**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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|---|---|---|---|---|---|---|---|---|---|
| CANDIDATE NAME | | | | | | | | | |
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**BIOLOGY** **0610/21**

Paper 2 Core **May/June 2015**

**1 hour 15 minutes**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **18** printed pages and **2** blank pages.

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CAMBRIDGE International Examinations

**1** Flowering plants can be divided into two groups: monocotyledons and eudicotyledons (dicotyledons).

Complete Table 1.1 to state the differences between these two types of flowering plants. An example has been done for you.

View solution

**Table 1.1**

| difference | monocotyledons | eudicotyledons (dicotyledons) |
|---|---|---|
| number of cotyledons in the seed | 1 | 2 |
| pattern of leaf veins | | |
| number of petals present | | |

[4]

**[Total: 4]**

**2 (a) (i)** Sometimes teeth develop dental decay.

View solution

Describe how dental decay develops.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

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**(ii)** Table 2.1 states three methods of caring for the teeth to prevent dental decay.

Complete Table 2.1 by describing why each method is effective.

View solution

**Table 2.1**

| method of caring for the teeth | description of why the method is effective |
|---|---|
| brushing | |
| rinsing the mouth after eating | |
| not eating sweet foods between meals | |

[3]

**(b) (i)** There are four types of teeth.

View solution

State the functions of each of the following when food is being eaten.

incisors .....

.....

canines .....

.....

premolars and molars .....

.....

[3]

**(ii)** Suggest how the tongue helps in the process of chewing.

View solution

.....

.....

..... [1]

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**(c)** Describe **two** reasons why solid food is chewed before it is swallowed.

1 .....

.....

2 .....

.....

[2]

**[Total: 13]**

View solution

**3** Fig. 3.1 shows the human respiratory system.

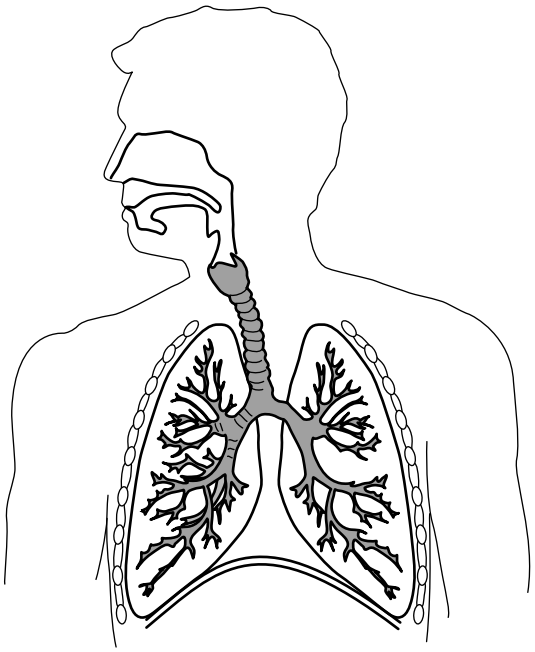

**Fig. 3.1**

**(a)** On Fig. 3.1 use label lines to identify:

a bronchiole;

the larynx;

the trachea.

[3]

**(b)** Fig. 3.2 shows:

a group of alveoli and the capillaries surrounding them in a human lung;
a section through this group of alveoli with most of the capillaries removed;
a magnified section of part of the wall of an alveolus and its capillary.

