CAMBRIDGE IGCSE BIOLOGY · 0610

BIOLOGY



EXAM QUESTION PACK

TOPIC 1: CHARACTERISTICS AND CLASSIFICATION OF LIVING ORGANISMS

SCORE	PERCENTAGE
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Characteristics and classification of living organisms – 2023 November IGCSE 0610

1. Nov/2023 /Paper_ 0610/11/No.1

Some processes carried out by living organisms are listed.

1 egestion

2 excretion

3 reproduction

4 respiration

Which processes are carried out by **all** living organisms?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 2, 3 and 4 only

D 3 and 4 only

2. Nov/2023 /Paper_ 0610/11/No.2

The scientific name for humans is *Homo sapiens*.

What does *Homo* refer to?

A mammal

B genus

C kingdom

D species

3. Nov/2023 /Paper_ 0610/11/No.3

Which row is correct for arthropod classification?

	arthropod group	antennae present	number of body parts	number of legs
A	arachnids	no	2	6
B	crustaceans	yes	3	8
C	insects	yes	3	6
D	myriapods	no	2	4

4. Nov/2023 /Paper_ 0610/11/No.4

In a mesophyll cell, where are chloroplasts found?

A between the cell wall and the cell membrane

B in the cytoplasm

C in the nucleus

D in the vacuole

5. Nov/2023 /Paper_ 0610/11/No.5

The cell shown in the diagram has been magnified 3000 times. The diagram is 21 mm wide.



What is the actual diameter of the cell?

A 21 mm

B $\frac{21\text{mm}}{3000}$

C 21 mm × 3000

D $\frac{3000}{21\text{mm}}$

6. Nov/2023 /Paper_ 0610/13/No.1

What are characteristics of all living organisms?

A breathing, growth and movement

B egestion, nutrition and reproduction

C digestion, excretion and respiration

D reproduction, respiration and sensitivity

7. Nov/2023 /Paper_ 0610/13/No.2

Using the binomial system, the name of a lion is *Panthera leo*.

Which statement is correct?

A The lion belongs to the kingdom *Panthera*.

B The lion belongs to the genus *Panthera*.

C The lion belongs to the species *Panthera*.

D The lion belongs to the genus *leo*.

8. Nov/2023 /Paper_ 0610/13/No.3

Which feature would place organisms into the crustacean group of arthropods?

A eight legs

B six legs

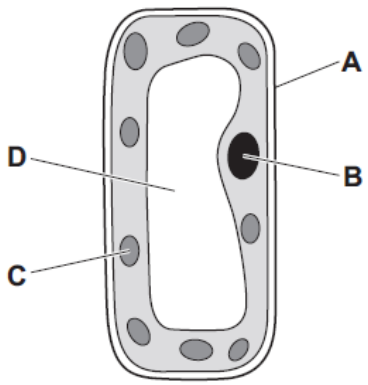
C two pairs of antennae

D usually have two pairs of wings

9. Nov/2023 /Paper_ 0610/13/No.4

The diagram shows the structure of a palisade cell from a leaf.

Which structure contains chlorophyll?



10. Nov/2023 /Paper_ 0610/13/No.5

A bacterial cell has a length of 40 mm when it is magnified by ×20 000.

What is the actual length of the bacterial cell?

A 0.0002 mm **B** 0.002 mm **C** 0.02 mm **D** 0.2 mm

11. Nov/2023 /Paper_ 0610/21/No.1

Some processes carried out by living organisms are listed.

1 egestion

2 excretion

3 reproduction

4 respiration

Which processes are carried out by **all** living organisms?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 2, 3 and 4 only

D 3 and 4 only

12. Nov/2023 /Paper_ 0610/21/No.2

The scientific name for humans is *Homo sapiens*.

What does *Homo* refer to?

A mammal

B genus

C kingdom

D species

13. Nov/2023 /Paper_ 0610/21/No.3

Some structures found in cells are listed.

1 cell membrane

2 cell wall

3 mitochondria

4 nucleus

Which structures are found in prokaryotic cells?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

14. Nov/2023 /Paper_ 0610/21/No.4

In a mesophyll cell, where are chloroplasts found?

A between the cell wall and the cell membrane

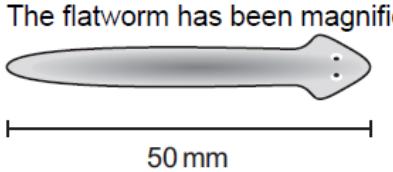
B in the cytoplasm

C in the nucleus

D in the vacuole

15. Nov/2023 /Paper_ 0610/21/No.5

The diagram shows a flatworm. The flatworm has been magnified by ×100.



What is the actual size of the flatworm?

A 0.5 μm **B** 5 μm **C** 50 μm **D** 500 μm

16. Nov/2023 /Paper_ 0610/22/No.1

Which processes are characteristics of **all** living organisms?

1 digestion

2 respiration

3 excretion

A 1, 2 and 3 **B** 1 only **C** 2 and 3 only **D** 2 only

17. Nov/2023 /Paper_ 0610/22/No.2

Using the binomial system, the Arctic fox is called *Vulpes lagopus*.

Which row is correct?

	Vulpes	*lagopus*
A	genus	kingdom
B	genus	species
C	species	genus
D	species	kingdom

18. Nov/2023 /Paper_ 0610/22/No.3

Which feature is found in viruses?

A cell wall

B mitochondria

C nucleus

D protein coat

19. Nov/2023 /Paper_ 0610/22/No.4

Which features are possessed by **all** plant cells?

	a cell wall	chloroplasts
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

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20. Nov/2023 /Paper_ 0610/22/No.5

21. Nov/2023 /Paper_ 0610/23/No.1

What are characteristics of all living organisms?

A breathing, growth and movement

B egestion, nutrition and reproduction

C digestion, excretion and respiration

D reproduction, respiration and sensitivity

22. Nov/2023 /Paper_ 0610/23/No.2

Using the binomial system, the name of a lion is *Panthera leo*.

Which statement is correct?

A The lion belongs to the kingdom *Panthera*.

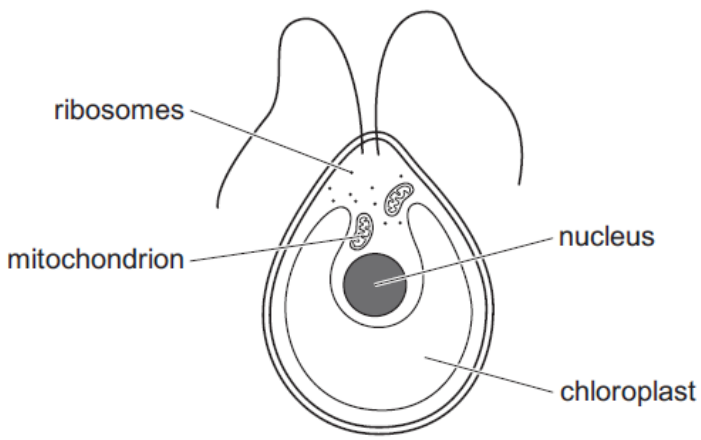
B The lion belongs to the genus *Panthera*.

C The lion belongs to the species *Panthera*.

D The lion belongs to the genus *leo*.

23. Nov/2023 /Paper_ 0610/23/No.3

The diagram shows an organism called *Chlamydomonas*.



Which processes can *Chlamydomonas* carry out?

A photosynthesis and respiration only

B photosynthesis, respiration, and protein synthesis

C protein synthesis and respiration only

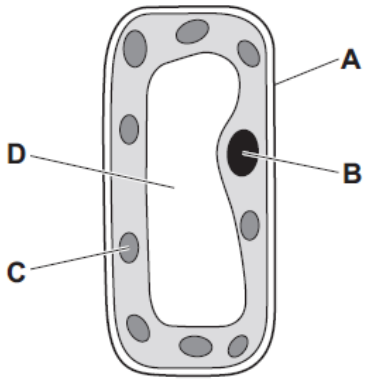
D respiration only

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24. Nov/2023 /Paper_ 0610/23/No.4

The diagram shows the structure of a palisade cell from a leaf.

Which structure contains chlorophyll?



25. Nov/2023 /Paper_ 0610/23/No.5

A diagram of a white blood cell has a diameter of 76 mm. The magnification of the diagram is ×8000.

What is the actual diameter of the white blood cell?

A 0.095 µm **B** 0.95 µm **C** 9.5 µm **D** 95.0 µm

26. Nov/2023 /Paper_ 0610/32/No.8(a)

(a) All living organisms can be classified into groups by the features they share.

(i) Complete the sentences about classifying organisms.

A species is a group of organisms that reproduce to produce

..... offspring.

All species are named using an internationally agreed system called the

..... system.

Fish, mammals, reptiles and amphibians are vertebrate groups. The other

vertebrate group is ..... . All vertebrates belong to the

..... kingdom.

One feature that is used to identify vertebrates is a ..... .

[5]

(ii) Draw a (circle) around the characteristic shared by all living organisms.

egestion **nutrition** **sexual reproduction** **transpiration**

[1]

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27. Nov/2023 /Paper_ 0610/33/No.7(a_ b)

Fig. 7.1 is a photograph of a lionfish (*Pterois volitans*).

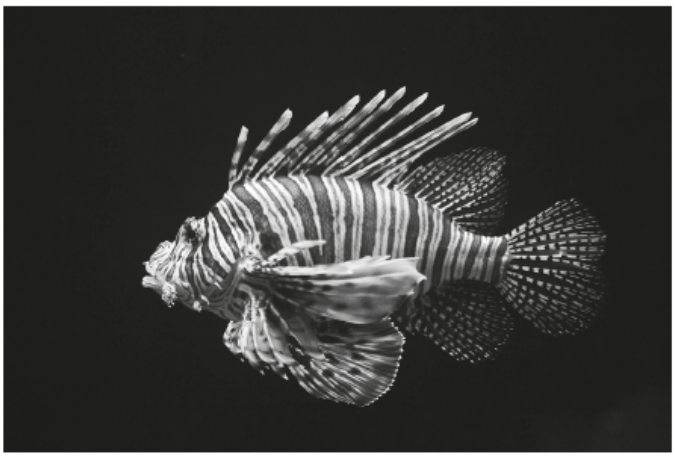


Fig. 7.1

(a) State the genus of the lionfish.

..... [1]

(b) Lionfish are classified as fish.

Table 7.1 shows features of organisms.

Place ticks (✓) in the boxes to show the correct features of birds, fish and insects.

Table 7.1

features	birds	fish	insects
compound eyes			
feathers			
internal skeleton			

[3]

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1. June/2023/Paper_0610/11/No.1

What are characteristics of all organisms?

A egestion and excretion

B egestion and nutrition

C excretion and nutrition

D excretion and photosynthesis

2. June/2023/Paper_0610/11/No.2

The scientific name for the golden eagle is *Aquila chrysaetos*.

What is the genus of the golden eagle?

A *Aquila*

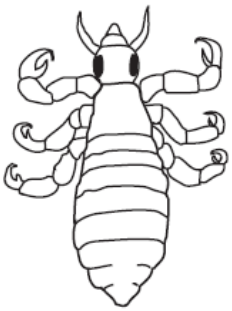
B *chrysaetos*

C eagle

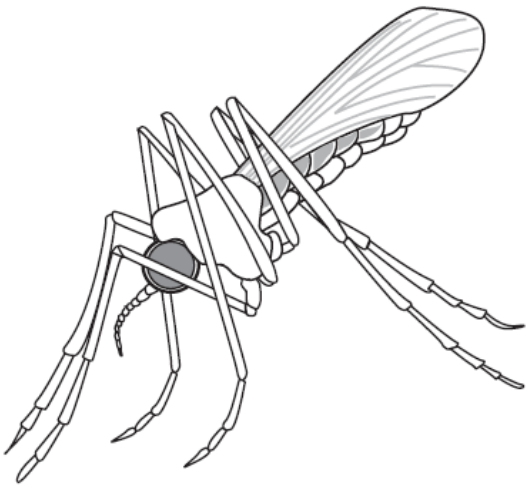
D golden

3. June/2023/Paper_0610/11/No.3

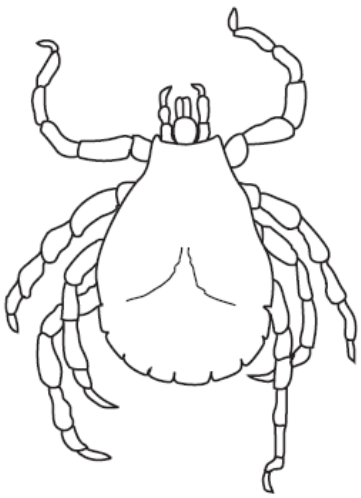
The diagram shows four arthropods.



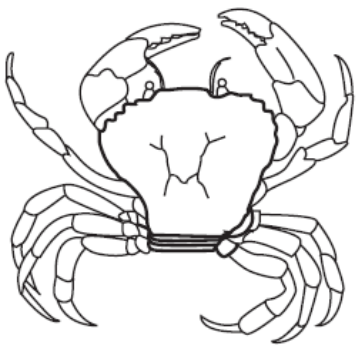
Pediculus ×20



Anopheles ×10



Dermacentor ×7



Carcinus ×0.5

How many of these arthropods are insects?

A 1 **B** 2 **C** 3 **D** 4

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4. June/2023/Paper_0610/12/No.1

Living animals release carbon dioxide.

This is an example of which life process?

A excretion

B movement

C nutrition

D sensitivity

5. June/2023/Paper_0610/12/No.2

Some statements about species are given.

1 Members of a species all look identical.

2 Members of a species belong to the same genus.

3 Members of a species can produce fertile offspring.

4 Species are named using an international system.

Which statements are correct?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 2 and 4 only

D 2, 3 and 4 only

6. June/2023/Paper_0610/12/No.3

The table shows some features of different animals.

Which animal is a reptile?

	wings	hair	scales
A	✗	✗	✓
B	✗	✗	✗
C	✓	✗	✓
D	✗	✓	✗

7. June/2023/Paper_0610/12/No.4

Which structures are found in the cells of all living organisms?

1 cell membrane

2 chloroplast

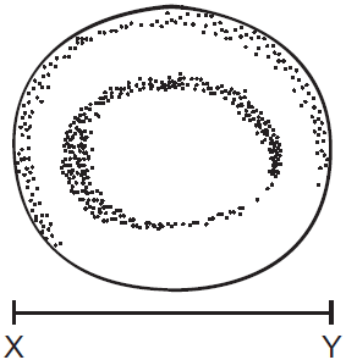
3 cytoplasm

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

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8. June/2023/Paper_0610/12/No.5

A diagram of a human red blood cell is shown. The length of line XY on the diagram is 40 mm. The actual width of the cell is 0.008 mm.



What is the magnification of the diagram?

A ×500 **B** ×5000 **C** ×50 000 **D** ×500 000

9. June/2023/Paper_0610/13/No.1

What are excretion, sensitivity and reproduction characteristics of?

A all animals and all plants

B animals only

C plants only

D some animals and some plants

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10. June/2023/Paper_0610/13/No.2

The photograph shows an organism.



Which visible feature can be used to classify this organism as a bird?

A feathers

B lays eggs

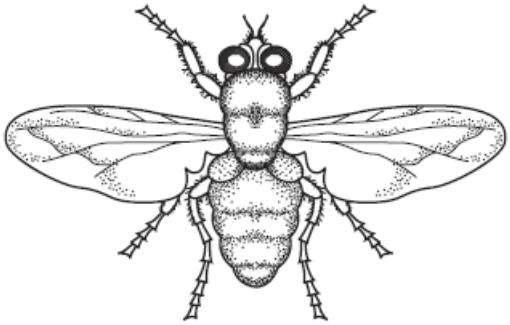
C two legs

D wings

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11. June/2023/Paper_0610/13/No.3

The diagram shows an arthropod.



Which features are characteristic of **all** arthropods?

A jointed legs and segmented body

B jointed legs and thorax

C segmented body and wings

D thorax and wings

12. June/2023/Paper_0610/13/No.4

Which statement about cell structure is correct?

A An animal cell has a cell wall.

B A bacterium has a cell wall.

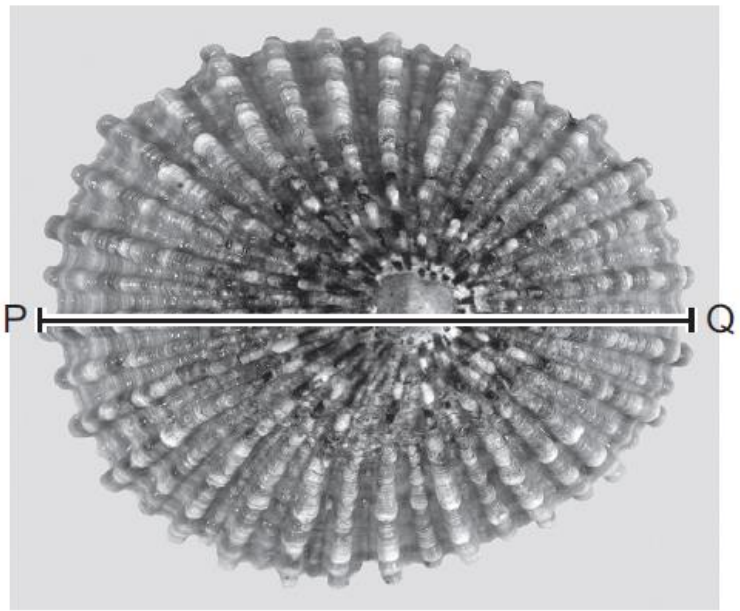
C An animal cell has chloroplasts.

D A bacterium has chloroplasts.

