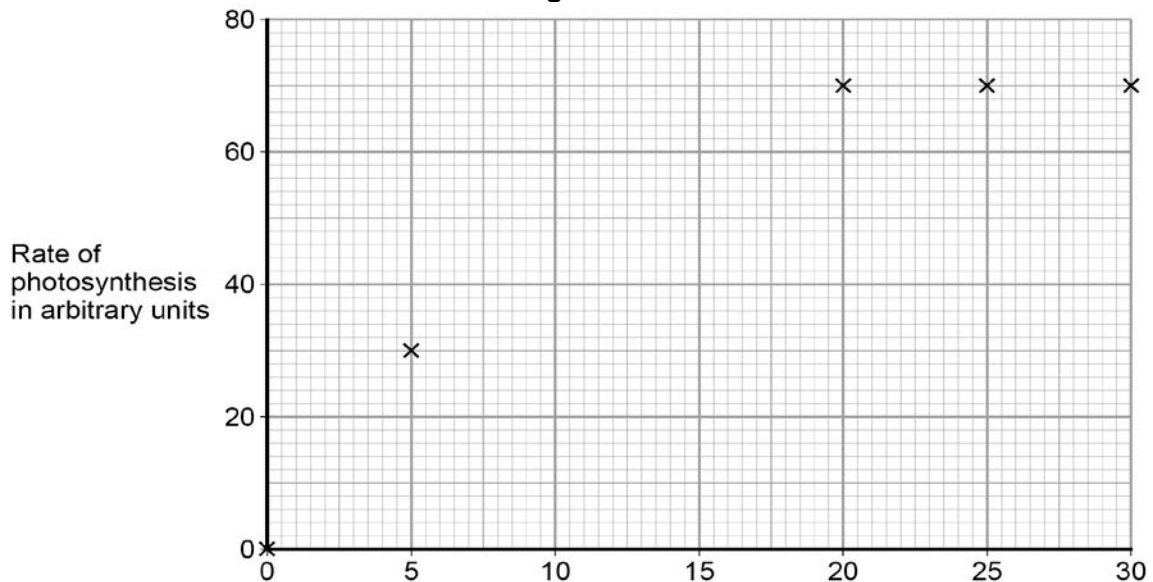
Light intensity in arbitrary units	Rate of photosynthesis in
0	0
5	30
10	52
15	64
20	70
25	70
30	70

**0 2 . 3** Complete the graph in **Figure 9** to show the Ying's results.

- Complete the *y*-axis.
- Plot the rate of photosynthesis for 10 and 15 arbitrary units of light.
- Draw a line of best fit.

**[3 marks]**

**Figure 9**



**0 2 . 4** Ying said:

**'Light is not a limiting factor at a light intensity of 25 arbitrary units.'**

Give evidence from the data to support this statement.

**[1 mark]**

0 3

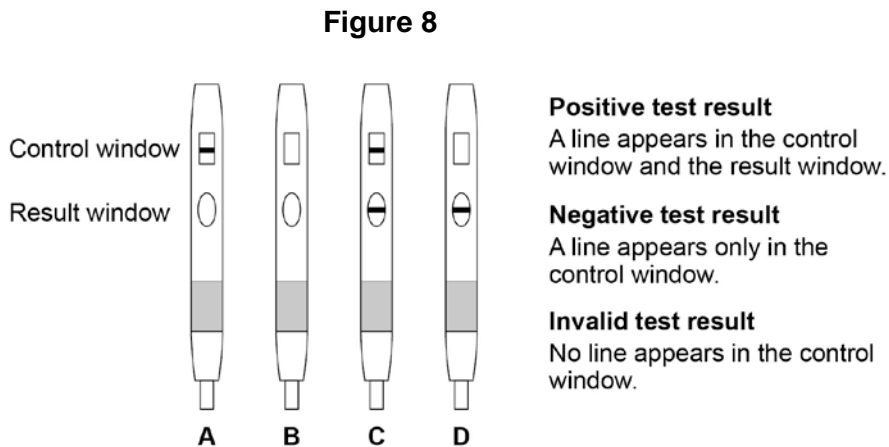
Monoclonal antibodies are used to measure the levels of hormones in the blood.

