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Level: IGCSE Oxford AQA Biology (9201)
Subject: Biology
Topic: IGCSE AQA Biology
Type: Topic Question

To be used by all students preparing for IGCSE Oxford AQA Biology (9201)
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Biology **IGCSE AQA**

Key skills

1. **Figure 1** shows:

- a food chain for organisms in a river
- the biomass of the organisms at each trophic level.

Figure 1

Algae → Invertebrate animals → Small fish → Large fish

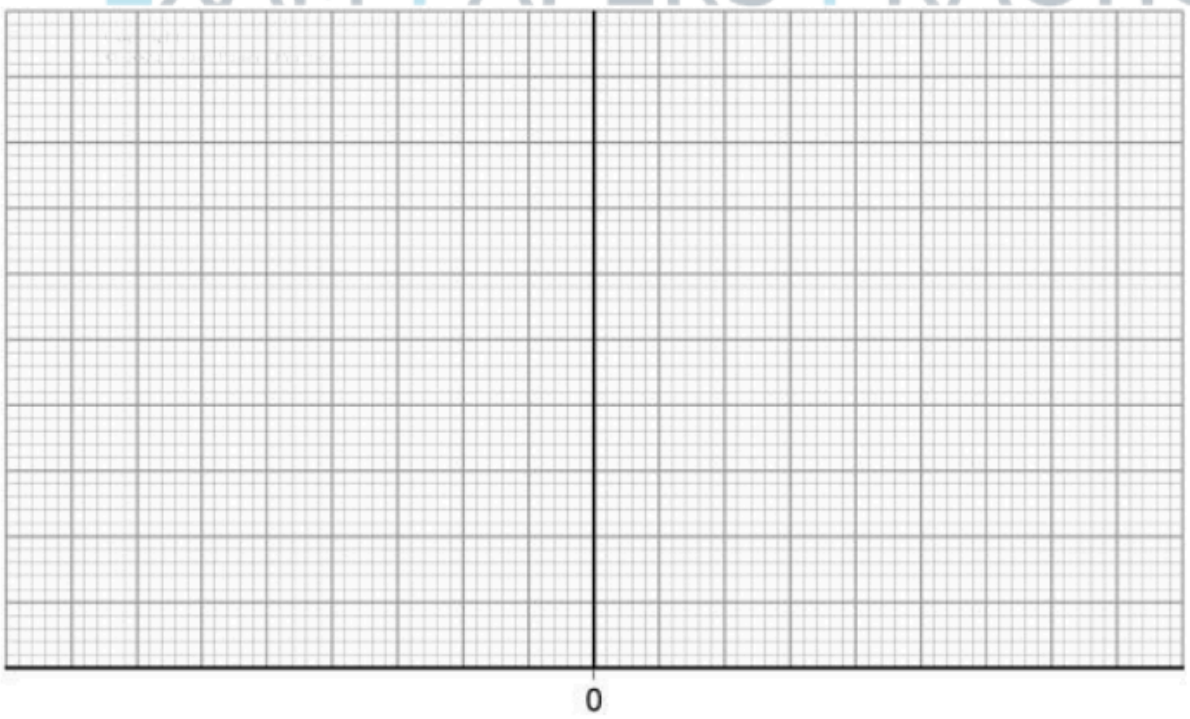
Biomass in g/m^2:	840	200	40	10

(a) Draw a pyramid of biomass for the food chain in **Figure 1** on **Figure 2**.

You should:

- use a suitable scale
- label the x-axis
- label each trophic level.

Figure 2



(4)

(b) Calculate the percentage of the biomass lost between the algae and the large Fish.

Give your answer to 2 significant figures.

Percentage loss = _____

(3)

(c) Give one way that biomass is lost between trophic levels.

(1)

(d) A large amount of untreated sewage entered the river. Many fish died.

Untreated sewage contains organic matter and bacteria.

Explain why many fish died.

(5)

(Total 13 marks)

2. The diagram below shows a food chain in a garden.

Lettuce © destillat/iStock/Thinkstock; Snail ©Valengilda/iStock/Thinkstock; Shrew © GlobalT/iStock/Thinkstock

(a) Name **one consumer** shown in the diagram above.

(1)

(b) Name **one carnivore** shown in the diagram above.

(1)

(c) A disease kills most of the shrews in the garden.

Suggest why the number of snails in the garden may then increase.

_____

_____

(1)

(d) What is the name given to all the snails in the garden shown in the diagram above?

Tick **one** box.