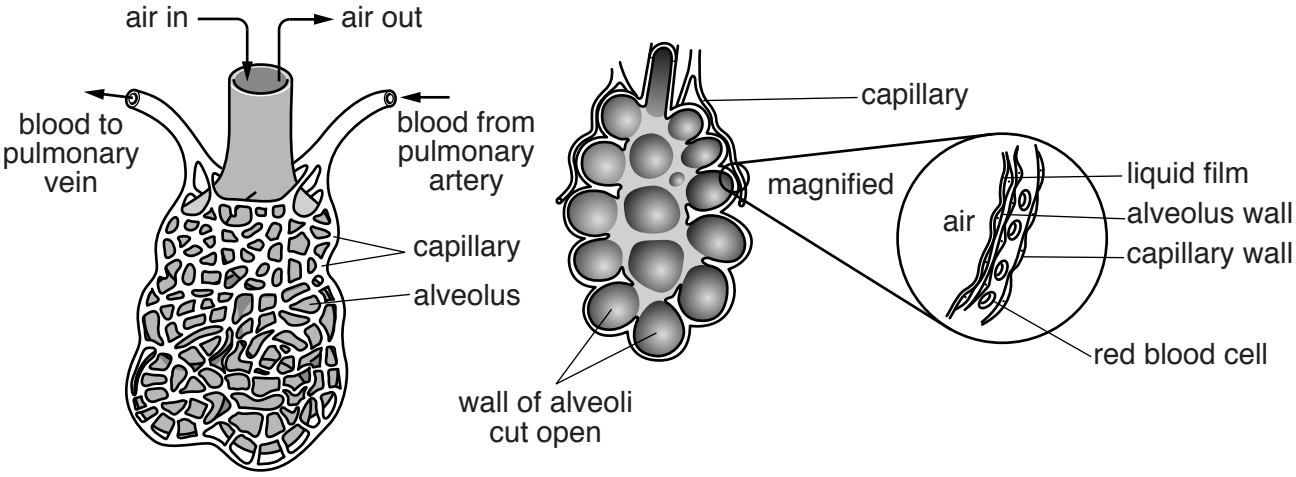


**Fig. 3.2**

Use Fig. 3.2 to describe **three** features of gas exchange surfaces in animals.

feature 1 .....

.....

feature 2 .....

.....

feature 3 .....

.....

[3]

**(c)** In an investigation a student recorded the volume of air inspired in one minute. The measurement was taken while the student was resting and again when the student had run an 800 m race.

View solution

The results are shown in Table 3.1.

**Table 3.1**

| | volume of air inspired / $dm^3$ per min |
|---|---|
| before the race | 5.80 |
| at the end of the race | 88.75 |

**(i)** Calculate the increase in the volume of air inspired by the student at the end of the race.

.....$dm^3$ per min [1]

**(ii)** State **two** changes that the body makes to increase the volume of air inspired.

View solution

1 .....

.....

2 .....

.....

[2]

**(iii)** Suggest **one** reason why the body needs more air during exercise.

View solution

.....

.....

..... [1]

**[Total: 10]**

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**4** **(a)** Describe how deforestation harms the environment.

View solution

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

**(b)** Humans are polluting the environment.

View solution

Complete Table 4.1 by naming **two** examples of pollutants in each part of the environment.
You should name different pollutants for each part of the environment.

**Table 4.1**

| part of the environment | pollutant |
|---|---|
| air | 1 .....<br>2 ..... |
| land | 1 .....<br>2 ..... |
| water | 1 .....<br>2 ..... |

[3]

**[Total: 7]**

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**5** **(a)** Define the following genetic terms.

View solution

*mutation* .....

.....

.....

*heterozygous* .....

.....

.....

*recessive allele* .....

.....

.....

[6]

**(b)** People use sun-cream to protect their skin. Ultra-violet light from the sun is a type of ionising radiation.

View solution

Fig. 5.1 shows sun-cream being applied.




**Fig. 5.1**

Suggest how using sun-cream reduces the damaging effect of the Sun's rays.

.....

.....

.....

[1]

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**(c)** Fig. 5.2 shows the hand of a person who suffers from a mutation that results in people having more than five digits on each hand (polydactyly).



**Fig. 5.2**

The mutation that results in this condition is **dominant**.

Fig. 5.3 shows how the condition is inherited in a family.