Pregnant women produce the hormone HCG.

HCG is excreted in urine.

**Figure 8** shows four pregnancy test strips.

The strips have been dipped in urine and the urine has travelled up the strip.



0 3

. 1

Which test strip shows a negative test result?

[1 mark]

Shade **one** answer.

A    B    C    D

0 3

. 2

Which test strip shows a positive test result?

[1 mark]

Shade **one** answer.

A    B    C    D

0 3

. 3

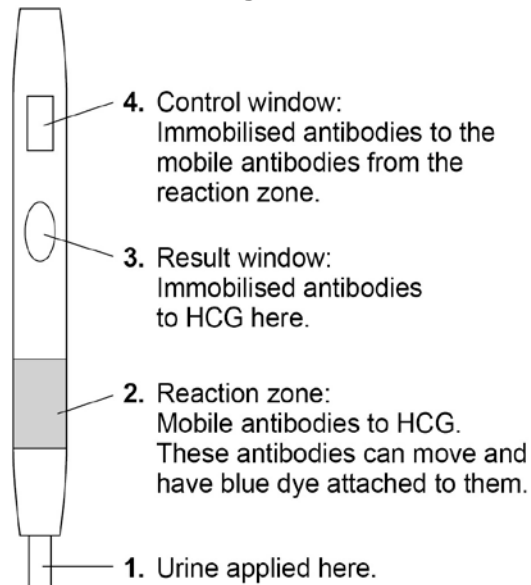
Give **one** use of monoclonal antibodies other than in pregnancy testing.

[1 mark]

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Figure 9 shows the parts of a pregnancy test strip.

Figure 9



0 3 . 4 Explain how the pregnancy test strip works to show positive test result when a woman is pregnant.

[5 marks]

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0 1

Figure 1 shows five different substances. Figure 1

0 1

. 1

Draw **one** line from each statement to the diagram which shows the structure.

[4 marks]

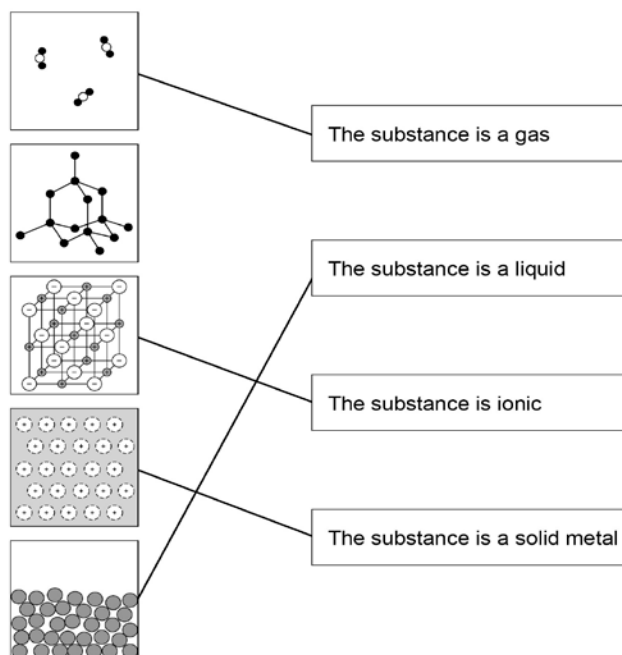
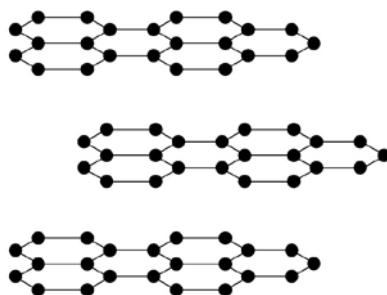


Figure 2 shows the structure of an element.

Figure 2



0 1

. 2

What is the name of the element?

Shade **one** answer.