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13. June/2023/Paper_0610/13/No.5

The photograph shows a limpet. The length of line PQ on the image is 65 mm.



×2.5

What is the actual diameter of the limpet along line PQ?

A 2.6 mm **B** 19.5 mm **C** 26 mm **D** 195 mm

14. June/2023/Paper_0610/21/No.1

What are characteristics of all organisms?

A egestion and excretion

B egestion and nutrition

C excretion and nutrition

D excretion and photosynthesis

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15. June/2023/Paper_0610/21/No.2

The scientific name for the golden eagle is *Aquila chrysaetos*.

What is the genus of the golden eagle?

A *Aquila*

B *chrysaetos*

C eagle

D golden

16. June/2023/Paper_0610/21/No.3

Which row shows structures that are present in both root hair cells and palisade mesophyll cells?

	cell wall	chloroplasts	cytoplasm	vacuole
A	✓	✓	✓	✗
B	✗	✓	✓	✓
C	✓	✗	✓	✓
D	✓	✓	✗	✓

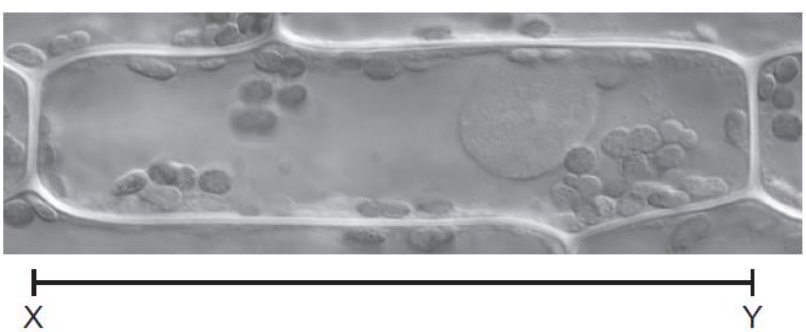
key

✓ = present

✗ = absent

17. June/2023/Paper_0610/21/No.4

The photomicrograph shows a plant cell. The length of line XY is 90 mm. The actual length of the cell is 30 µm.



What is the magnification of the photomicrograph?

A ×300 **B** ×3000 **C** ×33 000 **D** ×330 000

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18. June/2023/Paper_0610/22/No.1

Which process occurs both in plants and in animals?

A excretion

B phagocytosis

C photosynthesis

D transpiration

19. June/2023/Paper_0610/22/No.2

Some statements about species are given.

1 Members of a species all look identical.

2 Members of a species belong to the same genus.

3 Members of a species can produce fertile offspring.

4 Species are named using an international system.

Which statements are correct?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 2 and 4 only

D 2, 3 and 4 only

20. June/2023/Paper_0610/22/No.3

Which structures are found in the cells of all living organisms?

1 cell membrane

2 chloroplast

3 cytoplasm

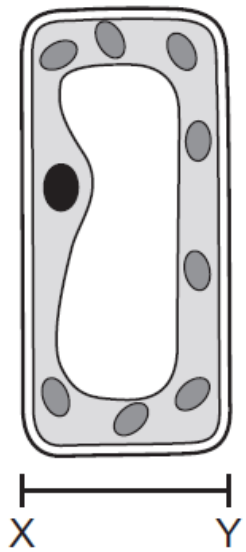
A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

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21. June/2023/Paper_0610/22/No.4

In the diagram of the palisade cell, the distance between X and Y is 20 mm.

The actual width of the cell between X and Y is 40 µm.



What is the magnification of the diagram?

A ×200 **B** ×500 **C** ×2500 **D** ×5000

22. une/2023/Paper_0610/23/No.1

What are two characteristics of all living organisms?

A breathing and reproduction

B photosynthesis and excretion

C reproduction and respiration

D respiration and photosynthesis

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23. June/2023/Paper_0610/23/No.2

The photograph shows an organism.



Which visible feature can be used to classify this organism as a bird?

A feathers

B lays eggs

C two legs

D wings

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24. June/2023/Paper_0610/23/No.3

Which statement about cell structure is correct?

A An animal cell has a cell wall.

B A bacterium has a cell wall.

C An animal cell has chloroplasts.

D A bacterium has chloroplasts.

25. June/2023/Paper_0610/23/No.4

The diameter of an egg cell from a frog is 2.5 mm.

The diameter of an egg cell from a human is 120 μm.

Which value shows approximately how many times larger an egg cell from a frog is than an egg cell from a human?

A ×2 **B** ×21 **C** ×48 **D** ×300

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26. June/2023/Paper_0610/31/No.1

(a) Describe the meaning of the term species.

.....

.....

..... [2]

(b) Fig. 1.1 is a photograph of *Lithobius forficatus*, a species of myriapod.



Fig. 1.1

(i) State the genus of the organism shown in Fig. 1.1.

..... [1]

(ii) State **one** feature **visible** in Fig. 1.1 that identifies the organism as:

a myriapod .....

an arthropod. .....
[2]

(iii) State the names of **two** groups of arthropods, other than myriapods.

1 .....

2 .....
[2]

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(iv) State **two** features of plant cells that would be **absent** in the cells of the organism shown in Fig. 1.1.

1 .....

2 .....

[2]

(c) Adaptive features enable organisms to survive in their environment.

Fig. 1.2 is a photograph of another species of arthropod. Some of its adaptive features are visible in Fig. 1.2.



Fig. 1.2

(i) State **one** adaptive feature visible in Fig. 1.2 that reduces water loss when the organism is on land.

..... [1]

(ii) State the name of the kingdom that the organism in Fig. 1.2 belongs to.

..... [1]

[Total: 11]

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27. June/2023/Paper_0610/32/No.1

Fig. 1.1 shows a photograph of a pseudoscorpion.



Fig. 1.1

(a) (i) State **two** features, **visible** in Fig. 1.1, that can be used to classify this organism as an arachnid.

1 .....

2 .....

[2]

(ii) State the kingdom that arachnids belong to.

..... [1]

(b) (i) Complete the definition of the term adaptive feature by inserting the missing words.

An adaptive feature is an ..... feature that helps an organism to

..... and ..... in its environment.

[3]

(ii) The part labelled **A** in Fig. 1.1 is an adaptive feature of the pseudoscorpion.

Suggest a function of the part labelled **A** in Fig. 1.1.

.....

.....

..... [1]

[Total: 7]

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28. June/2023/Paper_0610/32/No.2a

(a) Fig. 2.1 is a diagram showing some of the structures found in a plant cell.

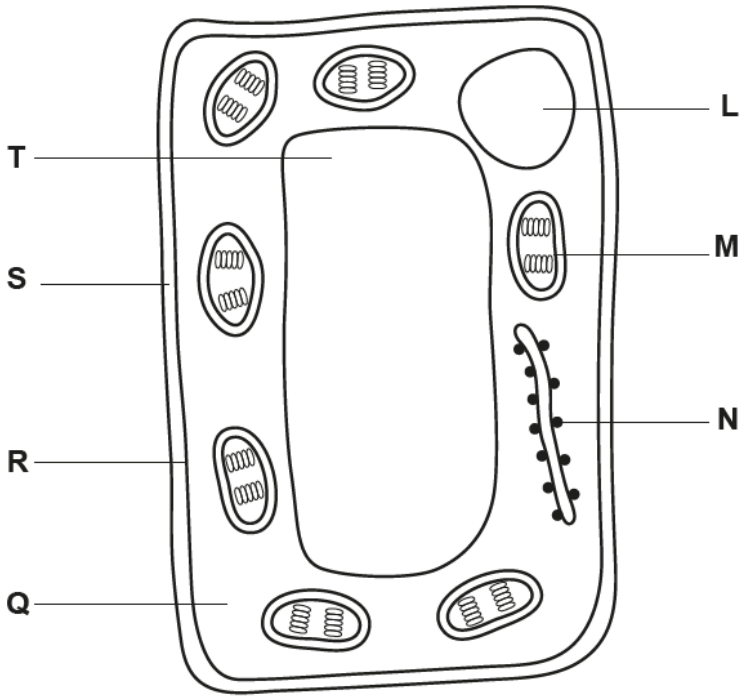


Fig. 2.1

Table 2.1 shows the names of some plant cell structures, their functions and the letters that identify them in Fig. 2.1.

Complete Table 2.1 by writing the missing name, letters and functions in the spaces provided.

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Table 2.1

name of structure	letter from Fig. 2.1	**one** function
chloroplast		site of photosynthesis
ribosome	**N**	
cell wall		prevents the cell bursting
	L	

[5]

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29. June/2023/Paper_0610/33/No.1

(a) Fig. 1.1 is a photograph of an insect. Insects are arthropods.



Fig. 1.1

(i) Arthropods belong to the animal kingdom.

State the name of **one other** kingdom.

..... [1]

(ii) State **one** feature **visible** in Fig. 1.1 that is present in insects but **not** in the other groups of arthropods.

..... [1]

(iii) Complete Table 1.1 by writing:

- the names of **two** groups of arthropods **other than** insects
- **one** identifying feature for each named group.

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Table 1.1

arthropod group	name of the arthropod group	identifying feature
1		
2		

[4]

(b) (i) Complete the description of an adaptive feature.

An adaptive feature is an ..... feature that helps an organism to survive and ..... in its environment.

[2]

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(ii) Fig. 1.2 is a photograph of a leaf insect.

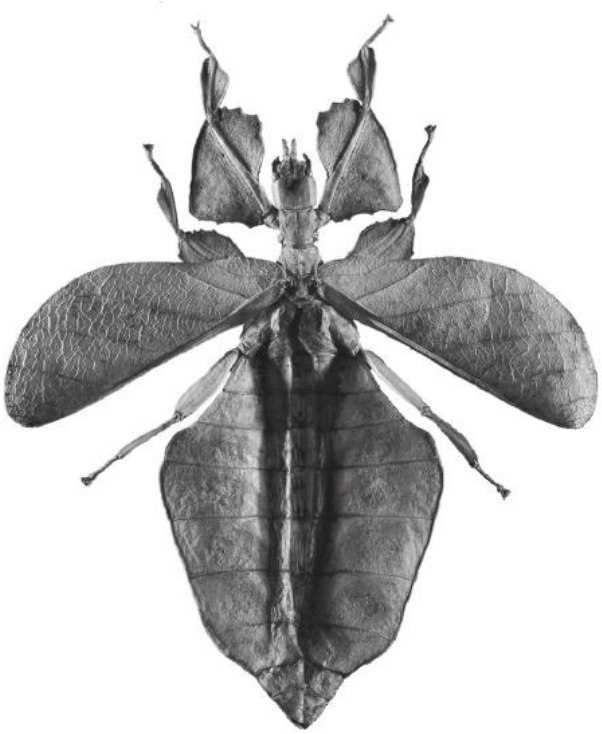


Fig. 1.2

State **one** adaptive feature **visible** in Fig. 1.2 and suggest how the adaptive feature helps the animal to survive.

feature .....

.....

suggestion .....

.....

.....

[2]

[Total: 10]

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30. June/2023/Paper_0610/33/No.2

(a) Fig. 2.1 is a labelled diagram of an animal cell.

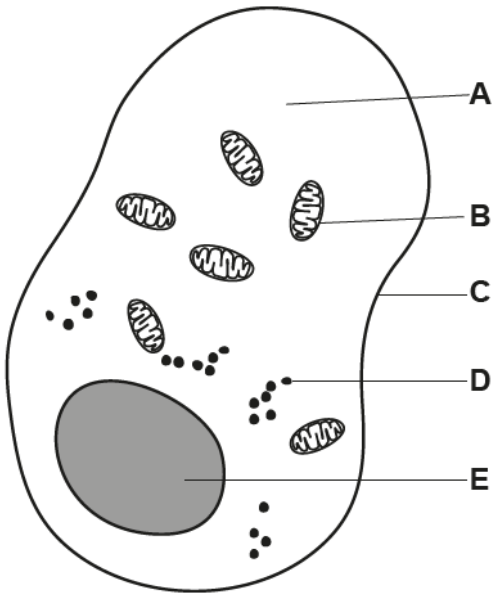


Fig. 2.1

(i) The boxes on the left show the functions of some of the structures shown in Fig. 2.1.

The boxes on the right show the letters of the structures labelled in Fig. 2.1.

Draw lines to link each function to the correct letter.

Draw **four** lines.

functions	**letter in Fig. 2.1**
contains and supports other cell structures	**A**
controls the activities of the cell	**B**
controls which substances enter or leave the cell	**C**
protein synthesis	**D**
	E

[4]

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(b) Respiration is a characteristic of living organisms.

State **three other** characteristics of all living organisms.

1 .....

2 .....

3 .....

[3]

[Total: 9]

31. June/2023/Paper_0610/42/No.3b

(b) **(i)** Bacteria are prokaryotes.

State **two** features of **all** prokaryotes.

1 .....

2 .....

[2]

(ii) Some bacteria have a flagellum.

State the function of a flagellum.

..... [1]

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32. March/2023/Paper_ 0610/12/No.2

Which two parts are included in the scientific name of an organism?

A genus and group

B genus and species

C group and kingdom

D kingdom and species

33. March/2023/Paper_ 0610/12/No.3

How many jointed legs does an insect have?

A two pairs

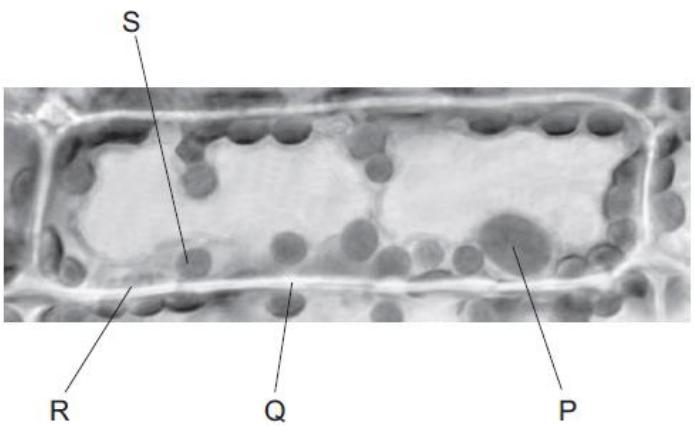
B three pairs

C four pairs

D more than six pairs

34. March/2023/Paper_ 0610/12/No.4

The photomicrograph shows a cell from a type of aquatic plant.



Which labelled parts indicate that this is a plant cell?

A P and R **B** P and S **C** Q and R **D** Q and S

35. March/2023/Paper_ 0610/42/No.3

(a) Fig. 3.1 shows part of a classification diagram for plants.

(i) Complete Fig. 3.1.

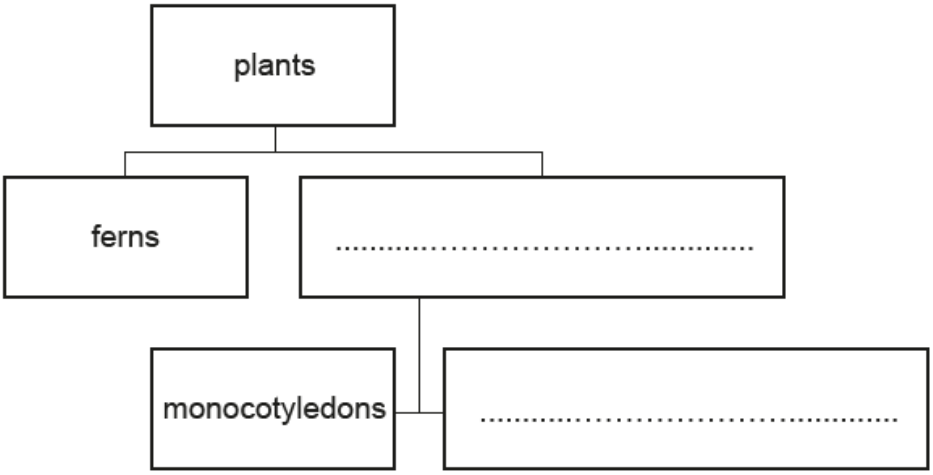


Fig. 3.1

[2]

(ii) Describe **two** identifying features of monocotyledons.

1 .....

2 .....

[2]

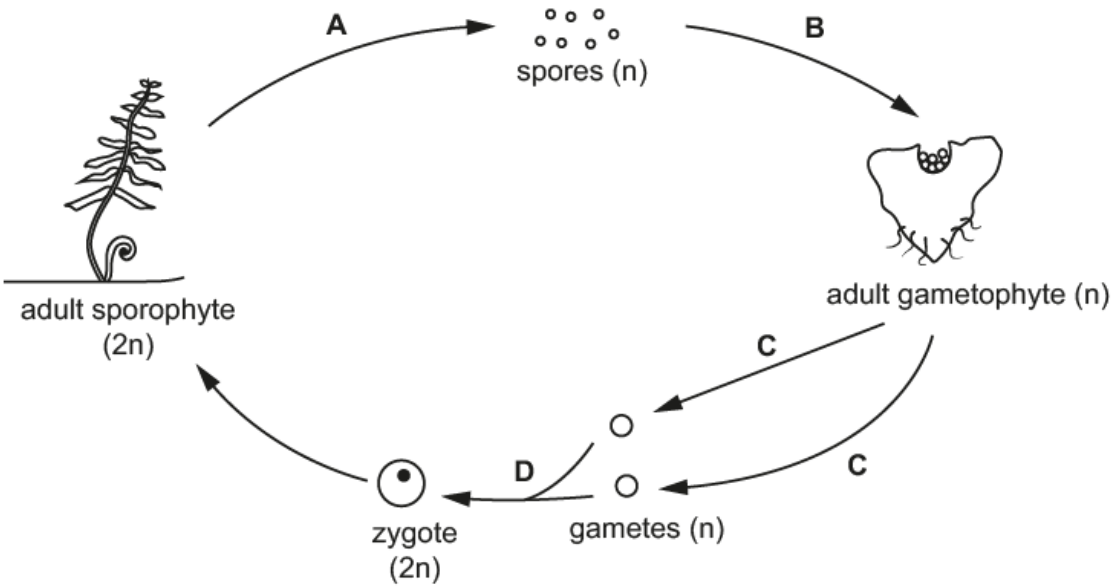
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(b) Fig. 3.2 shows the life cycle of a fern. The life cycle of a fern has some similarities and some differences compared with the life cycles of other plants.