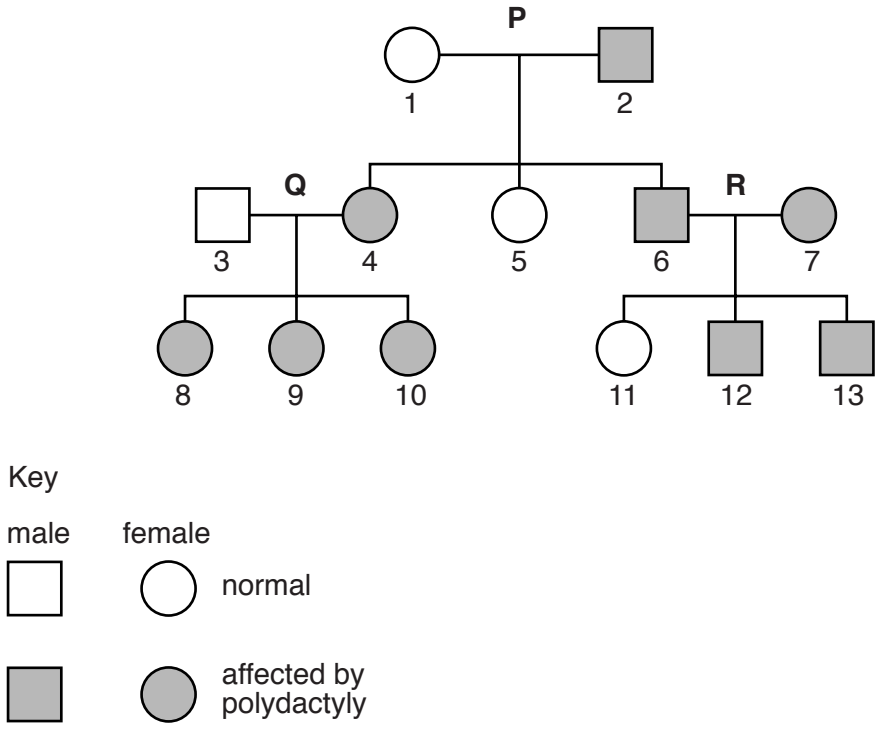


**Fig. 5.3**

**(i)** State the genotype of the individuals shown in Fig. 5.3.

View solution

Use **AA**, **Aa** or **aa**.

Write your answers in Table 5.1.

**Table 5.1**

| numbered person on Fig. 5.3 | genotype of person |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 9 | |

[4]

**(ii)** Using evidence from Fig. 5.3, state which of the couples, **P**, **Q** or **R**, provides proof that the mutation is **not** recessive.

couple ..... [1]

**(iii)** Explain the reason for your answer.

.....

.....

.....

..... [2]

**[Total: 14]**

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**6** Fig. 6.1 shows a section through a seed.

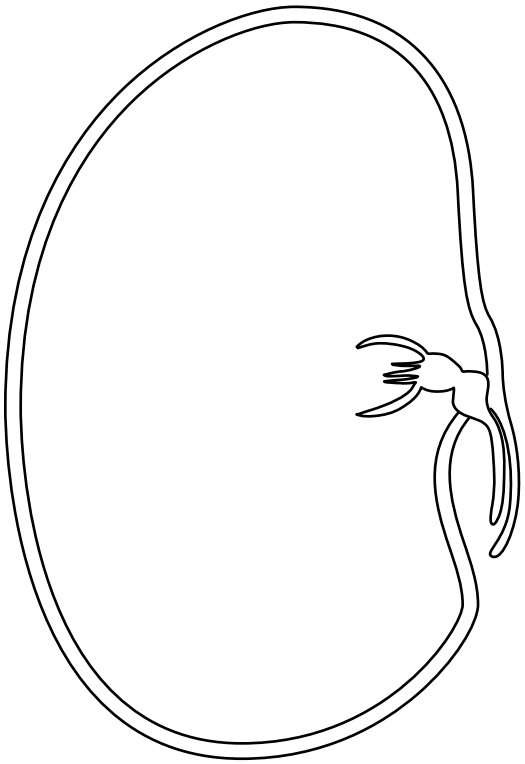

**Fig. 6.1**

**(a)** Using label lines, identify the following structures on Fig. 6.1:

View solution

the plumule;

the radicle;

the testa.

[3]

**(b)** Name the structure in the seed that contains a store of food.

View solution

..... [1]

**(c)** State the importance of seed dispersal to a plant.

View solution

.....