Community ☐

Ecosystem ☐

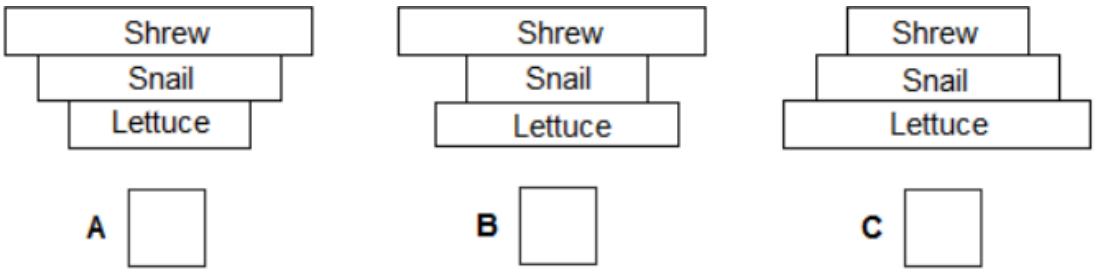
Population ☐

Territory ☐

(1)

(e) Which pyramid of biomass is correct for the food chain shown in the diagram above?

Tick **one** box.



A ☐ B ☐ C ☐

(1)

(f) Some snails ate some lettuces.

The lettuces contained 11 000 kJ of energy.

Only 10% of this energy was transferred to the snails.

Calculate the energy transferred to the snails from the lettuces.

Energy = _____ kJ

(1)

(g) Give **one** reason why only 10% of the energy in the lettuces is transferred to the snails.

Tick **one** box.

The lettuces carry out photosynthesis ☐

The snails do not eat the roots of the lettuces ☐

Not all parts of a snail can be eaten ☐

(1)

(h) **Abiotic** factors can affect the food chain.

Wind direction is one abiotic factor.

Name **one other** abiotic factor.

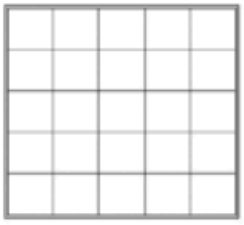
_____

(1)

(Total 8 marks)

3. A student was asked to estimate how many clover plants there are in the school field.

The image below shows the equipment used.



Quadrat

Tape

Identification key

Not drawn to scale

This is the method used.

1. Throw a quadrat over your shoulder.
2. Count the number of clover plants inside the quadrat.
3. Repeat step **1** and step **2** four more times.
4. Estimate the number of clover plants in the whole field.

(a) What is the tape in the image above used for in this investigation?

_____

_____

(1)

(b) The teacher told the student that throwing the quadrat over his shoulder was **not** random.

The method could be improved to make sure the quadrats were placed randomly.

Suggest **one** change the student could make to ensure the quadrats were placed randomly.

_____

_____

(1)

(c) How could the student improve the investigation so that a valid estimate can be made?

Tick **two** boxes.

- Weigh the clover plants ☐
- Compare their results with another student's results ☐
- Count the leaves of the clover plants ☐
- Place more quadrats ☐
- Place the quadrats in a line across the field ☐

(2)

(d) The table below shows the student's results.

Quadrat number	Number of clover plants counted
1	11
2	8
3	11
4	9
5	1
Total	40

The area of the school field was 500 m^2.

The quadrat used in the table above had an area of 0.25 m^2.

Calculate the estimated number of clover plants in the school field.

_____

_____

_____

Estimated number of clover plants = _____

(3)

(e) What was the mode for the results in the table above?

Tick **one** box.

1 ☐

8 ☐

11 ☐

40 ☐

(1)

(f) Suggest which quadrat could have been placed under the shade of a large tree.

Give one reason for your answer.

Quadrat number _____

Reason _____

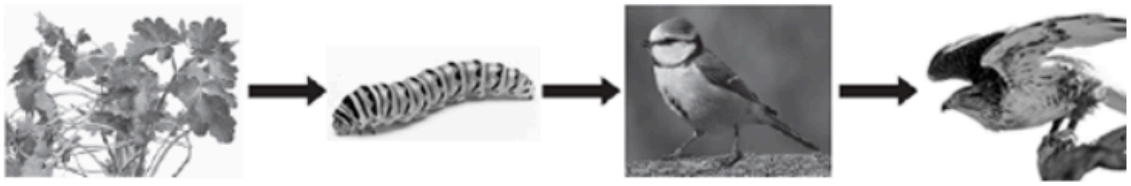
_____

(1)

(Total 9 marks)

4. **Figure 1** shows how energy and biomass pass along a food chain.

Figure 1



(a) The parsley shown in **Figure 1** carries out photosynthesis.

_____

_____

_____

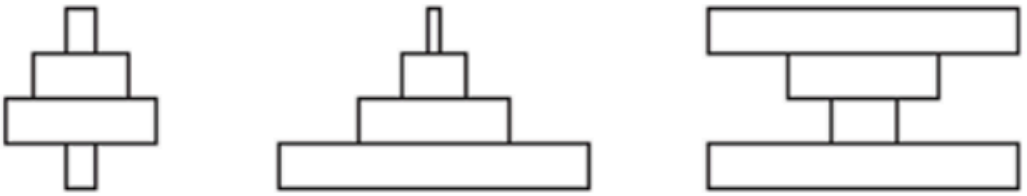
_____

(2)

(b) Which diagram shows the pyramid of biomass for the food chain in **Figure 1**?