The letters represent processes that occur during the life cycle.

The haploid stages of the life cycle are represented by (n).

The diploid stages of the life cycle are represented by (2n).



not to scale

Fig. 3.2

(i) The adult sporophyte has 1200 chromosomes in its body cells.

State the number of chromosomes in the body cells of the gametophyte.

..... [1]

(ii) Identify and describe process **A** in Fig. 3.2.

.....

.....

.....

.....

.....

.....

..... [3]

(iii) State the name of process **D** in Fig. 3.2.

..... [1]

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(c) Fig. 3.3 shows the parts of two flowers from two different plants of the same species.

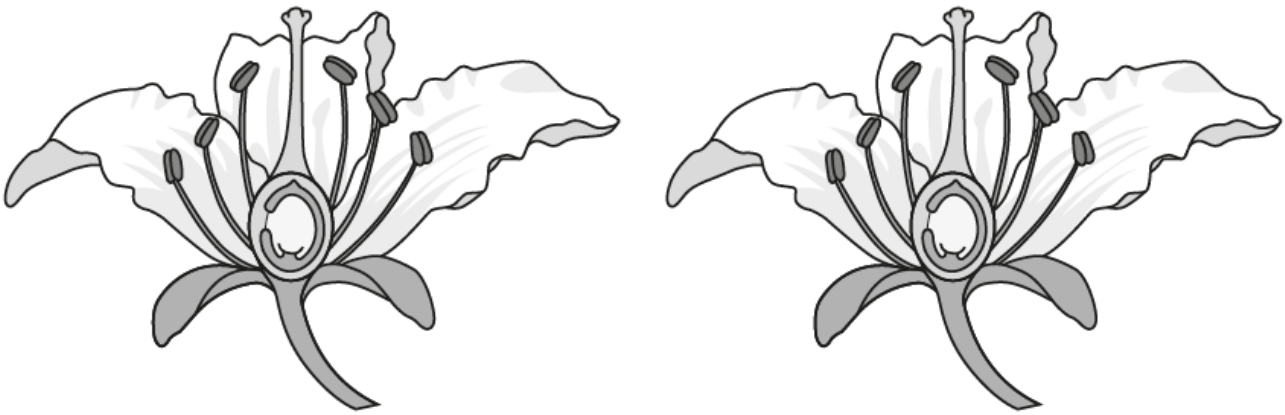


Fig. 3.3

(i) Describe what is meant by the term species.

.....

.....

.....

.....

..... [2]

(ii) Annotate Fig. 3.3 to show the mechanism of cross-pollination by:

- labelling the structures involved
- drawing an arrow to show the pathway of pollen.

[3]

(iii) Draw an **X** on Fig. 3.3 to show where fertilisation occurs. [1]

(iv) Explain the disadvantages of cross-pollination compared with self-pollination.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 18]

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Characteristics and classification of living organisms – 2022 November IGCSE 0610 Biology

1. Nov/2022/Paper_11/No.1

Which process provides an organism with the raw materials needed for tissue repair?

A excretion

B growth

C nutrition

D respiration

2. Nov/2022/Paper_11/No.2

Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

B a kingdom

C a species

D an organ system

3. Nov/2022/Paper_11/No.3

An animal has four legs, hair and a tail.

To which group of vertebrates does it belong?

A amphibians

B birds

C mammals

D reptiles

4. Nov/2022/Paper_12/No.1

Which process provides an organism with the raw materials needed for tissue repair?

A excretion

B growth

C nutrition

D respiration

5. Nov/2022/Paper_12/No.2

Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

B a kingdom

C a species

D an organ system

6. Nov/2022/Paper_12/No.3

An animal has four legs, hair and a tail.

To which group of vertebrates does it belong?

A amphibians

B birds

C mammals

D reptiles

7. Nov/2022/Paper_12/No.6

A cell was viewed under a microscope. The actual length of the cell is 0.025 mm. The magnification of the image is ×400.

What is the length of the cell in the image?

A 10 mm **B** 100 mm **C** 1600 mm **D** 16 000 mm

8. Nov/2022/Paper_13/No.1

Which process provides an organism with the raw materials needed for tissue repair?

A excretion

B growth

C nutrition

D respiration

9. Nov/2022/Paper_13/No.2

Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

B a kingdom

C a species

D an organ system

10. Nov/2022/Paper_13/No.3

An animal has four legs, hair and a tail.

To which group of vertebrates does it belong?

A amphibians

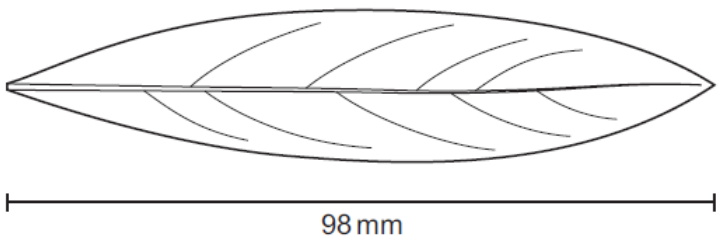
B birds

C mammals

D reptiles

11. Nov/2022/Paper_13/No.6

The diagram shows a leaf which has been drawn at a magnification of ×7.



What was the actual length of the leaf?

A 11 mm **B** 14 mm **C** 19 mm **D** 98 mm

12. Nov/2022/Paper_21/No.1

Which process provides an organism with the raw materials needed for tissue repair?

A excretion

B growth

C nutrition

D respiration

13. Nov/2022/Paper_21/No.2

Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

B a kingdom

C a species

D an organ system

14. Nov/2022/Paper_21/No.3

Root hair cells are found on plant roots.

Which feature is present in a root hair cell but **not** in a sperm cell?

A cell membrane

B cell wall

C chloroplasts

D cytoplasm

15. Nov/2022/Paper_21/No.19

Campylobacter is a bacterium that can cause food poisoning.

Which word describes *Campylobacter*?

A antibody

B disease

C pathogen

D symptom

16. Nov/2022/Paper_22/No.1

Which process provides an organism with the raw materials needed for tissue repair?

A excretion

B growth

C nutrition

D respiration

17. Nov/2022/Paper_22/No.2

Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

B a kingdom

C a species

D an organ system

18. Nov/2022/Paper_22/No.3

Root hair cells are found on plant roots.

Which feature is present in a root hair cell but **not** in a sperm cell?

A cell membrane

B cell wall

C chloroplasts

D cytoplasm

19. Nov/2022/Paper_22/No.4

The cells listed have specialised structures that allow them to carry out their functions.

1 ciliated cell

2 nerve cell

3 root cortex cell

4 sperm cell

Which cells have structures that can move?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

20. Nov/2022/Paper_23/No.1

Which process provides an organism with the raw materials needed for tissue repair?

A excretion

B growth

C nutrition

D respiration

21. Nov/2022/Paper_23/No.2

Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

B a kingdom

C a species

D an organ system

22. Nov/2022/Paper_23/No.3

Root hair cells are found on plant roots.

Which feature is present in a root hair cell but **not** in a sperm cell?

A cell membrane

B cell wall

C chloroplasts

D cytoplasm

23. Nov/2022/Paper_31/No.1(a)

(a) (i) Keys can be used to identify a species.

State the name of the type of key that uses paired choices of features.

..... [1]

(ii) Fig. 1.1 shows drawings of six different birds and their names.

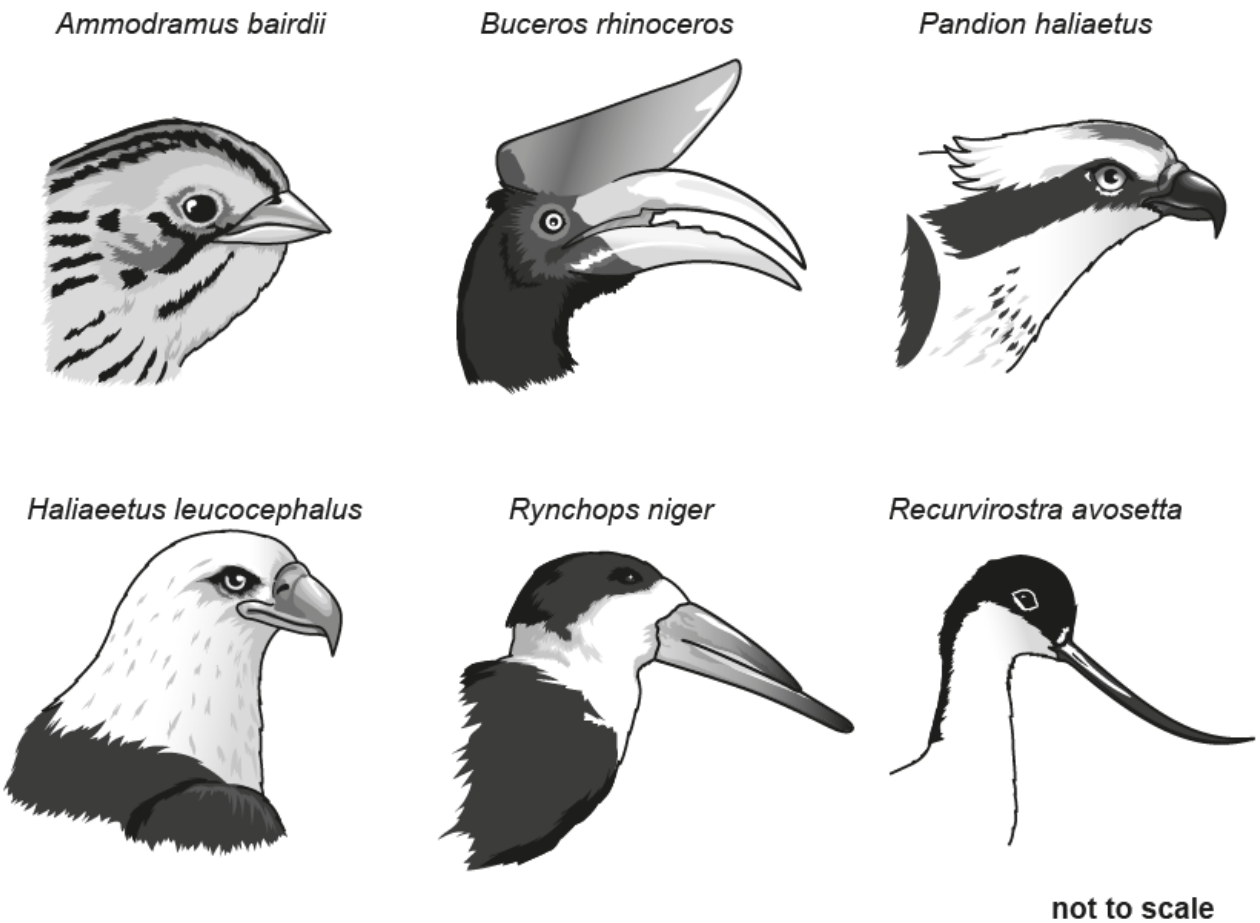


Fig. 1.1

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Use the key to identify the birds in Fig. 1.1.

Complete Table 1.1 by writing the letters of the birds **A** to **F** in the correct box.

		key	letter of the bird
1	(a)	beak is longer than the head	go to 2
	(b)	beak is shorter than the head	go to 3
2	(a)	beak curves upwards	**C**
	(b)	beak does **not** curve upwards	go to 4
3	(a)	top part of the beak is hooked over the bottom part of the beak	go to 5
	(b)	top part of the beak is **not** hooked over the bottom part of the beak	**E**
4	(a)	top part of the beak is shorter than bottom part of the beak	**A**
	(b)	has a large projection above the beak	**B**
5	(a)	head has a stripe	**F**
	(b)	head does **not** have a stripe	**D**

Table 1.1

name of the bird in Fig. 1.1	letter of the bird in the key
Ammodramus bairdii	
Buceros rhinoceros	
Pandion haliaetus	
Haliaeetus leucocephalus	
Rynchops niger	
Recurvirostra avosetta	

[5]

(iii) State **two** features of birds, other than the beak, that can be used to classify them as birds.

1 .....

2 .....

[2]

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24.

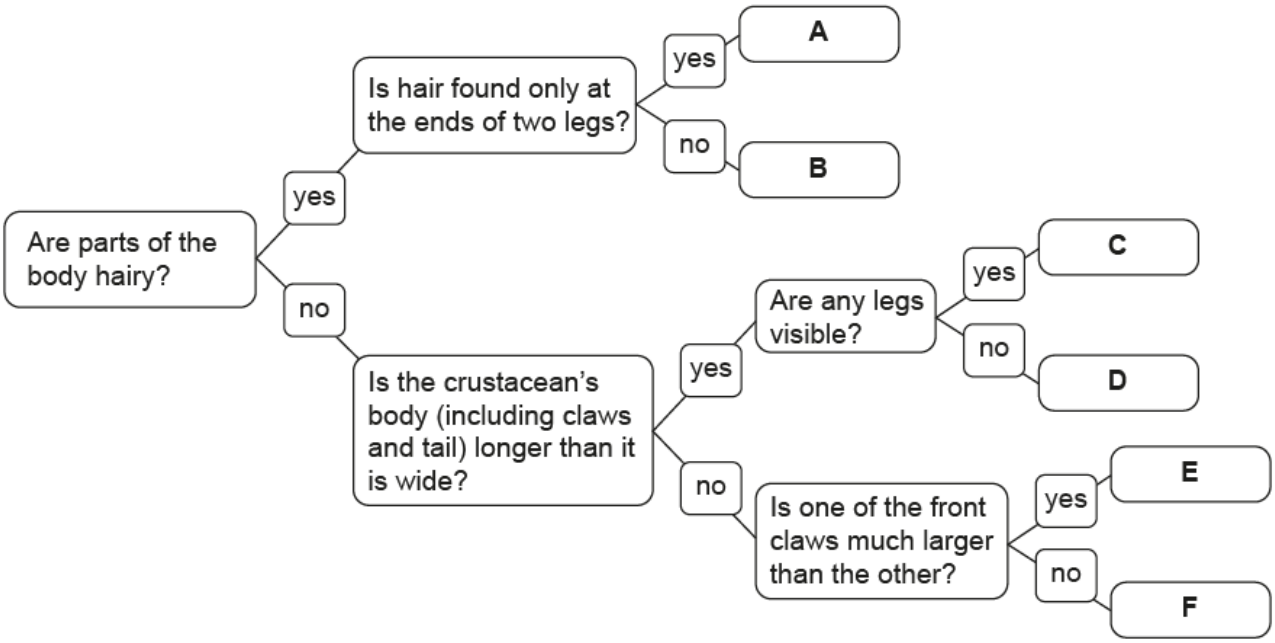


Fig. 1.1

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Fig. 1.2 shows six crustaceans.

Use the key in Fig. 1.1 to identify the six different types of crustacean.

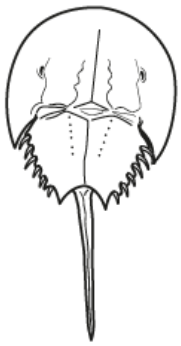
Write the letters on the lines in Fig. 1.2.



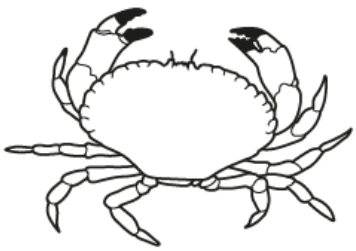
.....



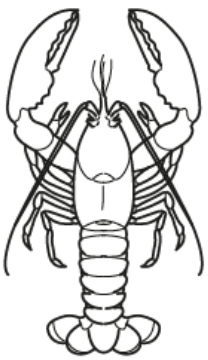
.....



.....



.....



.....



.....

Fig. 1.2 [5]

(b) Crustaceans are one group of arthropods.

State the names of **two other** groups of arthropods.

1 .....

2 .....

[2]

(c) Describe **one** way in which all vertebrates differ from arthropods.

.....

.....

..... [1]

[Total: 8]

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25. Nov/2022/Paper_33/No.1

Fig. 1.1 shows leaves from five different species of tree.