[1 mark]

- Carbon
- Chloride
- Nitrogen
- Xenon



0 1 . 3 Why does the element conduct electricity?

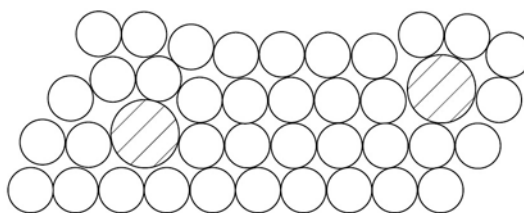
Shade **one** answer.

[1 mark]

- It has delocalised electrons
- It contains hexagonal rings
- It has weak forces between the layers
- It has ionic bonds

0 1 . 4 **Figure 3** shows the structure of an alloy.

**Figure 3**



Explain why alloys are harder than pure metals.

[2 marks]

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0 1

**Figure 8** shows a battery operated remote control car.

**Figure 8**

*Image to be inserted*

0 1 . 1

The store of chemical energy in the car's battery decreases as the car moves.

Only part of the energy is transferred usefully.

What happens to the energy that is not usefully transferred by the car?

[2 marks]

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0 1 . 2

The company that manufactures the car makes a new version.

The car is identical except it has a more efficient motor.

Having a more efficient motor increases the top speed of the car.

Explain why.

[2 marks]

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Mark scheme

<b>06.1</b>	(the wasted energy) is dissipated		1
	into the environment / surroundings	accept description of energy becoming more spread out and less useful for <b>2</b> marks	1
<b>06.3</b>	lower proportion of wasted energy	accept less energy is wasted	1
	higher proportion of energy is converted into kinetic energy	accept more kinetic energy	1

2

**Figure 5** shows a kettle a student used to determine the specific heat capacity of water.

Specific heat capacity can be calculated by

$$\text{Specific heat capacity} = \frac{\text{energy supplied}}{\text{mass} \times \text{change in temperature}}$$

**Figure 5**

*Image of an electric kettle*

The student placed different masses of water in the kettle and timed how long it took for the water to boil each time.

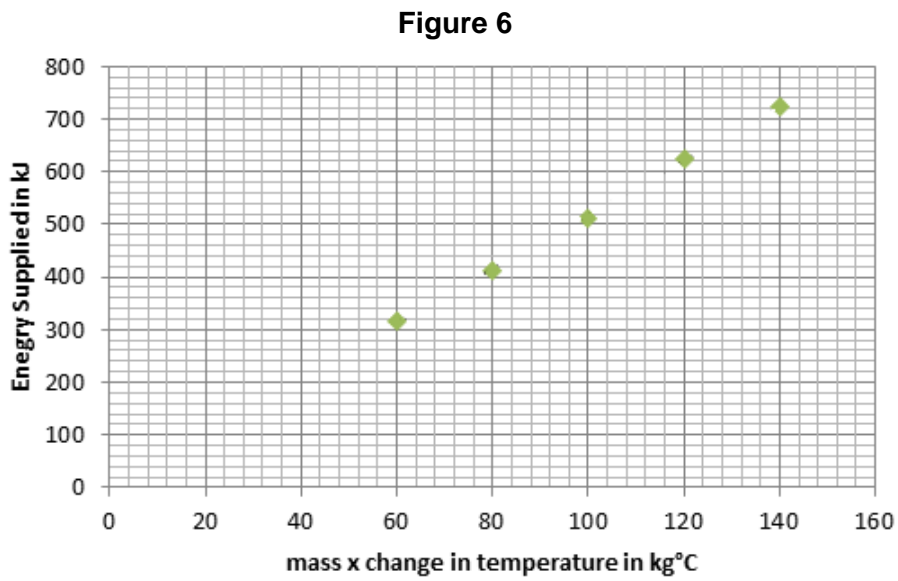
The student's results are shown in **Table 1**.