Why is photosynthesis important in the food chain?

Tick (✓) **one** box.

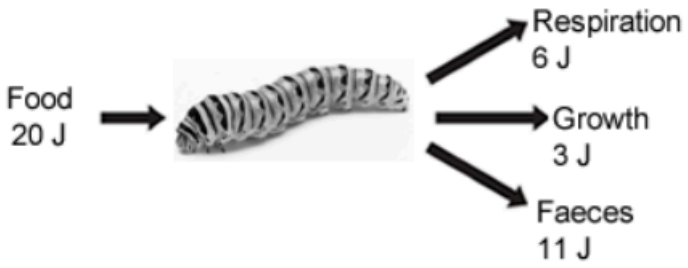


☐ ☐ ☐

(1)

(c) **Figure 2** shows the ways a swallowtail caterpillar transfers 20 J of energy from food.

Figure 2



What percentage of the energy in the caterpillar's food is used for growth?

_____

_____

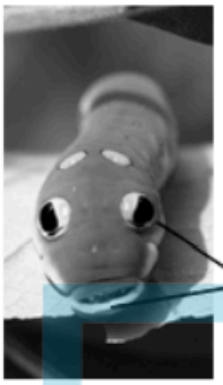
Percentage = _____

(2)

(d) The organisms in the food chain are adapted for survival.

(i) **Figure 3** shows a swallowtail caterpillar seen from the back.

Figure 3



Suggest how the swallowtail caterpillar shown in **Figure 3** is adapted to reduce the chance of being eaten by blue tits.

_____

_____

_____

_____

(2)

(ii) **Figure 4** shows a hawk.

Figure 4

Suggest **two** ways that the hawk is adapted to catch and kill blue tits.

1. _____

_____

2. _____

_____

(2)

(Total 9 marks)

5. Students investigated a food chain in a garden.

lettuce → snail → thrush (bird)

The students:

- estimated the number of lettuce plants in the garden
- estimated the number of snails feeding on the lettuces
- counted two thrushes in the garden in 5 hours.

The table below shows the students' results and calculations.

Organism	Population size	Mean mass of each organism in g	Biomass of population in g	Biomass from previous organism that is lost in g	Percentage of biomass lost
Lettuce	50	120.0	6000		
Snail	200	2.5	500	5500	91
Thrush	2	85.0	170	330	66

(a) (i) Give **two** ways that biomass is lost along a food chain.

_____

_____

_____

_____

(2)

(ii) Scientists estimate that about 90% of the biomass in food is lost at each step in a food chain.

Suggest **one** reason why the students' value for the percentage of biomass lost between the snails and the thrushes is only 66%.

_____

_____

(1)

(b) European banded snails have shells with different colours (light or dark) and with stripes or with no stripes.

Figure 1 shows two examples of European banded snails.