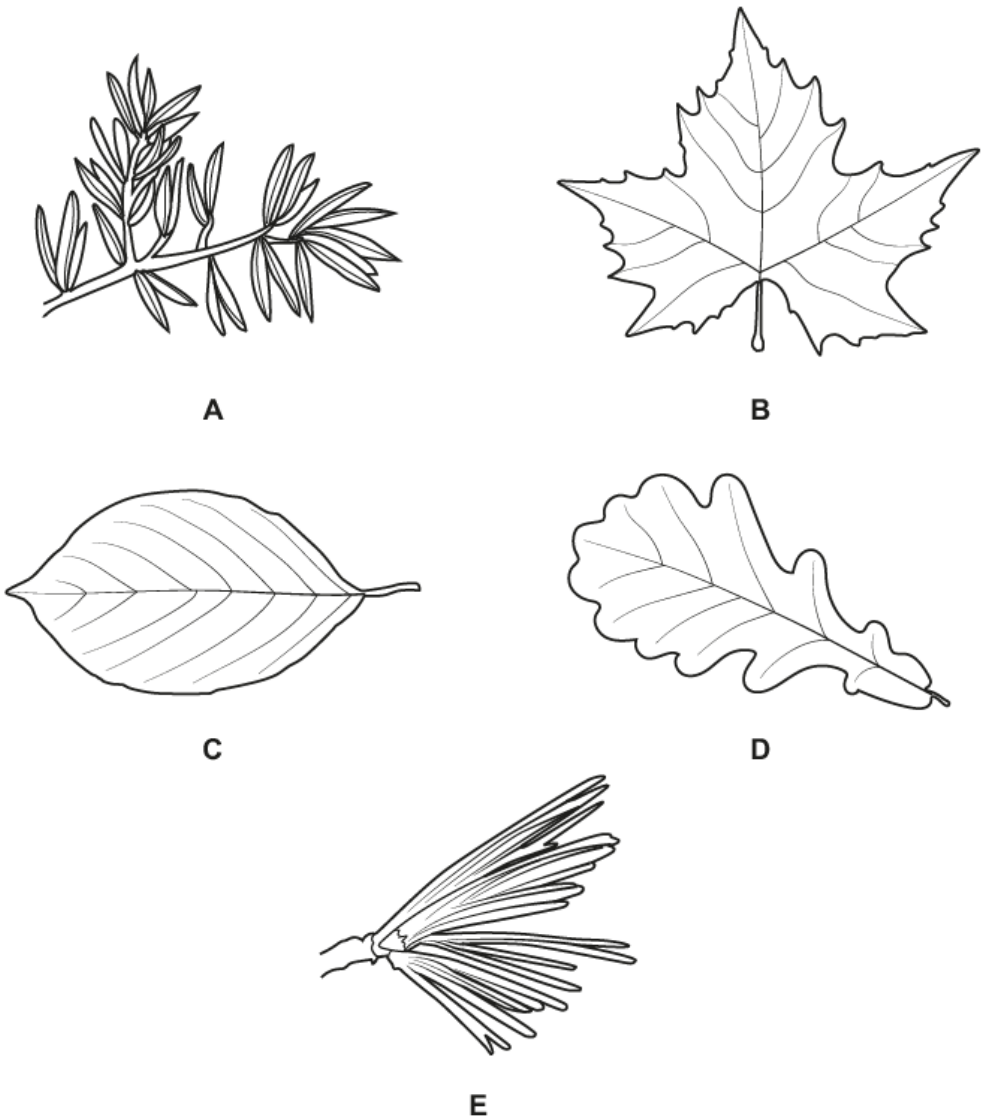


Fig. 1.1

STEMUP.CO.UK

(a) (i) Use the key to identify each tree species in Fig. 1.1.

Write the letter of each tree species (**A**, **B**, **C**, **D**, **E**) in the correct box beside the key.

1 (a)	multiple narrow, needle-like leaves	go to 2	
(b)	single leaf which is **not** needle-like	go to 3	
2 (a)	leaves are evenly spread along the branch	*Juniperus communis*	
(b)	leaves start from a single point	*Cedrus deodara*	
3 (a)	leaf has an unlobed smooth edge	*Frangula alnus*	
(b)	leaf has a lobed edge	go to 4	
4 (a)	lobes have a smooth, rounded edge	*Quercus robur*	
(b)	lobes have a jagged, irregular edge	*Acer pseudoplatanus*	

[4]

(ii) State the genus of *Quercus robur*.

..... [1]

(b) (i) Define the term species.

.....

.....

..... [2]

(ii) Organisms are classified into kingdoms based on their features.

State **two** features of plant cells that are **not** found in animal cells.

1 .....

2 .....

[2]

[Total: 9]

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(b) Mammals can be classified according to the position and shape of their teeth.

Fig. 1.2 shows the skulls of seven mammals.

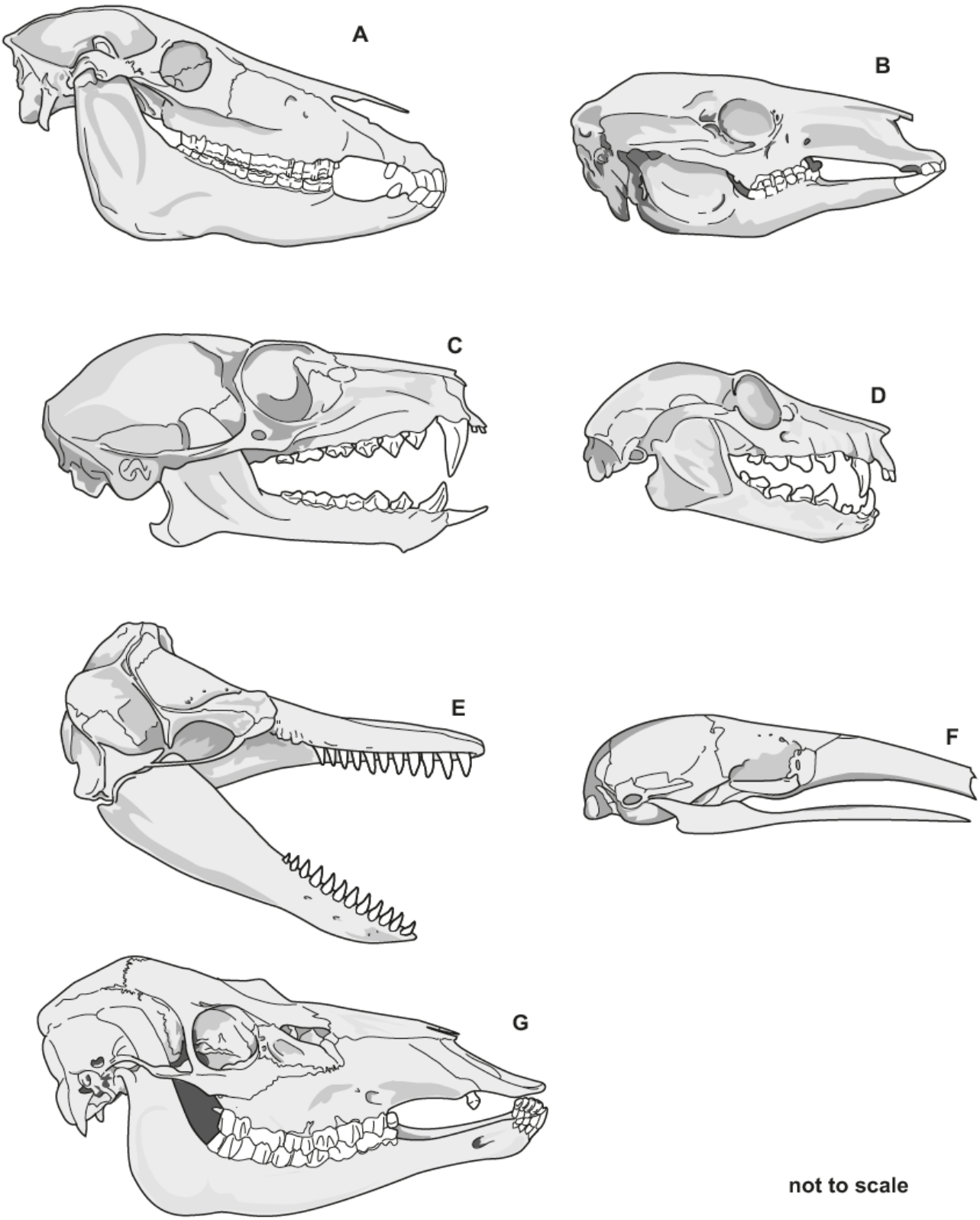


Fig. 1.2

STEMUP.CO.UK

(i) Use the key to identify each species shown in Fig. 1.2.

Write the letter of each species (**A** to **G**) in the correct box in the key.

Key

1 (a)	two or more different types of teeth	go to 2	
(b)	fewer than two different types of teeth	go to 3	
2 (a)	have wide gap between front and back teeth in both jaws	go to 4	
(b)	have no wide gap between front and back teeth in both jaws	go to 6	
3 (a)	all teeth of similar shape	*Orcinus orca*	
(b)	no teeth on either jaw	*Myrmecophaga tridactyla*	
4 (a)	no incisors in upper jaw	*Cervus elephus*	
(b)	incisors in both upper and lower jaw	go to 5	
5 (a)	incisors on lower jaw longer than incisors on upper jaw	*Macropus rufus*	
(b)	incisors on upper and lower jaw are similar in size	*Equus ferus*	
6 (a)	incisors on lower jaw project forwards	*Lemur catta*	
(b)	incisors on lower jaw do not project forwards	*Pteropus niger*	

[4]

(ii) Killer whales, *Orcinus orca*, are mammals.

State **two internal** features you would expect to find in a killer whale that you would **not** find in a fish.

1 .....

2 .....

[2]

(iii) State the name of the group of animals that includes mammals and fish.

..... [1]

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Phytoplankton consist of many species of single-celled and many-celled algae.

(a) Algae are classified in the Protoctist kingdom. All algae contain one or more chloroplasts.

State the name of another kingdom that contains organisms which have chloroplasts.

..... [1]

A student investigated the species composition of the phytoplankton in a lake.

Fig. 1.1 shows some of the phytoplankton collected by the student.

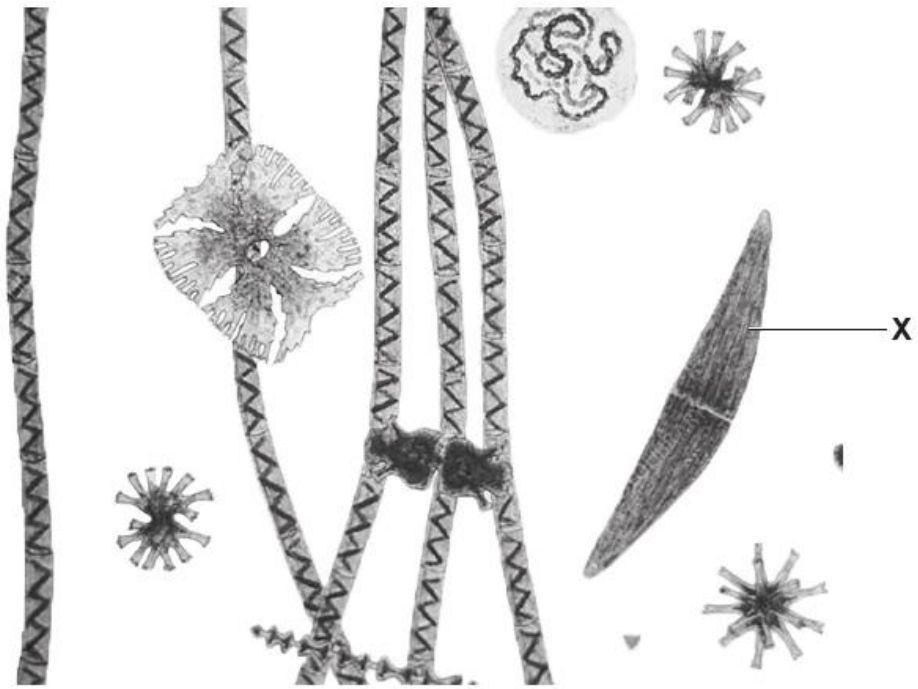


Fig. 1.1

(b) The actual length of alga **X** is 0.19 mm.

Convert the actual length of alga **X** to micrometres.

..... μm [1]

STEMUP.CO.UK

(c) The student made careful drawings of seven types of alga found in the samples of lake wate

The drawings are shown in Fig. 1.2.

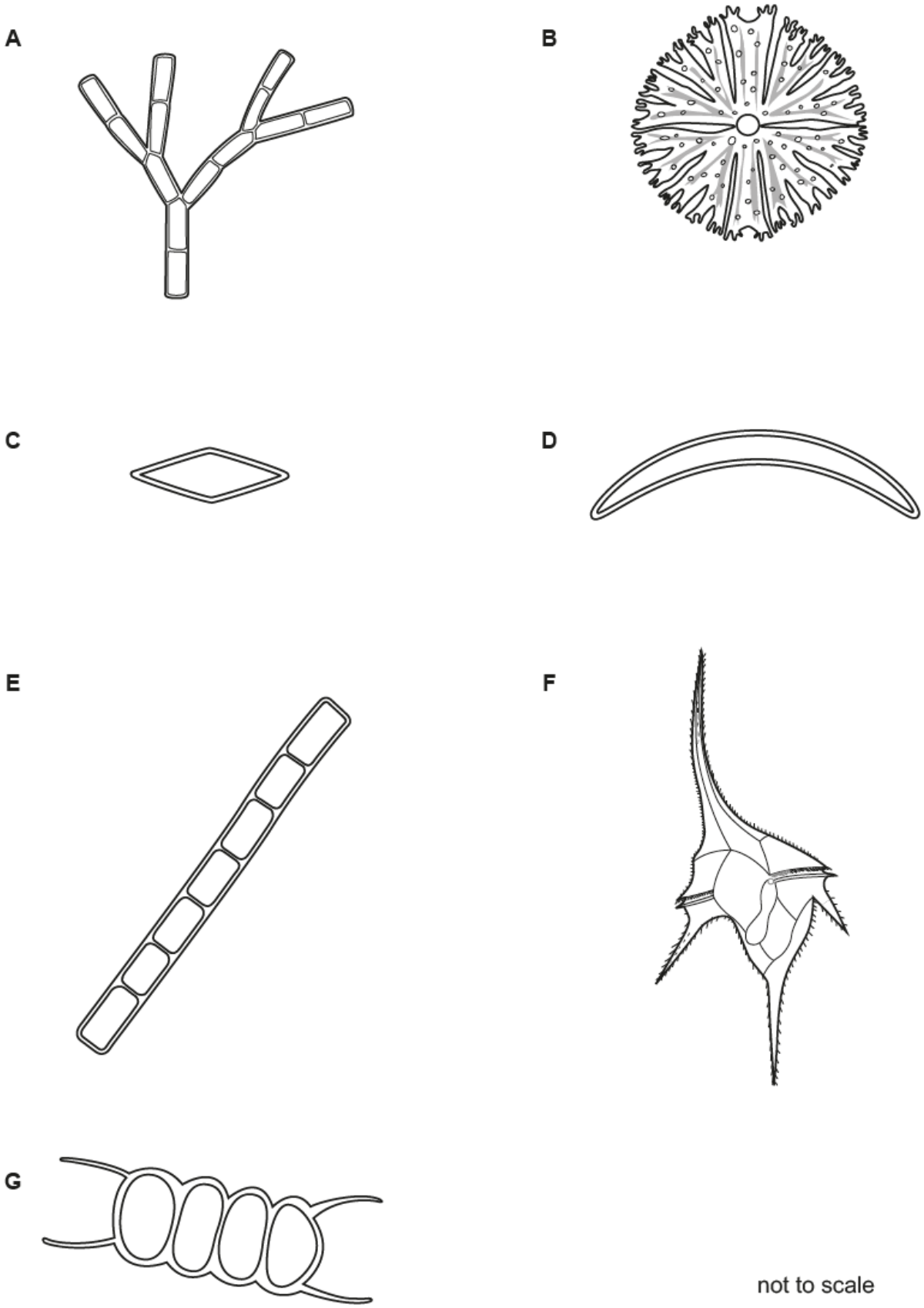


Fig. 1.2

STEMUP.CO.UK

Use the key to identify each of the species **A** to **G**. Write the letter of each species in the correct box beside the key.

1	alga has four spine-like extensions	go to 2	
	alga does not have four spine-like extensions	go to 3	
2	alga has spine-like extensions that are all the same length	*Scenedesmus communis*	
	alga has spine-like extensions that are different lengths	*Ceratium hirundinella*	
3	alga has a round shape	*Micrasterias radiosa*	
	alga does not have a round shape	go to 4	
4	alga narrows towards the ends	go to 5	
	alga does not narrow towards the ends	go to 6	
5	algal cell is semi-circular in shape	*Closterium dianae*	
	algal cell is not semi-circular in shape	*Navicula radiosa*	
6	alga is branched	*Chaetophora incrassata*	
	alga is not branched	*Zygnema* sp.	

[5]

(d) Phytoplankton are photosynthetic organisms.

Describe the importance of phytoplankton in the food web of lake ecosystems.

.....

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

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28. Nov/2022/Paper_42/No.1

Phytoplankton consist of many species of single-celled and many-celled algae.

(a) Algae are classified in the Protoctist kingdom. All algae contain one or more chloroplasts.

State the name of another kingdom that contains organisms which have chloroplasts.

..... [1]

A student investigated the species composition of the phytoplankton in a lake.

Fig. 1.1 shows some of the phytoplankton collected by the student.