..... [1]

**[Total: 5]**

**7** **(a)** Fig. 7.1 shows the relationships between some organisms in part of an ecosystem.

View solution

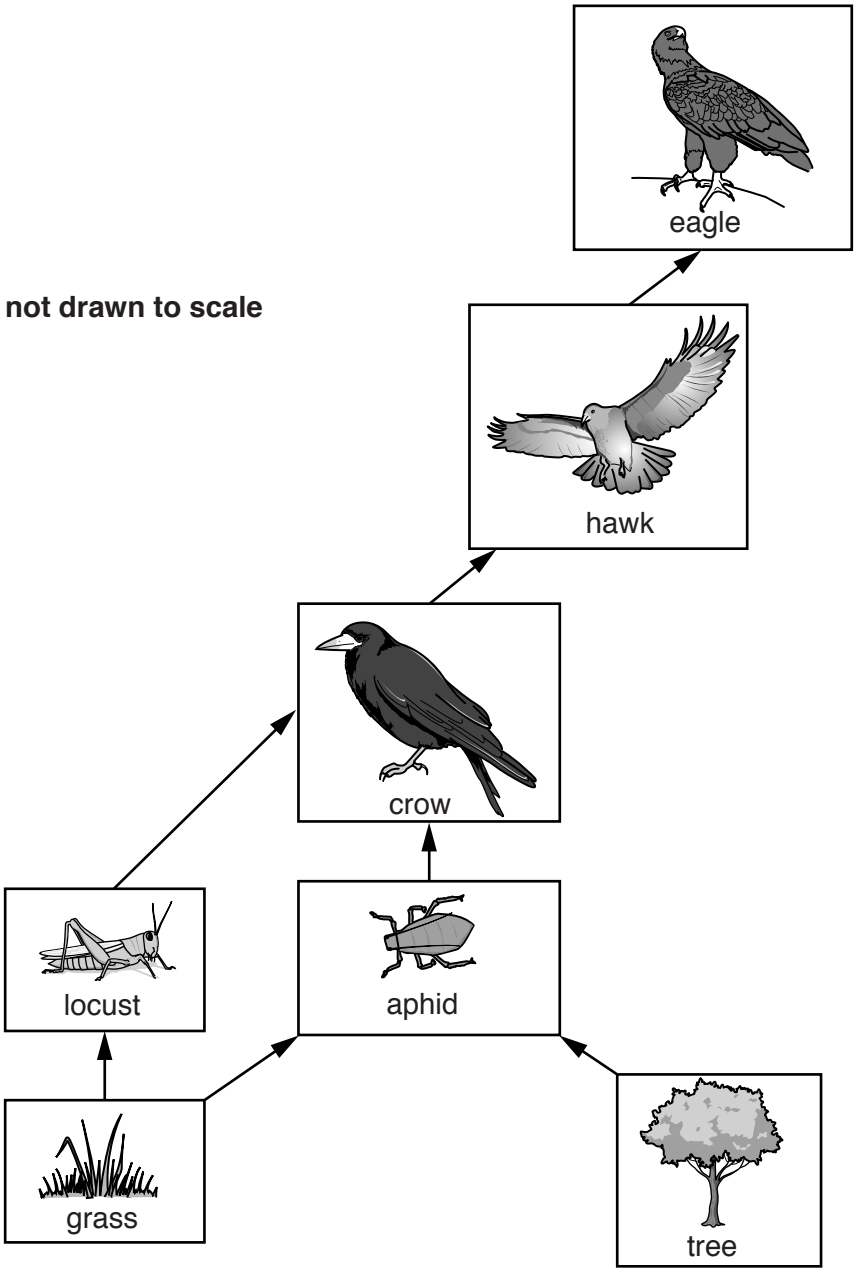


**Fig. 7.1**

**(i)** Finches are another organism in this ecosystem. These birds eat the seeds that the tree produces, and the hawks and eagles eat the finches.