Figure 1

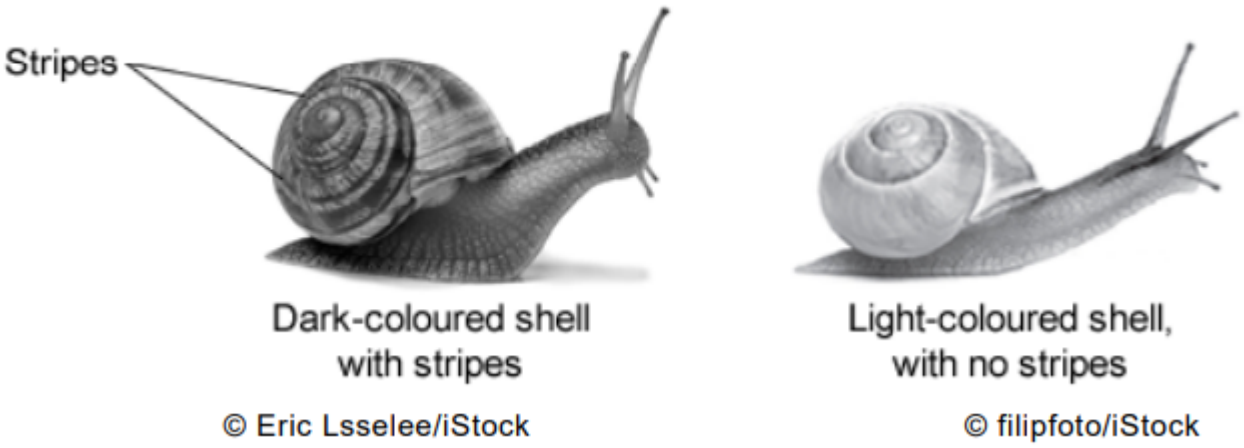
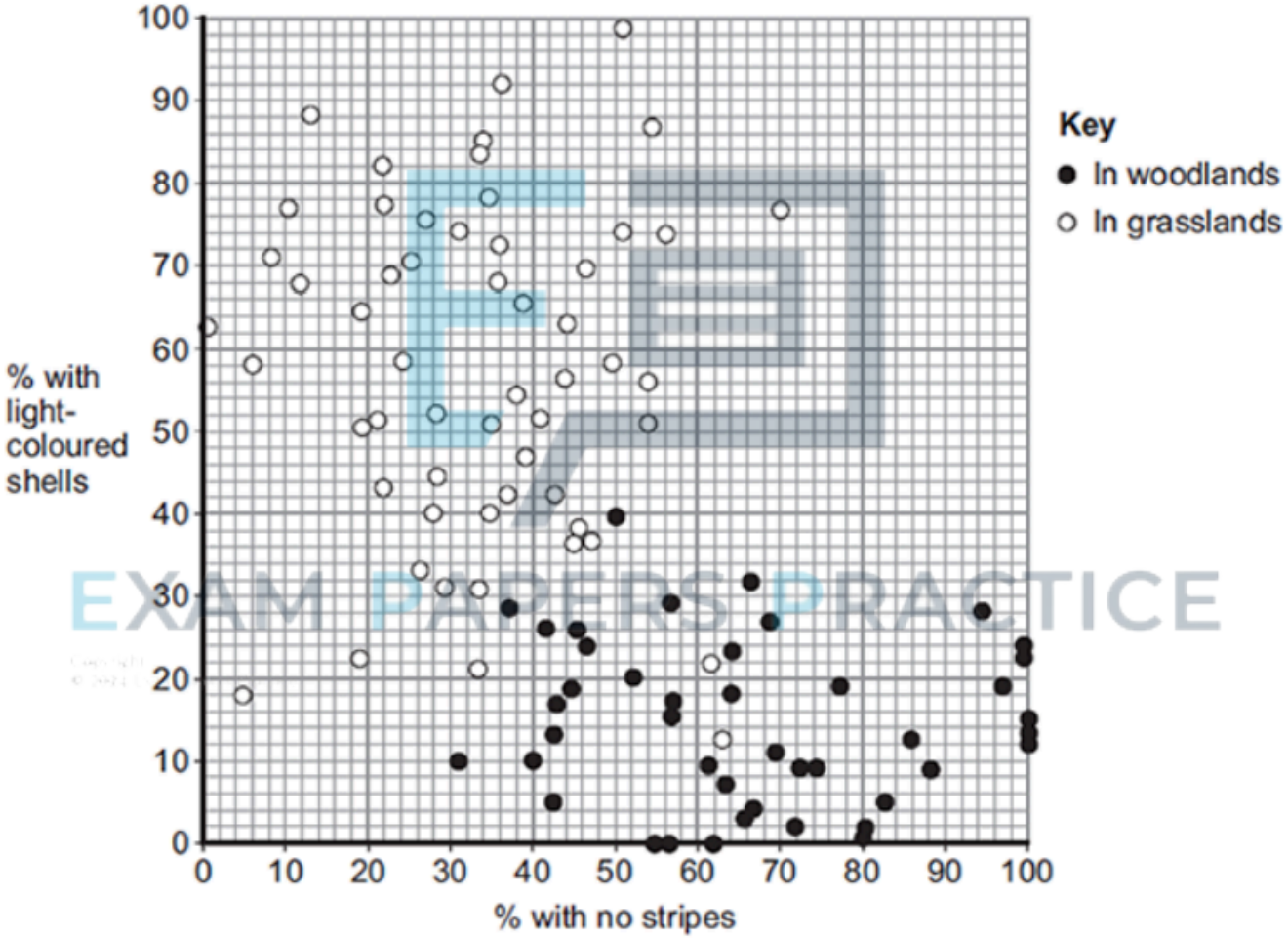


Figure 2 shows results from surveys in woodlands and in grasslands of the percentage of snails with light-coloured shells and the percentage of snails with no stripes.

Each point on the graph represents the results of one survey in one habitat.

Figure 2



(i) **Figure 2** is a scatter graph.

Why is a scatter graph used for this data?

_____

_____

(1)

(ii) Compare the general appearance of snails that live in woodlands with the general appearance of snails that live in grasslands.

_____

_____

_____

_____

(2)

(iii) Suggest a reason for the general appearance of snails that live in woodlands.

_____

_____

(1)

(Total 7 marks)