**Table 1**

Mass of water in kg	Time for water to boil in seconds				Mass x change in temperature in kg°C	Energy supplied in kJ
	1	2	3	Mean		
0.25	55	60	63	59	20	131
0.50	105	110	116	110	40	243
0.75	140	148	141	143	60	314
1.00	184	190	183	182	80	401
1.25	216	215	211	214	100	471
1.50	272	263	266	267	120	587
1.75	298	300	302		140	

The student plotted a graph of energy supplied in kJ against mass x change in temperature in kg°C.

Figure 6 shows the graph the student plotted.



The axes and scales should remain the same, plot the following points (20, 131), (40, 243), (60, 314).

0 2 . 1

Use **Table 1** to plot the four missing points and draw a line of best fit on the graph.

[3 marks]

0 2 . 2

Use the graph to determine the specific heat capacity of water.

[4 marks]

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Specific heat capacity of water = \_\_\_\_\_ J/Kg°C

GCSE Physics/Combined Science Sample Questions

3 The sound and image from a Bluetooth baby monitor can be sent to a mobile phone.

0 3 . 1 The monitor detects electromagnetic waves and sound waves.

Give **two** differences between electromagnetic waves and sound waves.

[2 marks]

1. ....

2. ....

0 3 . 2 The Bluetooth signals for the baby monitor are transmitted as electromagnetic waves with a frequency of  $2.4 \times 10^9$  Hz.

Wave speed of electromagnetic waves =  $3 \times 10^8$  m/s

Write down the equation which links frequency, wave speed and wavelength.

Work out the wavelength of the Bluetooth signal.

Equation:

[3 marks]

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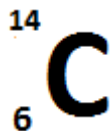
Wavelength = \_\_\_\_\_ m

0 1

Carbon is a very important element for life on Earth.

One way of representing a carbon atom is shown in **Figure 5**.

**Figure 5**



0 1

. 1 Use **Figure 5** to complete the sentences.

[3 marks]

The number of protons in carbon is \_\_\_\_\_

The number of electrons in carbon is \_\_\_\_\_

The number of neutrons in carbon is \_\_\_\_\_

0 1

. 2 Where are the protons in an atom of carbon?

[1 mark]

\_\_\_\_\_

0 1

. 3 What is the charge of one neutron in carbon?

Shade **one** answer.

[1 mark]

-1

0

+1

## GCSE Combined Science Sample Questions

Combustion of carbon releases carbon dioxide into the atmosphere.

Increased amounts of carbon dioxide in the atmosphere cause global warming.

**0 1** . **4** One environmental impact of global warming is rising sea levels.

Give **two** other environmental impacts of global warming.

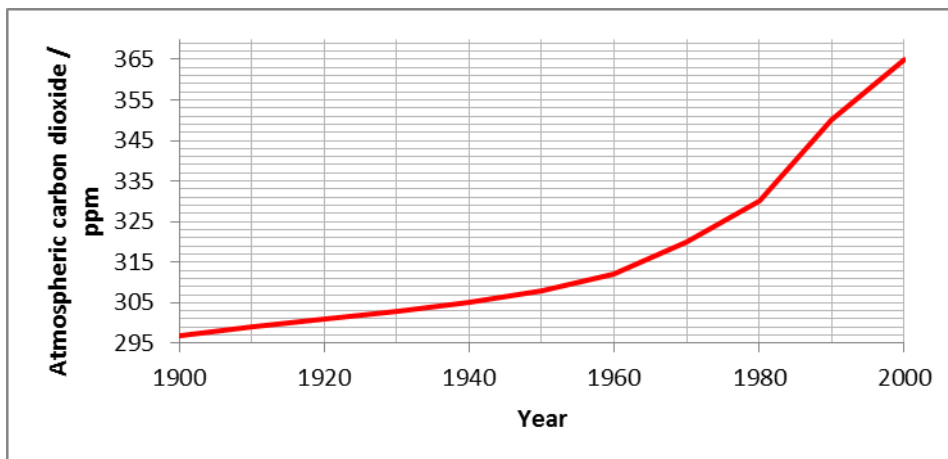
**[2 marks]**

1 \_\_\_\_\_

2 \_\_\_\_\_

**Figure 6** shows the levels of atmospheric carbon dioxide between 1900 and 2000

**Figure 6**



**0 1** . **5** Describe the trend in atmospheric carbon dioxide between 1900 and 2000.

**[2 marks]**

\_\_\_\_\_

**0 1** . **6** Global warming can be reduced if carbon dioxide is removed from the atmosphere.

0 2

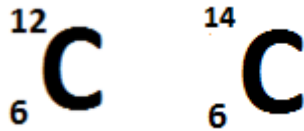
Carbon is a very important element for life on Earth.