Add this information to Fig. 7.1. [3]

**(ii)** Suggest and explain **two** changes that might occur if the eagles in this ecosystem died out.

change .....

.....

explanation .....

.....

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change .....

.....

explanation .....

.....

[4]

**(b)** The boxes on the left contain the names of types of organisms found in a food web.

The boxes on the right contain definitions of these types of organisms.

Draw a line from each box on the left to the box on the right that states its definition.

One example has been done for you.

| | |
|---|---|
| carnivore | an animal that gets its energy by eating other animals |
| consumer | the position of an organism in a food chain, food web or pyramid of numbers, biomass or energy |
| decomposer | an animal that gets its energy from eating plants |
| herbivore | an organism that gets its energy from feeding on other organisms |
| producer | an organism that gets its energy from dead or waste organic matter |
| | an organism that makes its own organic nutrients, usually using energy from sunlight, through photosynthesis |

[4]

**[Total: 11]**

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**8** **(a)** The digestive system produces enzymes.

View solution

Define the term *enzyme*.

.....

.....

.....

.....

..... [2]

**(b)** Fig. 8.1 shows how the reaction rates of two different enzymes, **L** and **M**, vary when the pH changes.

View solution

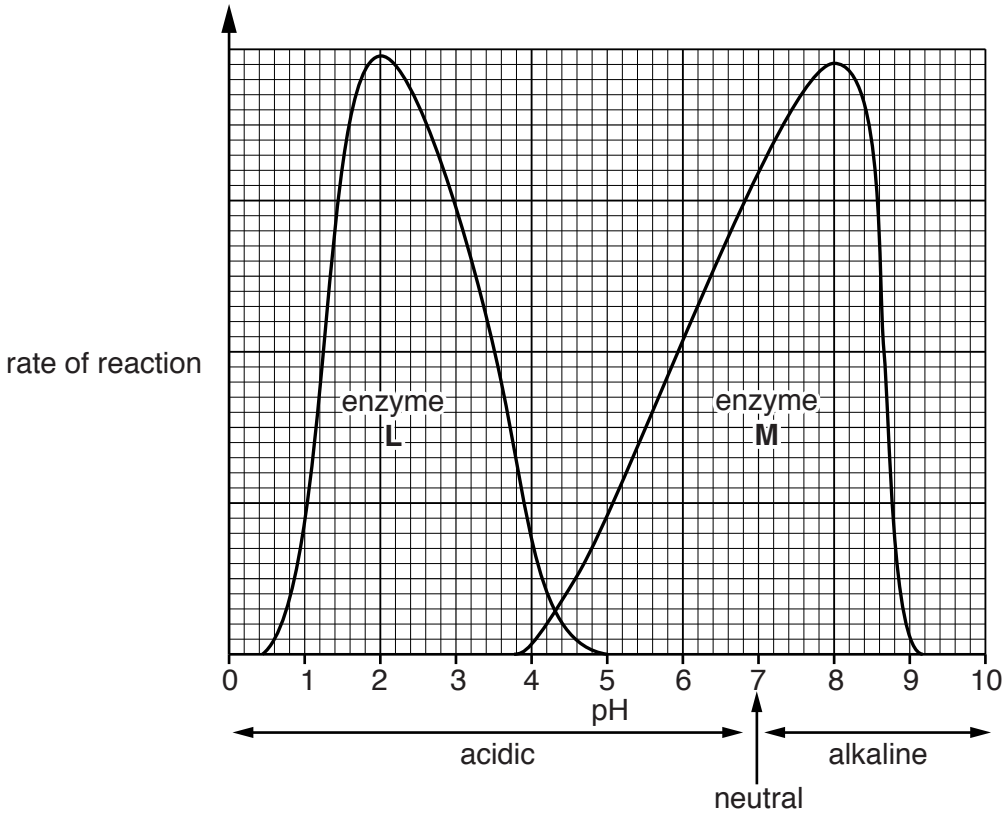


**Fig. 8.1**

Use Fig. 8.1 to state the pH at which each of these enzymes work the fastest.

pH for enzyme **L**: .....

pH for enzyme **M**: .....