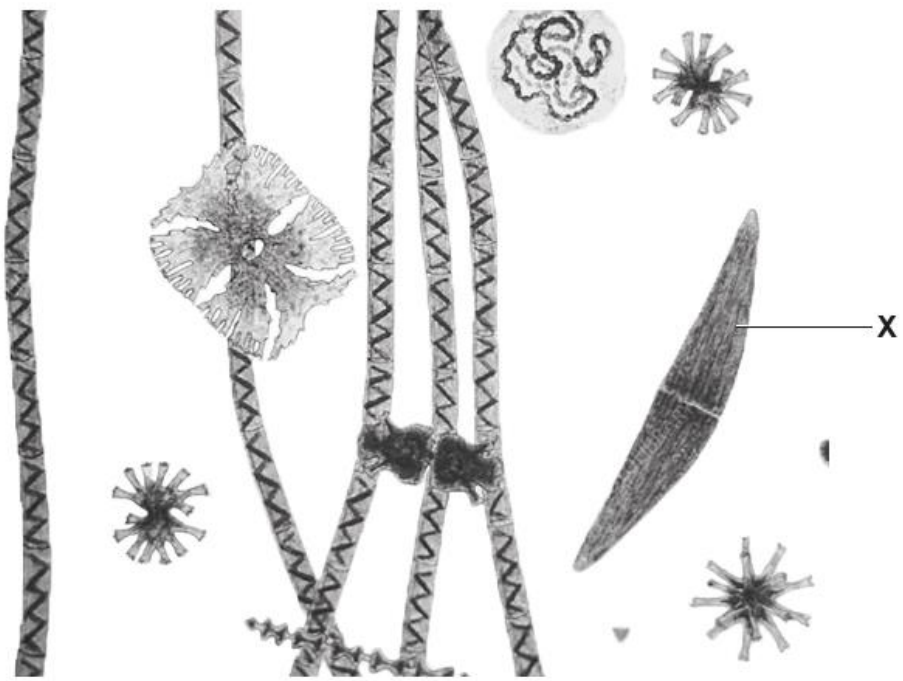


Fig. 1.1

(b) The actual length of alga **X** is 0.19 mm.

Convert the actual length of alga **X** to micrometres.

..... μm [1]

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29. Nov/2022/Paper_42/No.3(a_ b)

Aphids are insects that feed on phloem sap by inserting their mouthparts into phloem tissue.

Fig. 3.1 shows an aphid feeding on phloem tissue in a leaf.



Fig. 3.1

(a) (i) State **two** features **visible in Fig. 3.1** that identify this animal as an insect.

1 .....

2 .....

[2]

(ii) Aphids can transmit viral pathogens when they feed on a plant.

Suggest how a severe infestation of aphids on crop plants can be avoided.

.....

.....

.....

.....

..... [2]

(iii) The aphid shown in Fig. 3.1 is feeding on phloem tissue in a leaf.

State the names of **two** tissues in the leaf that the mouthparts of the aphid pass through to reach the phloem.

1 .....

2 .....

[2]

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(b) Aphids have been used to investigate the translocation of sucrose in phloem tissue. While they are feeding on phloem sap aphids excrete a sucrose-rich fluid known as honeydew.

In an investigation, two groups of four aphids were placed at intervals along the stem of a young willow plant, as shown in Fig. 3.2.

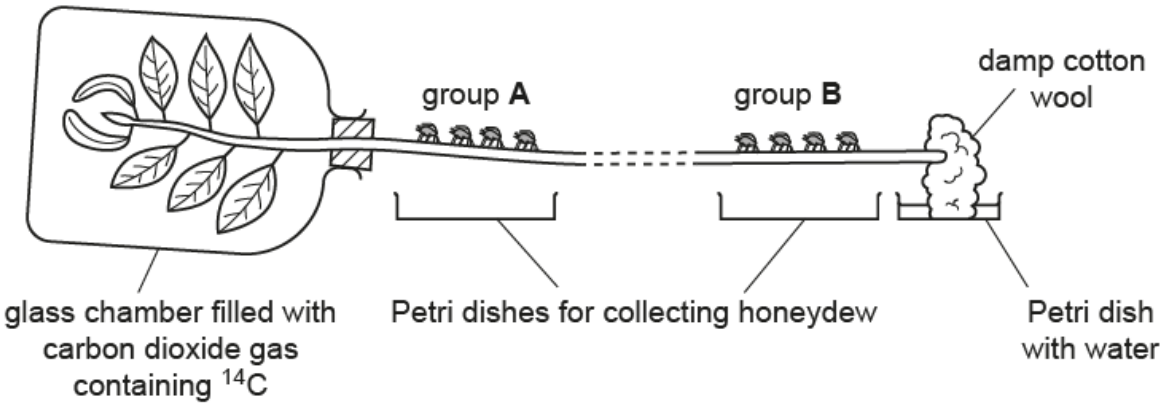


Fig. 3.2

The leaves were enclosed in an airtight glass chamber. A special form of carbon dioxide gas that contained radioactive carbon-14 (^{14}C) was supplied to the leaves for a short period of time.

Samples of honeydew were collected at intervals from the groups of aphids. The time taken for sucrose containing ^{14}C to travel the distance between group **A** and group **B** was recorded.

The investigation was repeated twice using a fresh stem and different groups of aphids for each trial. The results are shown in Table 3.1.

(i) Complete Table 3.1 by calculating the rate of movement of ^{14}C in trial 3.

Table 3.1

trial	distance between group **A** and group **B** on the stem / mm	time taken for ^{14}C to travel between group **A** and group **B** / minutes	rate of movement of ^{14}C / mm per hour
1	650	120	325
2	340	75	272
3	630	150	

[1]

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(ii) Outline how ^{14}C in carbon dioxide gas becomes incorporated into the sucrose molecules that are translocated in the phloem.

.....

.....

.....

.....

.....

.....

..... [3]

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Characteristics and classification of living organisms – 2022 IGCSE 0610

1. June/2022/Paper_ 11/No.1

All living organisms release energy from nutrient molecules within their cells.

What is the name of this characteristic?

A growth

B nutrition

C respiration

D sensitivity

2. June/2022/Paper_ 11/No.2

The horse, *Equus ferus*, and the donkey, *Equus asinus*, are able to interbreed. The offspring they produce is called a mule.

Which statement is correct?

A The horse and the donkey are the same genus; the mule is infertile.

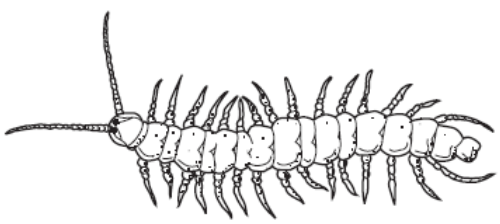
B The horse and the donkey are the same species; the mule is infertile.

C The horse and the donkey are the same genus; the mule is fertile.

D The horse and the donkey are the same species; the mule is fertile.

3. June/2022/Paper_ 11/No.3

The diagram shows an organism.



Which type of arthropod is this organism?

A myriapod

B insect

C crustacean

D arachnid

4. June/2022/Paper_ 11/No.6

A student found four different worms in a sample of soil and drew diagrams of them. The diagrams were drawn with different magnifications.

Which worm was the longest?

	length of diagram / mm	magnification
A	60	×3
B	70	×1
C	100	×2
D	120	×5

5. June/2022/Paper_ 12/No.1

All living organisms release energy from nutrient molecules within their cells.

What is the name of this characteristic?

A growth

B nutrition

C respiration

D sensitivity

6. June/2022/Paper_ 12/No.2

Which levels of classification are shown in the scientific name of an organism, using the binominal system?

	genus	kingdom	species
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

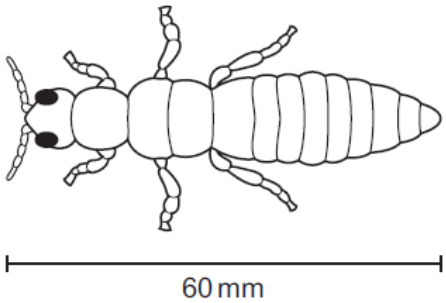
✓ = yes

✗ = no

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7. June/2022/Paper_ 12/No.6

The diagram shows an animal. The actual length of this animal is 0.6 mm.



What is the magnification of the diagram?

A ×10 **B** ×100 **C** ×1000 **D** ×10 000

8. June/2022/Paper_ 13/No.5

Which level of organisation is shown by the heart of a mammal?

A a cell

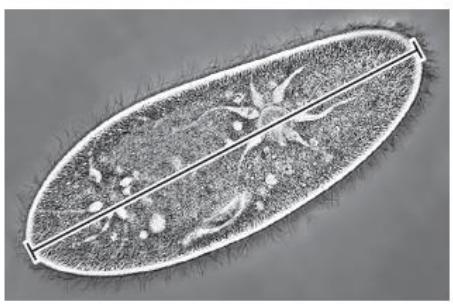
B a tissue

C an organ

D an organ system

9. June/2022/Paper_ 13/No.6

The image shows a single-celled organism called a *Paramecium*.



The length of the *Paramecium* in the image is 6 cm. The magnification is ×400.

Which calculation will give the correct actual length of the *Paramecium*, in mm?

A $\frac{6 \times 10}{400}$ **B** $\frac{6 \times 1000}{400}$ **C** $\frac{400 \times 10}{6}$ **D** $\frac{400}{6 \times 1000}$

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10. June/2022/Paper_ 21/No.1

All living organisms release energy from nutrient molecules within their cells.

What is the name of this characteristic?

A growth

B nutrition

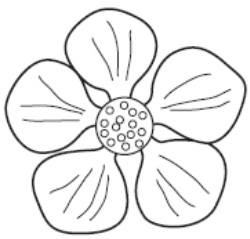
C respiration

D sensitivity

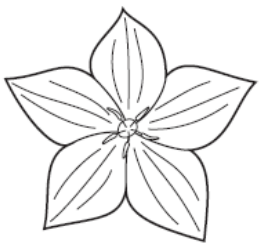
11. June/2022/Paper_ 21/No.2

Which diagram shows a flower from a monocotyledon?

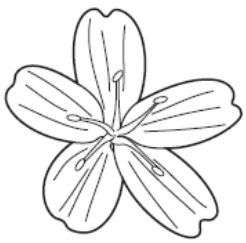
A



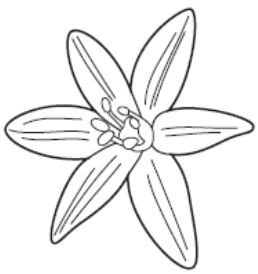
B



C

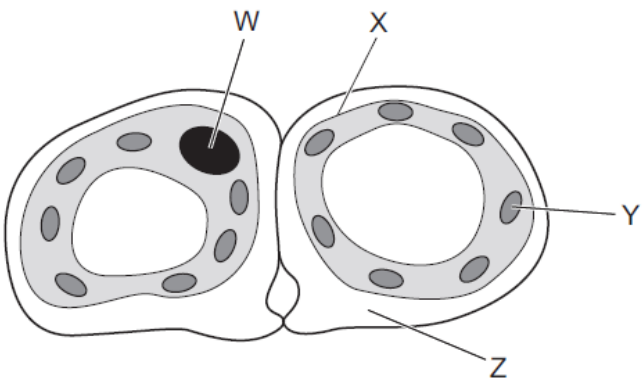


D



12. June/2022/Paper_ 21/No.3

The diagram shows a cross-section through two guard cells of a leaf.



Which labelled structures would also be found in an animal cell?

A W and X **B** X and Y **C** Y and Z **D** Z and W

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13. June/2022/Paper_ 23/No.1

All living organisms release energy from nutrient molecules within their cells.

What is the name of this characteristic?

A growth

B nutrition

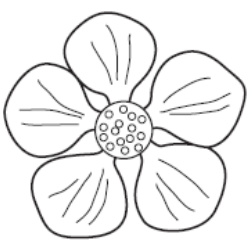
C respiration

D sensitivity

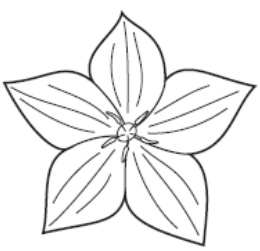
14. June/2022/Paper_ 23/No.2

Which diagram shows a flower from a monocotyledon?

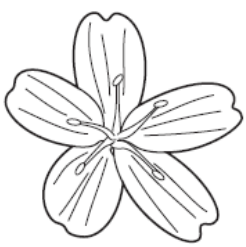
A



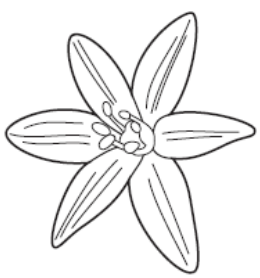
B



C



D



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15. June/2022/Paper_ 31/No.1(a_ b)

(a) Fig. 1.1 is a diagram of a plant cell.

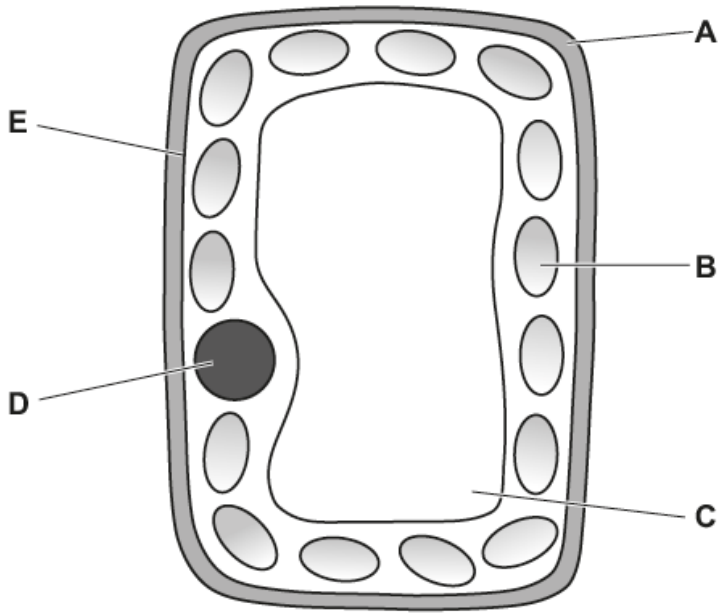


Fig. 1.1

The boxes on the left contain the letters that identify some parts of the plant cell in Fig. 1.1.
The boxes on the right show the functions of some parts of a cell.
Draw **five** lines to link each letter to its correct function.

letter from Fig. 1.1	function
	contains the genetic material
A	
	controls which substances enter and leave the cell
B	
	filled with sap to support the cell
C	
	strengthens the cell
D	
	transports nerve impulses
E	
	where photosynthesis occurs

[5]

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16. June/2022/Paper_ 41/No.1(a)

(a) Some students were studying the activity of yeast. They made a fact file, as shown in Fig. 1.1.

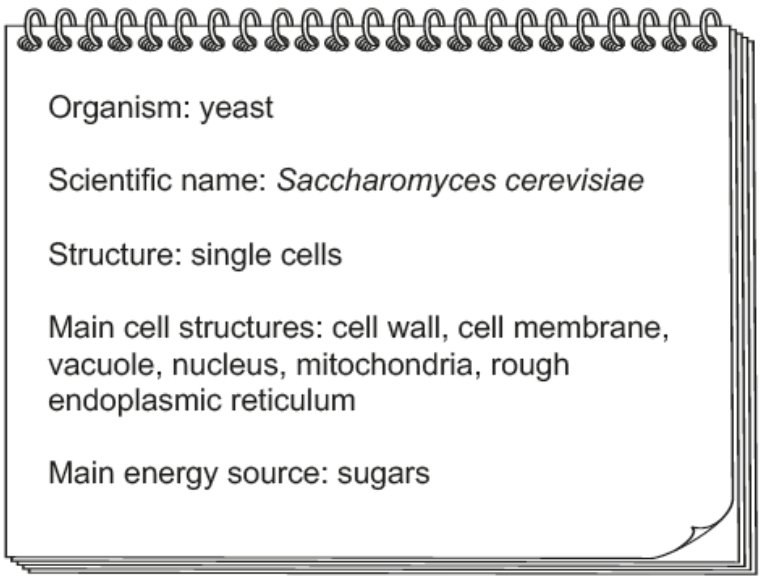


Fig. 1.1

(i) State the kingdom in which yeast is classified.

..... [1]

(ii) State the process that occurs in mitochondria to provide energy for yeast cells.

..... [1]

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17. June/2022/Paper_ 41/No.5(a)

The Mulanje cedar, *Widdringtonia whytei*, is the national tree of Malawi. This species of tree grows naturally only on Mount Mulanje in Malawi. Many of the trees have been overharvested or destroyed by wildfires, resulting in deforestation, as shown in Fig. 5.1.



Fig. 5.1

(a) State the genus name of the Mulanje cedar tree.

..... [1]

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18. June/2022/Paper_ 42/No.1(a_ d)

Fig. 1.1 shows a spongy mesophyll cell from the leaf of a plant. The arrows show the net direction of movement of carbon dioxide molecules during daylight.

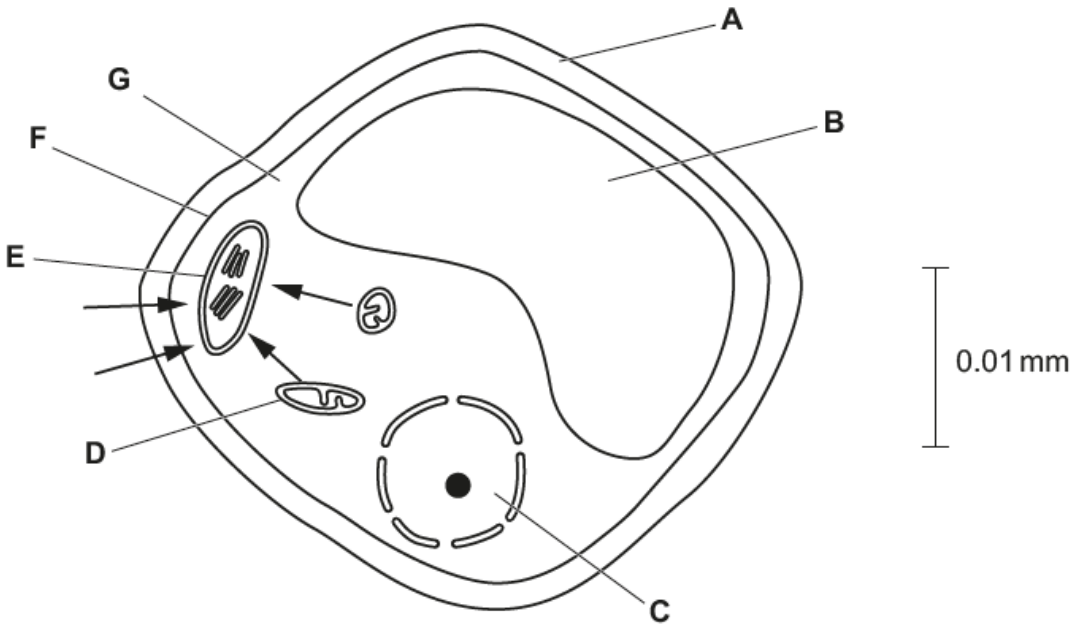


Fig. 1.1

(a) The scale bar in Fig. 1.1 represents 0.01 mm.

