



WESTMINSTER SCHOOL
THE CHALLENGE 2019
BIOLOGY

Thursday 2 May 2019

Time allowed: 30 minutes

Write your answers in the spaces provided.

Please write in black or blue ink.

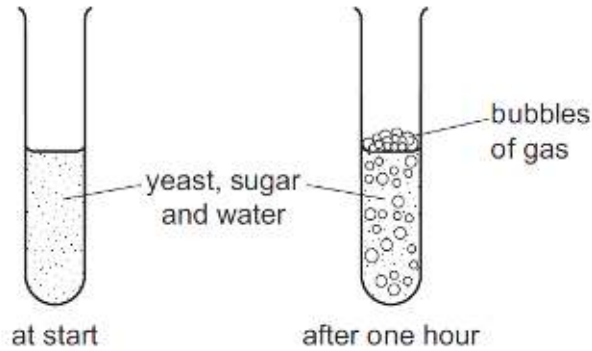
For examiner use only

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|-------|--|
| Total | |
| Mark | |

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B1 The following are multiple choice questions. Choose the option that you consider to be correct and write either **A**, **B**, **C** or **D** on the line provided. There is no negative marking.

(a) Some yeast, sugar and water are mixed in a test-tube. The diagrams show the test-tube at the start and after one hour.

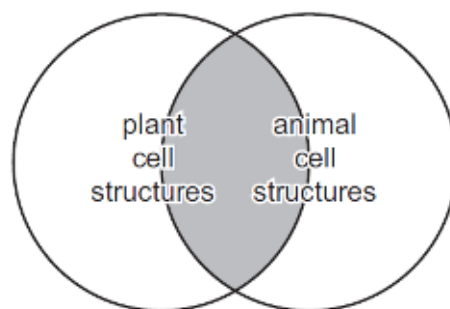


Which process causes this change?

- A** growth
- B** reproduction
- C** respiration
- D** sensitivity

(a) Answer

(b) The shaded area of the diagram represents structures found in both plant and animal cells.



Which cell structure is from the shaded area?

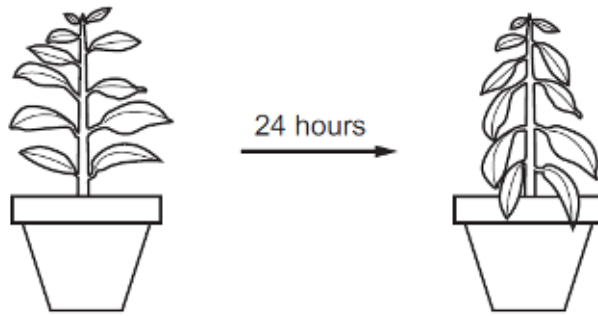
- A** cell membrane
- B** cell wall
- C** chloroplast
- D** large vacuole

(b) Answer

(c)

(c)

The diagram shows a potted plant and the same plant 24 hours later.



What causes the change in the appearance of the plant?

- A Water loss is greater than water uptake.
- B Water moves from the leaves to the stem.
- C Water uptake is equal to water loss.
- D Water uptake is greater than water loss.

(d) Answer

(d)

What is the path of carbon dioxide as it leaves the lungs?

- A alveolus → bronchiole → bronchus → trachea
- B alveolus → bronchus → bronchiole → trachea
- C trachea → bronchiole → bronchus → alveolus
- D trachea → bronchus → bronchiole → alveolus

(d) Answer

(e)

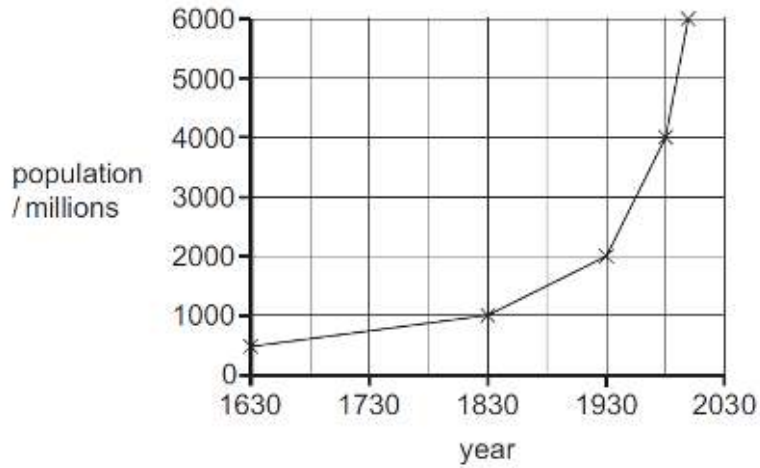
Which characteristic shows discontinuous variation in humans?