0 2

1

**Figure 7** shows representations of two isotopes of carbon.

**Figure 7**



Compare the two isotopes of carbon.

You should answer in terms of subatomic structure.

**[3 marks]**

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0 2

2

Carbon can enter the atmosphere as carbon dioxide.

Levels of atmospheric carbon dioxide is linked to global warming.

Global warming can negatively impact plants.

Identify three consequences of global warming.

Identify how each consequence directly affects plants.

**[3 marks]**

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## GCSE Combined Science Sample Questions

Many people think that deforestation is linked to global warming.

**Table 3** shows the levels of deforestation in the Amazon rainforest during a 10-year period.

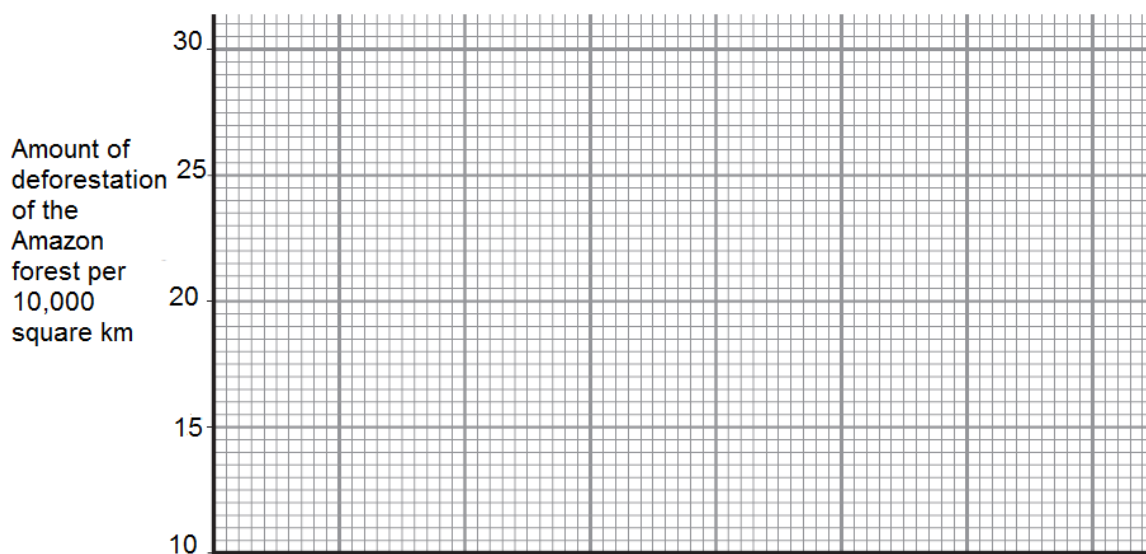
**Table 3**

Year	Amount of deforestation of the Amazon forest per 10,000 square km
2002	18.0
2003	21.0
2004	25.0
2005	26.5
2006	16.5
2007	13.5

**0 2 . 3** Use the data in **Table 3** to plot a line graph on **Figure 8**.

**[4 marks]**

**Figure 8**



GCSE Combined Science Sample Questions

**0 2** . **4** In 2005, Brazil and other developing countries proposed to reduce deforestation.

One benefit of reducing deforestation is the positive impact on animals and their habitats.

Explain why else it is important to reduce deforestation.

**[4 marks]**

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**0 2** . **5** Carbon is a vital element in plants

Explain why.

You should answer in terms of chemical substances in plants.

**[5 marks]**

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