Convert 0.01 mm to micrometres.

..... µm [1]

(b) Table 1.1 shows:

- the functions of some of the structures in plant cells
- some of the names of the structures where these functions occur
- some of the letters that label these structures in Fig. 1.1.

Complete Table 1.1.

Table 1.1

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function	structure	letter in Fig. 1.1
	nucleus	
	chloroplast	
aerobic respiration		
contains cell sap and stores water		
		A

[5]

(c) Carbon dioxide is a raw material for photosynthesis.

(i) State the process by which carbon dioxide travels into the leaf from the air.

..... [1]

(ii) Describe the pathway taken by a molecule of carbon dioxide, from the air outside a leaf to a spongy mesophyll cell.

.....

.....

.....

.....

..... [2]

(d) Low concentrations of carbon dioxide in the air may restrict the rate of photosynthesis in plants.

(i) State the term given to something present in the environment in such short supply that it restricts life processes.

..... [1]

(ii) State **one** other feature of the environment that may also restrict the rate of photosynthesis.

..... [1]

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19. June/2022/Paper_ 43/No.6(a)

(a) Fig. 6.1 shows a photograph of fruit attached to the branch of an orange tree, *Citrus sinensis*.



Fig. 6.1

State **one** reason why orange trees are classified as dicotyledonous plants.

.....

.....

..... [1]

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Characteristics and classification of living organisms – 2021 IGCSE 0610

1. Nov/2021/Paper_11/No.1

Which characteristics of all living organisms are needed to release energy for growth?

A breathing and respiration

B excretion and nutrition

C excretion and respiration

D nutrition and respiration

2. Nov/2021/Paper_11/No.2

Which pair of organisms belong to the same genus?

A *Alderia modesta* and *Austrominius modestus*

B *Arenicola cristata* and *Arenicola marina*

C *Bittium reticulatum* and *Clypeostoma reticulatum*

D *Botryllus schlosseri* and *Botrylloides leachii*

3. Nov/2021/Paper_11/No.3

The diagram shows an animal.



What is the animal?

1	animal with a vertebral column	vertebrate
	animal with an exoskeleton	go to 2
2	no distinct head, thorax and abdomen	**A**
	distinct head, thorax and abdomen	go to 3
3	eye occupies less than one third of the head	**B**
	eye occupies more than one third of the head	go to 4
4	wings are wider than they are long	**C**
	wings are longer than they are wide	**D**

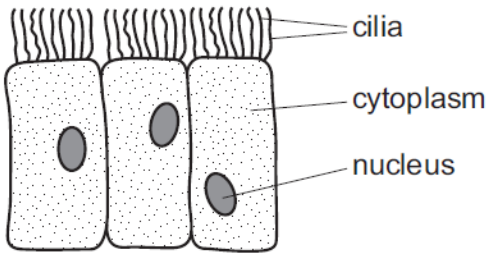
4. Nov/2021/Paper_11/No.4

Which row shows the structure on the outside of a plant cell and the location of the chloroplasts in the cell?

	structure on the outside of a plant cell	location of chloroplasts
A	cell membrane	in the cytoplasm
B	cell membrane	in the vacuole
C	cell wall	in the cytoplasm
D	cell wall	in the vacuole

5. Nov/2021/Paper_11/No.5

The diagram shows some cells.



Where are these cells found?

A alimentary canal

B blood

C bronchus

D plant roots

6. Nov/2021/Paper_11/No.5

What is the equation for calculating the magnification of a biological drawing?

A magnification = actual size × image size × 100

B magnification = actual size ÷ image size

C magnification = image size ÷ actual size

D magnification = actual size × 100 ÷ image size

7. Nov/2021/Paper_12/No.1

All living things can remove toxic materials and other substances that are in excess of requirements.

What is this process called?

A egestion

B excretion

C nutrition

D respiration

8. Nov/2021/Paper_12/No.2

The table shows features of some animals.

Which animal is a mammal?

	gills	hair	scales	wings
A	✓	✗	✗	✗
B	✓	✗	✓	✗
C	✗	✓	✗	✓
D	✗	✗	✓	✓

key

✓ = present

✗ = absent

9. Nov/2021/Paper_12/No.3

The diagram shows an animal.



What is the animal?

1 animal with a vertebral column ..... vertebrate

animal with an exoskeleton ..... go to 2

2 no distinct head, thorax and abdomen ..... **A**

distinct head, thorax and abdomen ..... go to 3

3 eye occupies less than one third of the head ..... **B**

eye occupies more than one third of the head ..... go to 4

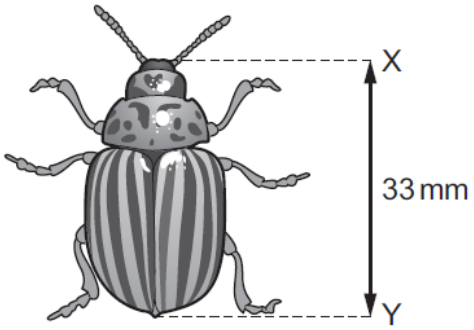
4 wings are wider than they are long ..... **C**

wings are longer than they are wide ..... **D**

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10. Nov/2021/Paper_12/No.6

The diagram shows a beetle.



The actual size of the beetle between X and Y is 15 mm.

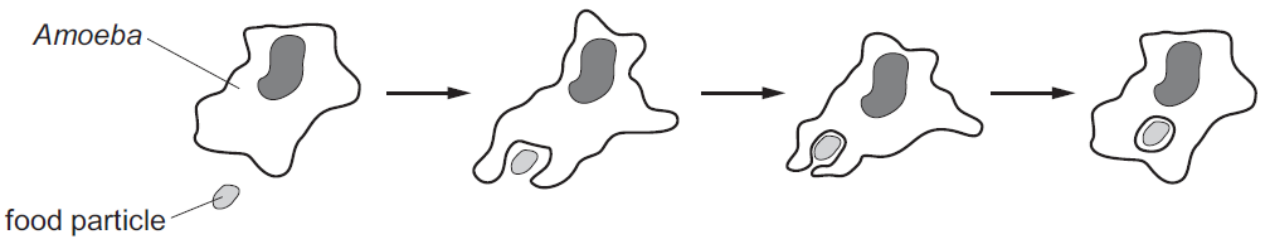
What is the magnification of the image?

A ×0.45 **B** ×2.2 **C** ×48 **D** ×495

11. Nov/2021/Paper_13/No.1

An *Amoeba* is a single-celled organism.

The diagram shows an *Amoeba* engulfing a food particle.



Which characteristics of living organisms are shown?

A excretion, movement and nutrition

B excretion, nutrition and sensitivity

C movement, nutrition and sensitivity

D movement, reproduction and sensitivity

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12. Nov/2021/Paper_13/No.2

The binomial names for five different species are listed.

1 *Calluna vulgaris*

2 *Garra rufa*

3 *Primula veris*

4 *Primula vulgaris*

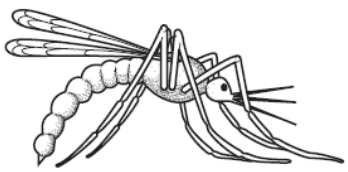
5 *Vespula rufa*

Which species belong to the same genus?

A 1 and 4 **B** 2 and 5 **C** 3 and 4 **D** 1 and 5

13. Nov/2021/Paper_13/No.3

The diagram shows an animal.



What is the animal?

1 animal with a vertebral column ..... vertebrate

animal with an exoskeleton ..... go to 2

2 no distinct head, thorax and abdomen ..... **A**

distinct head, thorax and abdomen ..... go to 3

3 eye occupies less than one third of the head ..... **B**

eye occupies more than one third of the head ..... go to 4

4 wings are wider than they are long ..... **C**

wings are longer than they are wide ..... **D**

14. Nov/2021/Paper_21/No.1

Which characteristics of all living organisms are needed to release energy for growth?

A breathing and respiration

B excretion and nutrition

C excretion and respiration

D nutrition and respiration

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15. Nov/2021/Paper_21/No.3

Which row shows the structure on the outside of a plant cell and the location of the chloroplasts in the cell?

	structure on the outside of a plant cell	location of chloroplasts
A	cell membrane	in the cytoplasm
B	cell membrane	in the vacuole
C	cell wall	in the cytoplasm
D	cell wall	in the vacuole

16. Nov/2021/Paper_21/No.4

The length of a mitochondrion in a photomicrograph is 15 mm.

The actual length of the mitochondrion is 3 μm.

What is the magnification of the photomicrograph?

A ×5 **B** ×45 **C** ×5000 **D** ×45 000

17. Nov/2021/Paper_22/No.1

All living things can remove toxic materials and other substances that are in excess of requirements.

What is this process called?

A egestion

B excretion

C nutrition

D respiration

18. Nov/2021/Paper_22/No.4

The length of a mitochondrion in a photomicrograph is 15 mm.

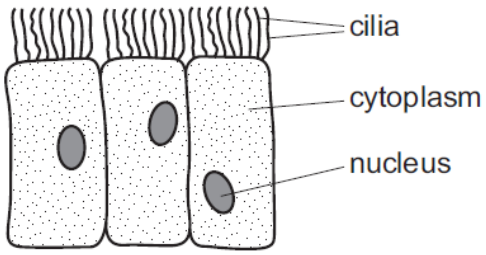
The actual length of the mitochondrion is 3 μm.

What is the magnification of the photomicrograph?

A ×5 **B** ×45 **C** ×5000 **D** ×45 000

19. Nov/2021/Paper_22/No.5

The diagram shows some cells.



Where are these cells found?

A alimentary canal

B blood

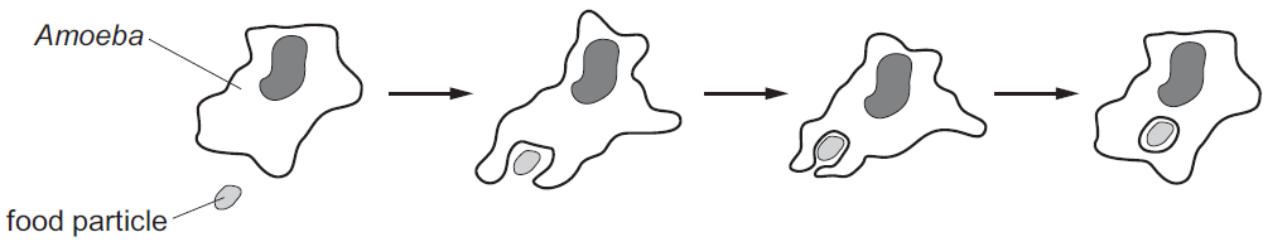
C bronchus

D plant roots

20. Nov/2021/Paper_23/No.1

An *Amoeba* is a single-celled organism.

The diagram shows an *Amoeba* engulfing a food particle.



Which characteristics of living organisms are shown?

A excretion, movement and nutrition

B excretion, nutrition and sensitivity

C movement, nutrition and sensitivity

D movement, reproduction and sensitivity

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21. Nov/2021/Paper_31/No.1

(a) Fig. 1.1 is a diagram of part of the human circulatory system.

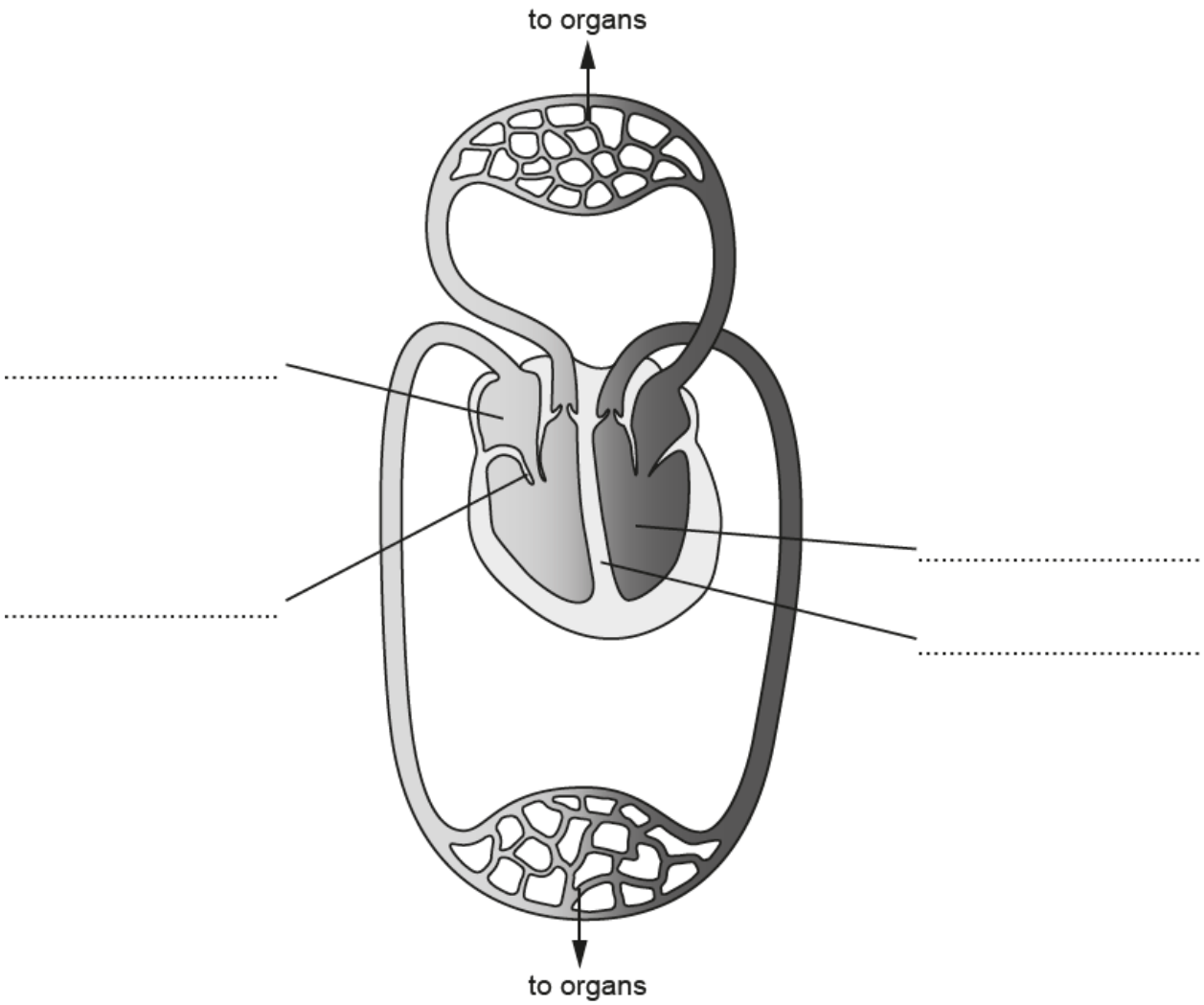


Fig. 1.1

(i) Identify and label on Fig. 1.1 in the spaces provided:

- the left ventricle
- the right atrium
- the septum
- a valve

[4]

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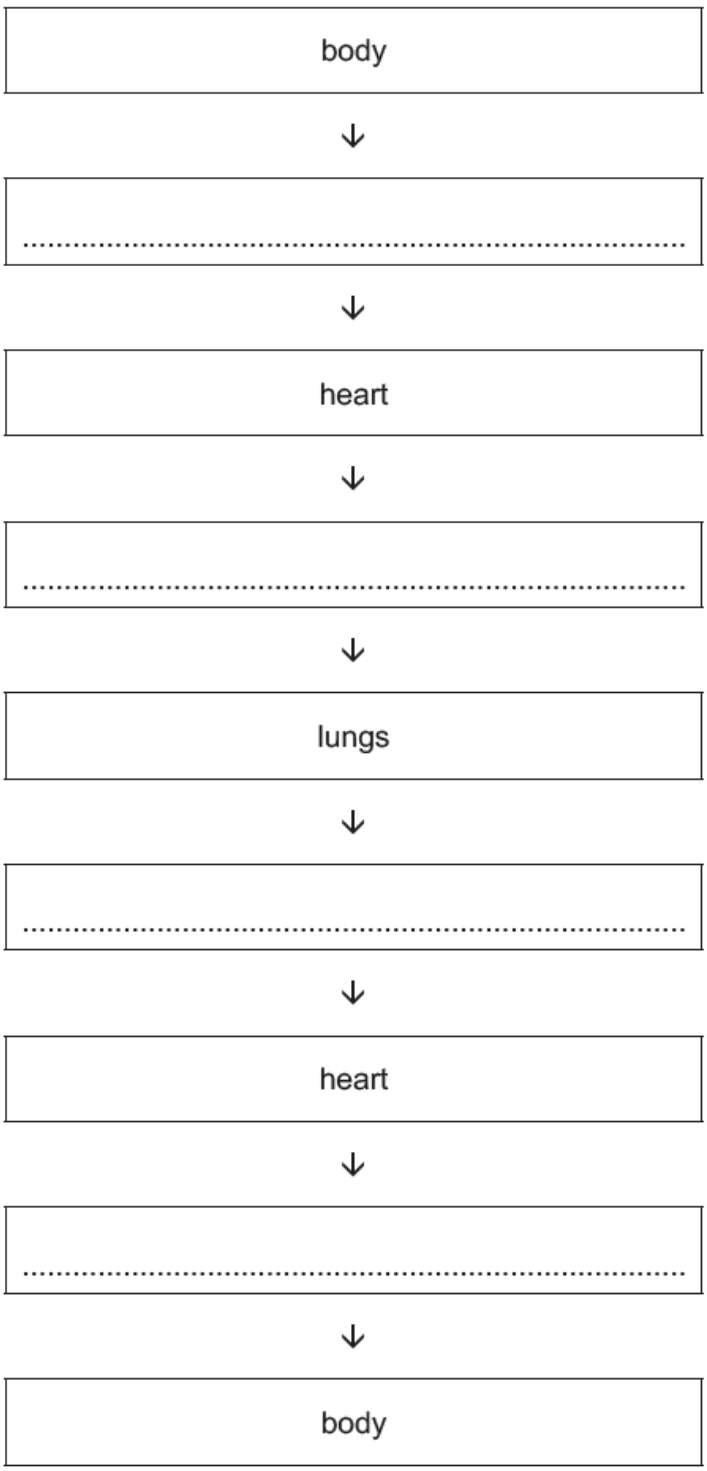
(ii) Complete the flow chart of the circulatory system by writing the correct blood vessels from the list, in the spaces provided.