[2]

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**(c)** Table 8.1 lists the names of three enzymes found in the alimentary canal.

Complete Table 8.1 by writing in the names of the substrate and **one** end-product for each enzyme.

View solution

Choose your answers from the list.

| | | | |
|---|---|---|---|
| **amino acids** | **cellulose** | **fat** | **fatty acids** |
| **glucose** | **glycerol** | **maltose** | **protein** |
| **starch** | **vitamins** | | |

**Table 8.1**

| name of enzyme | substrate | one end-product |
|---|---|---|
| amylase | | |
| lipase | | |
| protease | | |

[6]

**[Total: 10]**

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**9** **(a)** Fig. 9.1 shows a green plant.

View solution

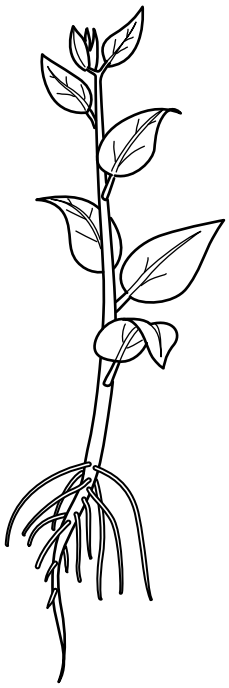

**Fig. 9.1**

Plants need to move substances around between their leaves, stems and roots. One of the processes they use is translocation.

Describe the process of translocation.

.....

.....

.....

.....

.....

.....

..... [3]

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**(b)** Fig. 9.2 shows the whole plant and sections through its root, stem and a leaf.

View solution

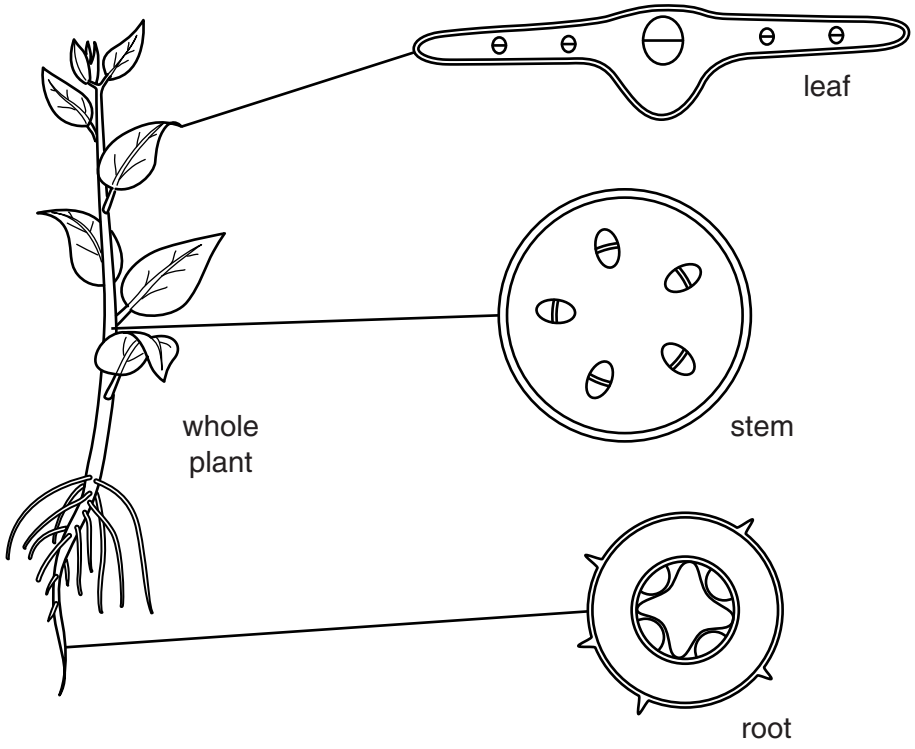


**Fig. 9.2**

On Fig. 9.2 use label lines and the letter **X** to identify one region of xylem in **each** section (root, stem and leaf). [3]

**[Total: 6]**

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