- A height
- B length of foot
- C tongue rolling
- D weight

(e) Answer

(f)

The graph shows the increase in the human population of the world since 1630.



What was the longest time taken for the population to double?

- A** 100 years **B** 200 years **C** 300 years **D** 400 years

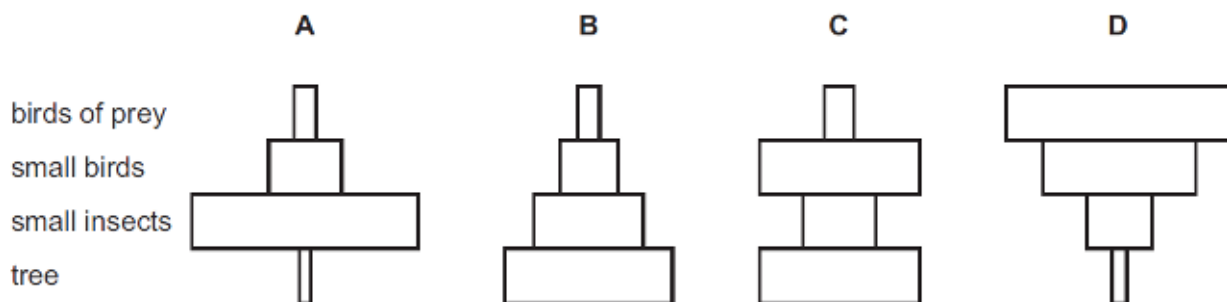
(f) Answer

(g)

The diagram shows a food chain.

tree → small insects → small birds → birds of prey

What is the correct pyramid of numbers for this food chain?



(g) Answer

[Total: 7]

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B3 Ladybirds prey on aphids. Aphids are a common pest of many crop species. The use of natural predators is a form of biological pest control. Some farmers rely only on biological pest control.

Figure 3.1 shows the changes in relative populations of ladybird and aphid species in an arable field surrounded by hedgerows.

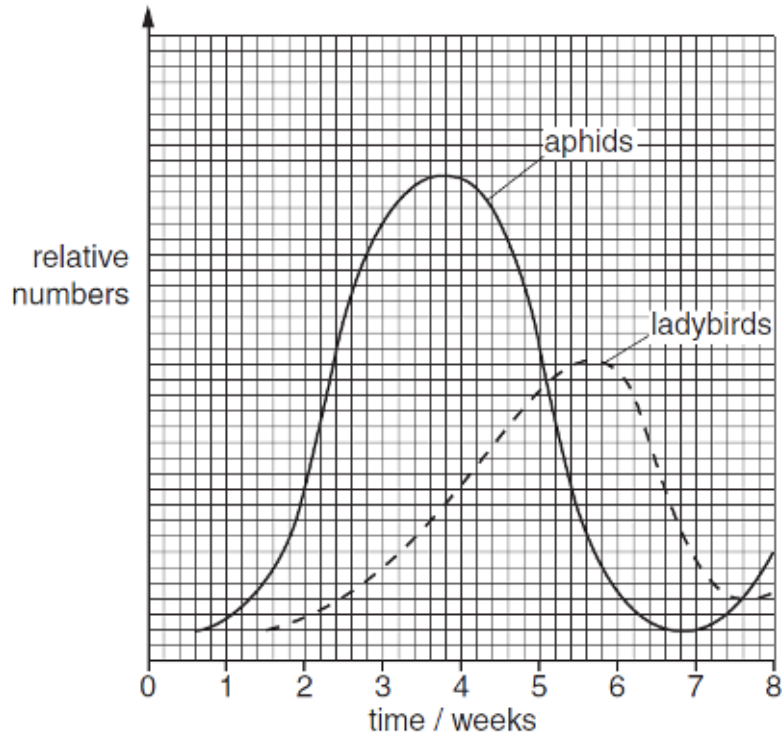


Fig 3.1

(a) Suggest one advantage (A) and one disadvantage (D) of a farmer using biological pest control as outlined above.

A

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D

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(b) Suggest two advantages, other than predation of pests, of maintaining invertebrate populations in arable land

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(c) Suggest how a farmer might measure the number of ladybirds in the field at any given time.