The arrows show the direction of blood flow.

Each word or phrase may be used once, more than once or not at all.

aorta **pulmonary artery** **pulmonary vein**

renal artery **renal vein** **vena cava**



[4]

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(b) A healthy diet is recommended to reduce the risk of coronary heart disease (CHD).

State **three** other risk factors for CHD.

1 .....

2 .....

3 .....

[3]

[Total: 11]

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22. Nov/2021/Paper_31/No.6

(a) (i) State the word equation for photosynthesis.

..... [2]

(ii) State the source of energy for photosynthesis.

..... [1]

(iii) State the name of the structure in a cell where photosynthesis takes place.

..... [1]

(b) The effect of carbon dioxide concentration on the rate of photosynthesis in an aquatic plant was investigated.

- 10 test-tubes were prepared. Each contained water, an aquatic plant and a different concentration of carbon dioxide.
- Each test-tube was placed next to a lamp and the temperature in the test-tubes was maintained at 20 °C.
- The number of bubbles produced by each aquatic plant in one minute was counted.

Fig. 6.1 shows the apparatus that was used.

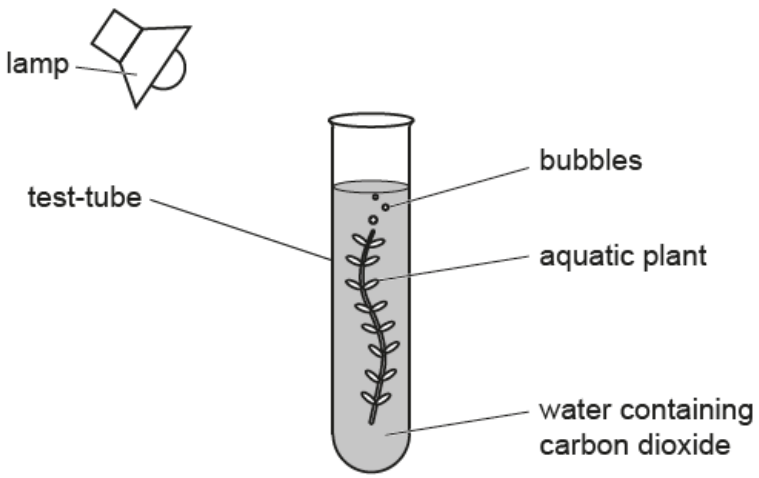


Fig. 6.1

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The results of the investigation are shown in Fig. 6.2.

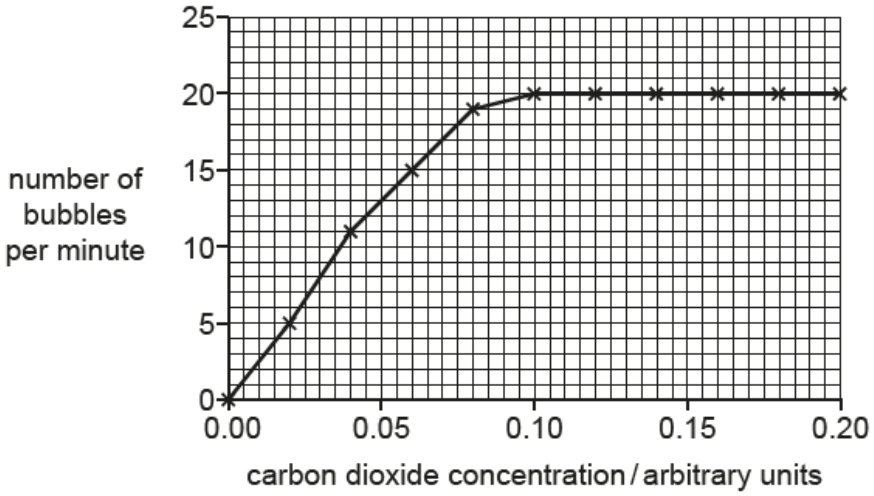


Fig. 6.2

(i) State the maximum number of bubbles produced in one minute.

..... [1]

(ii) The investigator concluded that 0.10 arbitrary units was the optimum (best) concentration of carbon dioxide for photosynthesis in this investigation.

Describe the evidence shown in Fig. 6.2 that supports the investigator's conclusion.

.....

.....

.....

.....

..... [2]

(iii) The investigation described in **6(b)** was repeated but the temperature was reduced from 20 °C to 10 °C.

Predict the effect of reducing the temperature on the number of bubbles produced and explain your answer.

prediction .....

.....

explanation .....

.....

.....

[2]

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(c) Carbon dioxide is a greenhouse gas.

State the name of **one** other greenhouse gas.

..... [1]

[Total: 10]

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23. Nov/2021/Paper_33/No.1

Respiration is a process that occurs in all living organisms.

(a) (i) Complete the definition of aerobic respiration.

The ..... reactions in cells that use .....

to break down ..... molecules to release energy.

[3

(ii) State **two** uses of the energy released by respiration in the human body.

1 .....

2 .....

[2

(iii) Carbon dioxide is one chemical product of aerobic respiration.

State the name of the other chemical product of aerobic respiration.

..... [1

(b) A student investigated respiration at two different temperatures in germinating pea seeds.

The apparatus is shown in Fig. 1.1.

Soda lime is a chemical that absorbs carbon dioxide.

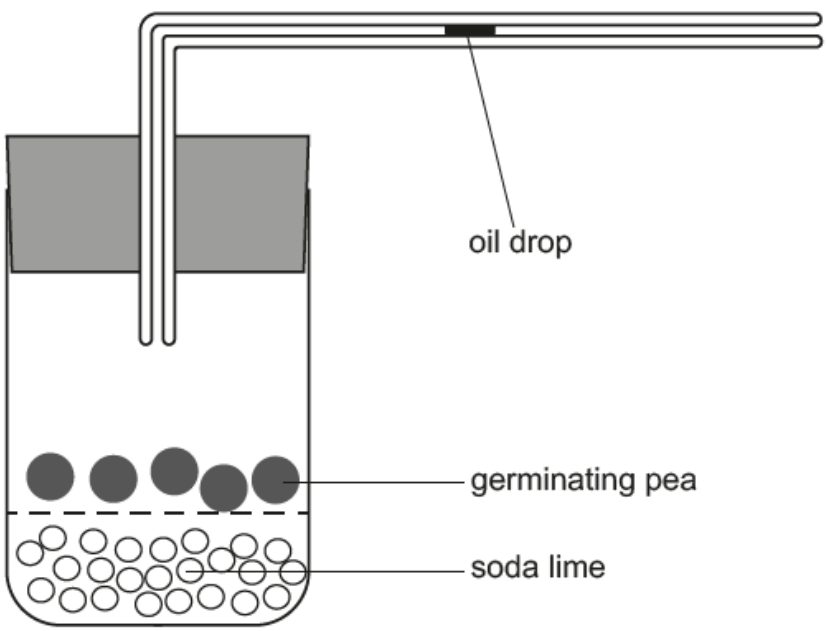


Fig. 1.1

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The results of the investigation are shown in Table 1.1.

Table 1.1

temperature / °C	distance moved by the oil drop / cm
5	2.3
25	5.0

(i) Calculate the percentage increase in the **distance** the oil drop moved, when the temperature changed from 5 °C to 25 °C.

Give your answer to **one** decimal place.

Space for working.

..... %
[3]

(ii) State **two** environmental conditions that the pea seeds shown in Fig. 1.1 would need for germination.

1 .....

2 .....
[2]

[Total: 11]

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24. Nov/2021/Paper_41/No.1

(a) Fish, mammals and birds are all groups of vertebrates.

(i) State the names of the **two other** main groups of vertebrates.

..... and ..... [1]

(ii) Complete Table 1.1 to compare the features of fish, mammals and birds.

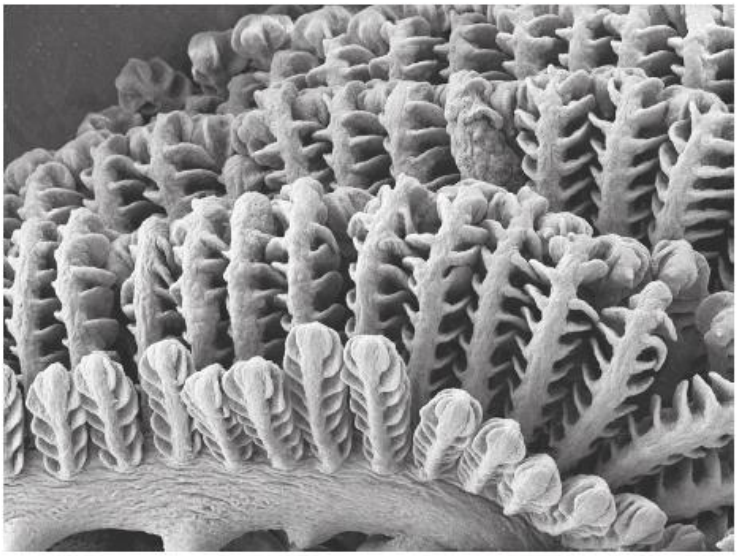
Table 1.1

feature	fish	mammals	birds
organ involved in gas exchange	gills		lungs
circulatory system			double
body covering		fur	
presence of external ears (pinnae)	no		

[3]

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(b) Fig. 1.1 is a micrograph of part of some fish gills.



magnification ×110

Fig. 1.1

Fish gills are adapted for gas exchange by diffusion.

(i) Define the term diffusion.

.....

.....

.....

.....

..... [2]

(ii) Suggest **one** adaptation, visible in Fig. 1.1, that shows that fish gills are efficient structures for gas exchange by diffusion.

.....

.....

..... [1]

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(c) Some pollutants decrease the concentration of dissolved oxygen in rivers. This can result in the death of fish.

(i) State **one** type of pollutant that can result in a decrease in the concentration of dissolved oxygen in rivers.

..... [1]

(ii) Researchers investigated the effect of the concentration of dissolved oxygen in water on gas diffusion distance in tissues. The thickness of fish gills was used to determine the gas diffusion distance.

The researchers changed the concentration of dissolved oxygen by bubbling different concentrations of oxygen into water. The temperature of the water was kept constant at 15 °C.

Their results are shown in Fig. 1.2.

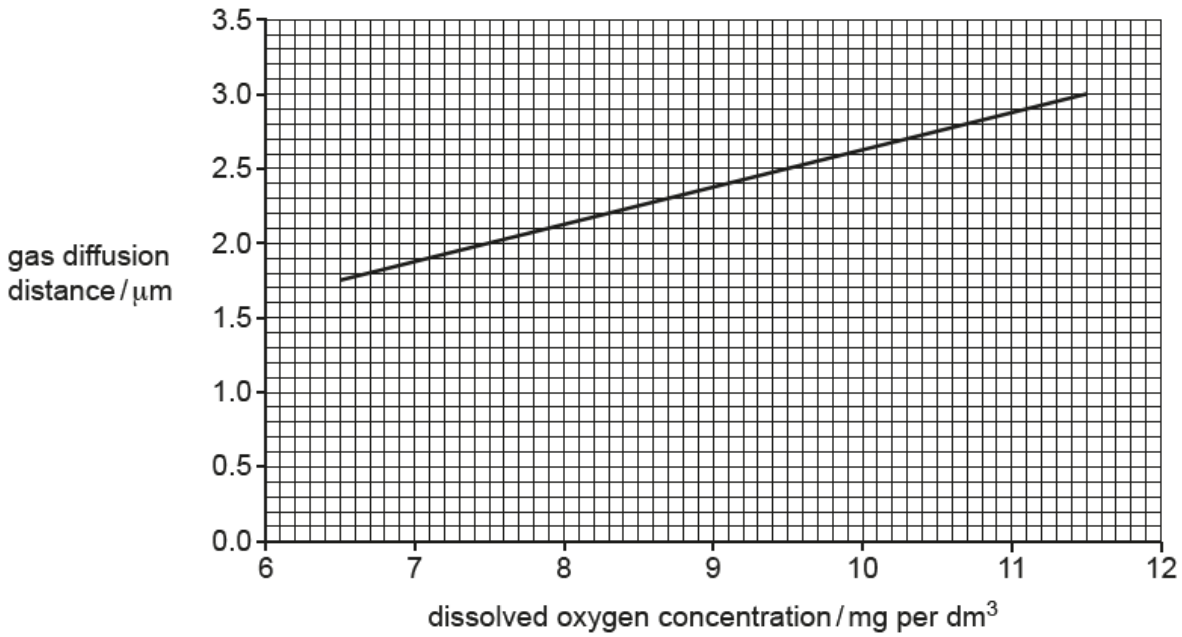


Fig. 1.2

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Fig. 1.3 shows the relationship between the concentration of dissolved oxygen and water temperature.

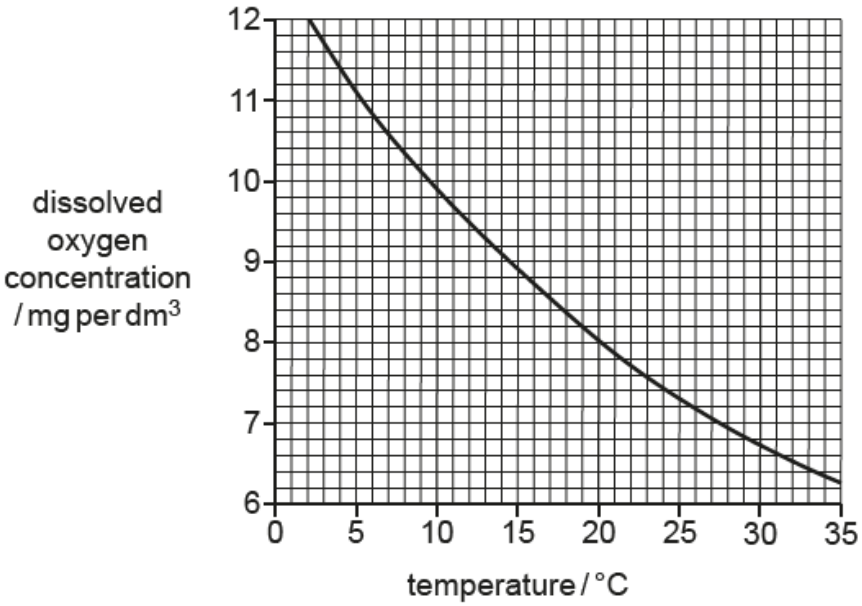


Fig. 1.3

Complete steps 1 to 3 to determine the effect on gas diffusion distance of increasing the temperature of the water from 15 °C to 25 °C.

Step 1
Find the concentration of dissolved oxygen from Fig. 1.3 at:

15 °C: ..... mg per dm^3 25 °C: ..... mg per dm^3

Step 2
Use the values from step 1 to find the gas diffusion distances from Fig. 1.2:

..... μm ..... μm

Step 3
Calculate the difference in the values from step 2.

..... μm
[3]

[Total: 11]

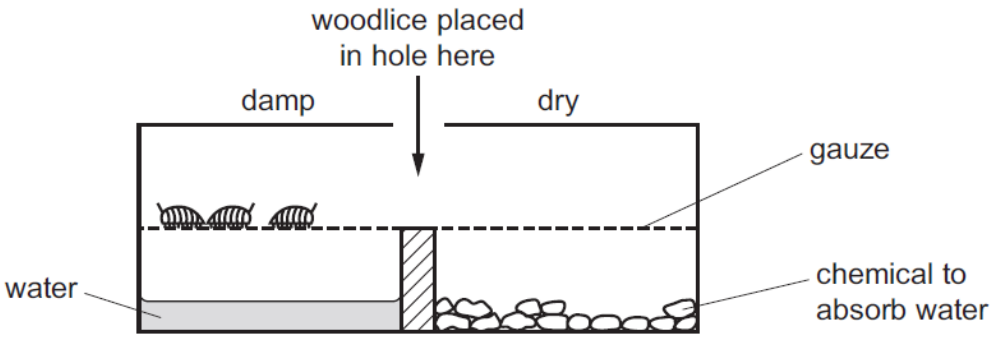
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Characteristics and classification of living organisms – 2021 IGCSE 0610

1. March/2021/Paper_12/No.1

Woodlice are small organisms that live in damp places.