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(d) Explain the changes in the ladybird population in Fig 3.1 between weeks 3 and 7.

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[Total: 8]

B4 Photosynthesis occurs in green plants, and other photosynthetic organisms such as algae.

A student, Anthony, was interested in investigating factors that affect the rate of photosynthesis in an aquatic plant. They used the equipment as shown in **Figure 3.1** to measure the rate of photosynthesis when light intensity was changed. The data obtained can be seen in **Table 3.2**.

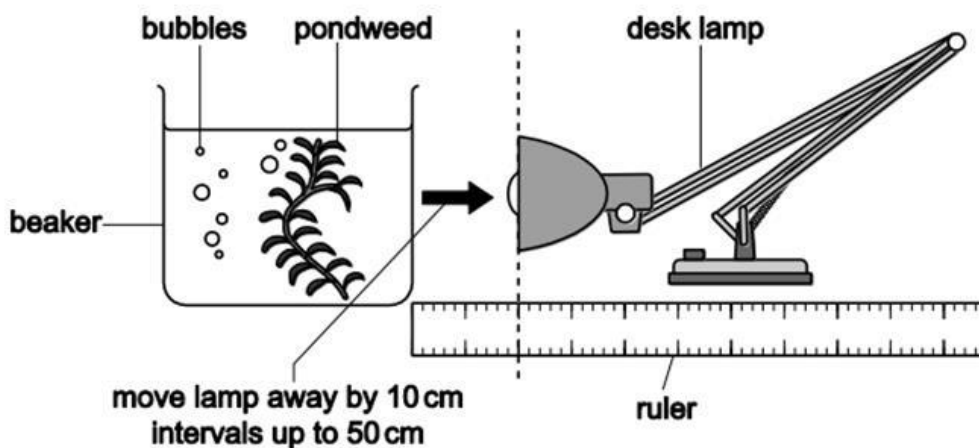


Fig 3.1 (© OCR)

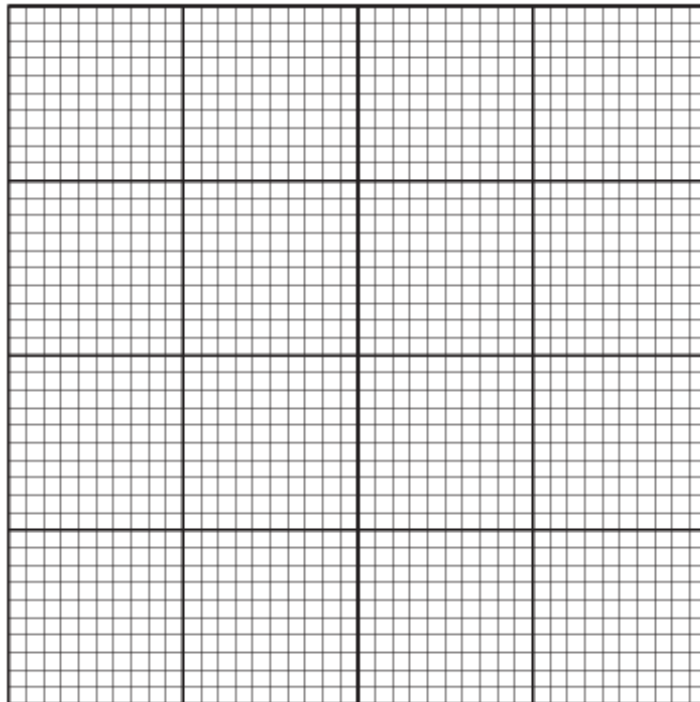
| Distance from light /cm | Number of bubbles produced in five minutes | Rate of photosynthesis / bubbles min ⁻¹ |
|-------------------------|--|--|
| 10 | 85 | |
| 20 | 80 | |
| 30 | 61 | |
| 40 | 42 | |

Table 3.2

(a) State a feature of the cells of algae that they share with plants which allow them to photosynthesise.

..... [1]

(b) Complete **Table 3.2** and then plot a graph of Anthony's data shown in **Table 3.2**.



[5]

Plants also aerobically respire and the process is summarised with the following word equation:



(c) Suggest one reason why this word equation is a simplification of the process.

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..... [1]

(d) Another student, Rupert, was interested in measuring the rate of aerobic respiration in a Geranium (*Pelargonium*) plant. Suggest how they might set up an experiment to investigate how temperature affected the rate of aerobic respiration.

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[Total: 10]