In an experiment, three live woodlice are put into a glass container. The diagram shows what happens after 30 minutes.



Which characteristic of living organisms is shown by this experiment?

A growth

B nutrition

C respiration

D sensitivity

2. March/2021/Paper_12/No.2

Which species can breed with *Prunella vulgaris* to produce fertile offspring?

	Prunella modularis	*Vespula vulgaris*
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

3. March/2021/Paper_12/No.3

What is the correct order of arthropod groups, from those with the **most** legs to those with the fewest legs?

A arachnids → crustaceans → insects → myriapods

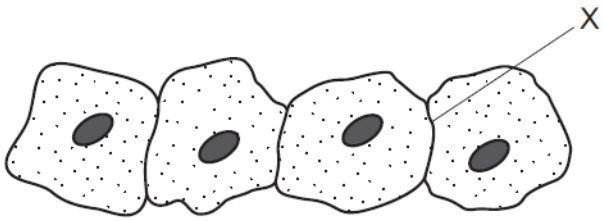
B arachnids → insects → myriapods → crustaceans

C myriapods → crustaceans → arachnids → insects

D myriapods → insects → arachnids → crustaceans

4. March/2021/Paper_12/No.4

The diagram shows four animal cells, as seen under a light microscope.



What will be present at X?

A one cell membrane

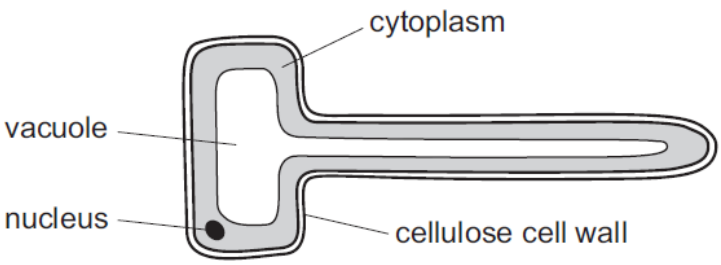
B one cell wall

C two cell membranes

D two cell walls

5. March/2021/Paper_12/No.5

The diagram shows a root hair cell.



How is this cell modified for the absorption of water?

A It has a cellulose cell wall.

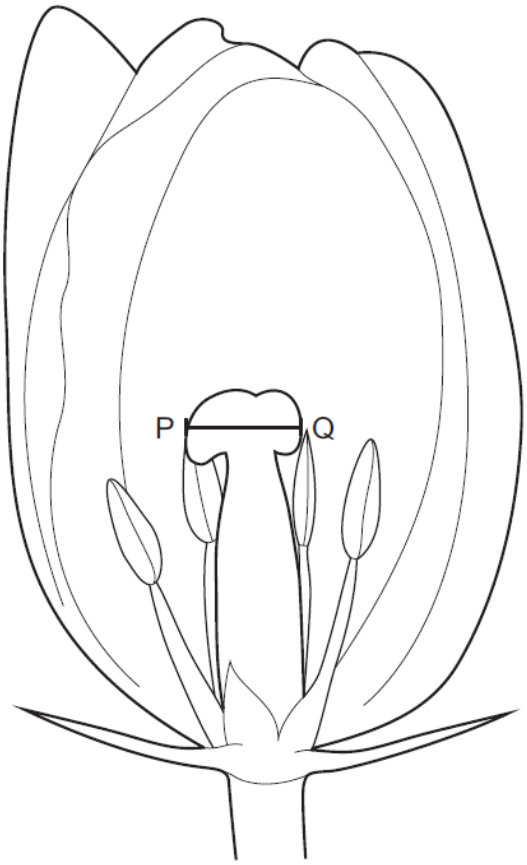
B It has a thin layer of cytoplasm.

C It has a large surface area.

D It has a large vacuole.

6. March/2021/Paper_12/No.6

The diagram shows a drawing of part of a tulip flower. The actual width of the stigma, shown by the line PQ, is 5 mm. The length of line PQ is 15 mm.



What is the magnification of the diagram?

A ×0.3 **B** ×3 **C** ×30 **D** ×300

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7. June/2021/Paper_11/No.1

What is a characteristic of all living organisms?

A breathing

B circulation

C egestion

D sensitivity

8. June/2021/Paper_11/No.2

The scientific names of some animals are listed.

1 *Camelus dromedarius*

2 *Camelus ferus*

3 *Equus ferus*

4 *Struthio camelus*

Which animals are in the same genus?

A 1, 2 and 3 **B** 1, 2 and 4 **C** 1 and 2 only **D** 2 and 3 only

9. June/2021/Paper_11/No.3

Scientists discover a new species of animal.

It has a segmented body with two pairs of legs on each segment.

To which group of animals does this new species belong?

A arachnids

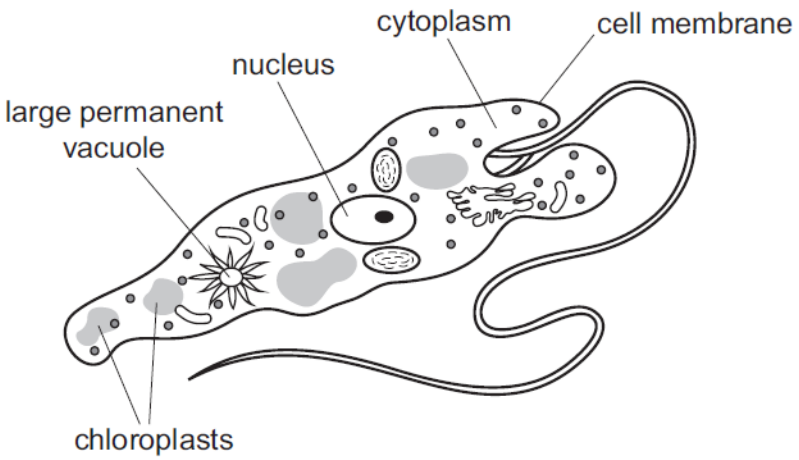
B crustaceans

C insects

D myriapods

10. June/2021/Paper_11/No.4

The diagram shows a single-celled organism called *Euglena*.



Which labelled structures would also be found in an animal cell?

A cell membrane, chloroplast, nucleus

B chloroplast, cytoplasm, nucleus

C cell membrane, cytoplasm, nucleus

D cell membrane, cytoplasm, large permanent vacuole

11. June/2021/Paper_12/No.1

What is a characteristic of all living organisms?

A breathing

B circulation

C egestion

D sensitivity

12. June/2021/Paper_12/No.2

Which term is used to describe a group of living things that can reproduce to produce fertile offspring?

A binomial

B genus

C organism

D species

13. June/2021/Paper_12/No.3

Scientists discover a new species of animal.

It has a segmented body with two pairs of legs on each segment.

To which group of animals does this new species belong?

A arachnids

B crustaceans

C insects

D myriapods

14. June/2021/Paper_13/No.1

What is a characteristic of all living organisms?

A breathing

B circulation

C egestion

D sensitivity

15. June/2021/Paper_13/No.2

Which statement about the binomial naming system is correct?

A It is used for naming animal species but not plant species.

B It is an internationally agreed scientific naming system.

C The name of a species is different in different countries.

D The name consists of one or two words.

16. June/2021/Paper_13/No.3

Scientists discover a new species of animal.

It has a segmented body with two pairs of legs on each segment.

To which group of animals does this new species belong?

A arachnids

B crustaceans

C insects

D myriapods

17. June/2021/Paper_21/No.1

What is a characteristic of all living organisms?

A breathing

B circulation

C egestion

D sensitivity

18. June/2021/Paper_21/No.3

Scientists discover a new species of animal.

It has a segmented body with two pairs of legs on each segment.

To which group of animals does this new species belong?

A arachnids

B crustaceans

C insects

D myriapods

19. June/2021/Paper_22/No.1

What is a characteristic of all living organisms?

A breathing

B circulation

C egestion

D sensitivity

20. June/2021/Paper_22/No.2

The bonobo and the chimpanzee are two closely related species.

What is the **most** accurate method of deciding how closely related species are?

A compare evolutionary relationships of other species

B compare the base sequences of their DNA

C compare their anatomy

D compare their morphology

21. June/2021/Paper_22/No.3

Scientists discover a new species of animal.

It has a segmented body with two pairs of legs on each segment.

To which group of animals does this new species belong?

A arachnids

B crustaceans

C insects

D myriapods

22. June/2021/Paper_22/No.6

A photograph shows a plant cell nucleus measuring 2 mm across.

If the magnification of the cell is ×500, what is the actual size of the nucleus?

A 0.00002 mm **B** 0.004 mm **C** 0.04 mm **D** 250 mm

23. June/2021/Paper_23/No.1

What is a characteristic of all living organisms?

A breathing

B circulation

C egestion

D sensitivity

24. June/2021/Paper_23/No.2

What is the most accurate method of classifying animals?

A comparing bones

B comparing the morphology of organisms

C identifying similarities in anatomy

D identifying similarities in DNA base sequences

25. June/2021/Paper_23/No.3

Scientists discover a new species of animal.

It has a segmented body with two pairs of legs on each segment.

To which group of animals does this new species belong?

A arachnids

B crustaceans

C insects

D myriapods

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26. June/2021/Paper_31/No.1

27. June/2021/Paper_31/No.8

(a) A student investigated the conditions needed for germination of seeds.

Fig. 8.1 shows the apparatus and conditions used.

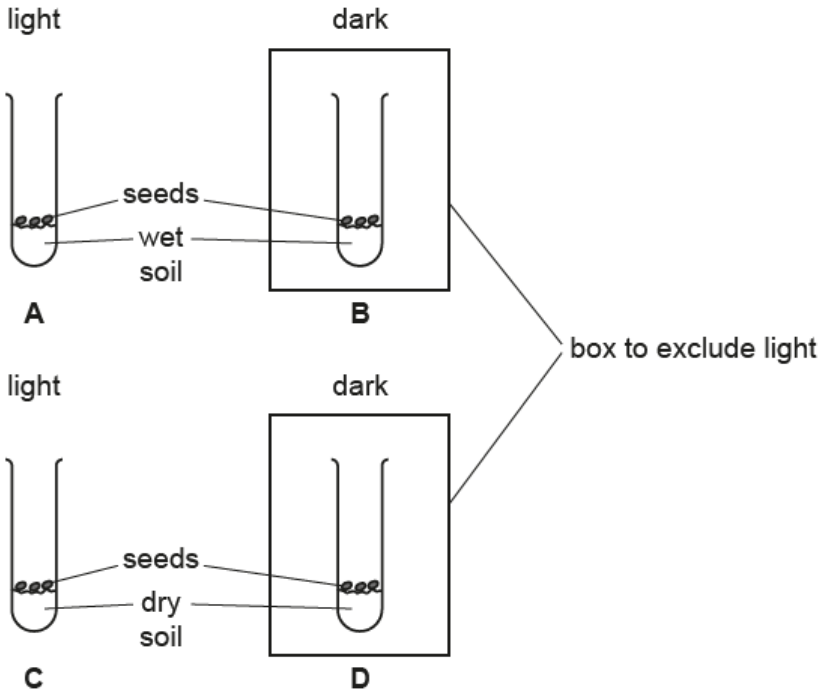


Fig. 8.1

The seeds in test-tubes **A** and **B** germinated but the seeds in test-tubes **C** and **D** did not germinate.

(i) Use the information in Fig. 8.1 to state **one** condition required for germination.

..... [1]

(ii) Use the information in Fig. 8.1 to state **one** condition **not** required for germination.

..... [1]

(iii) The investigation was repeated with seeds that had been boiled for 10 minutes and then cooled.

Predict **and** explain the effect of boiling on the results.

.....

.....

.....

.....

..... [2]

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(b) Photosynthesis and germination have different requirements.

(i) State the word equation for photosynthesis.

..... [2]

(ii) State the name of **one** condition needed for both photosynthesis and germination.

..... [1]

[Total: 7]

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28. June/2021/Paper_32/No.1

Fig. 1.1 is a diagram of the human gas exchange system.

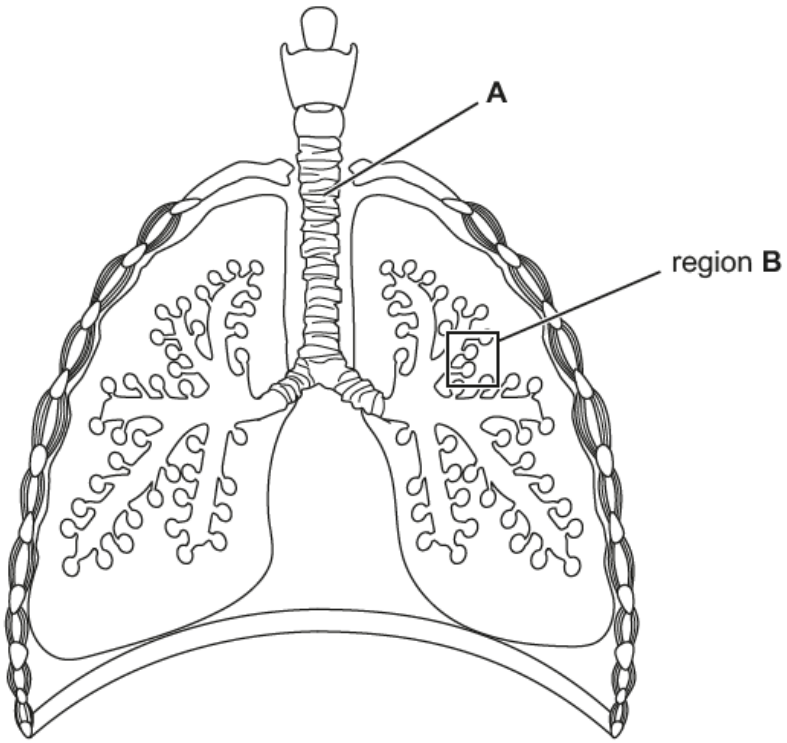


Fig. 1.1

(a) (i) Identify using a label line and a label **on Fig. 1.1**:

- a lung
- the diaphragm. [2]

(ii) State the name of structure **A** in Fig. 1.1.

..... [1]

(iii) Oxygen molecules pass through structure **A** on their way to the red blood cells.

State the names of **three** other structures in the gas exchange system that oxygen molecules must pass through on their way to the red blood cells.

1 .....

2 .....

3 .....

[3]

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29. June/2021/Paper_33/No.1

(a) State the name of the large group of organisms that includes insects, arachnids, crustaceans and myriapods.

..... [1]

(b) Fig. 1.1 shows a key that identifies nine genera of invertebrates that have jointed legs.

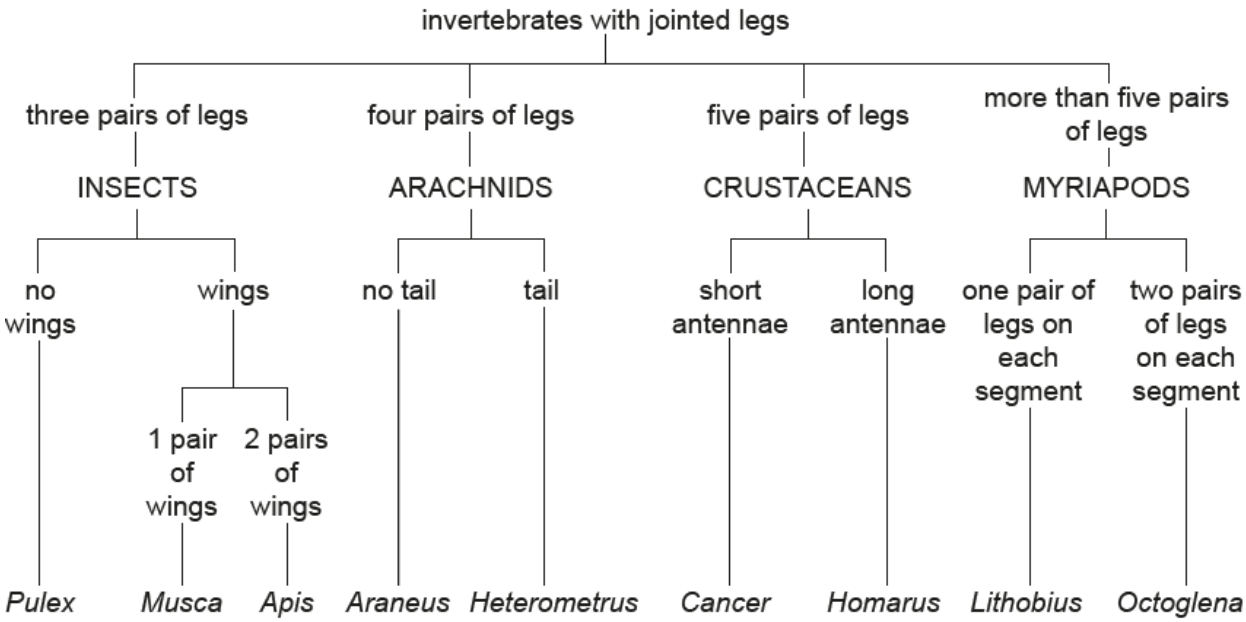


Fig. 1.1

(i) Use the information in Fig. 1.1 to describe **two** features of *Musca*.

1 .....

.....

2 .....

.....

[2]

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(ii) Fig. 1.2 shows one of the animals described in the key.



Fig. 1.2

Use the key in Fig. 1.1 to identify this animal.

..... [1]

[Total: 4]

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30. June/2021/Paper_41/No.1

(a) Baker's yeast, *Saccharomyces cerevisiae*, is a single-celled organism that is classified in the kingdom Fungi.

Fig. 1.1 is a drawing of a section through a yeast cell.

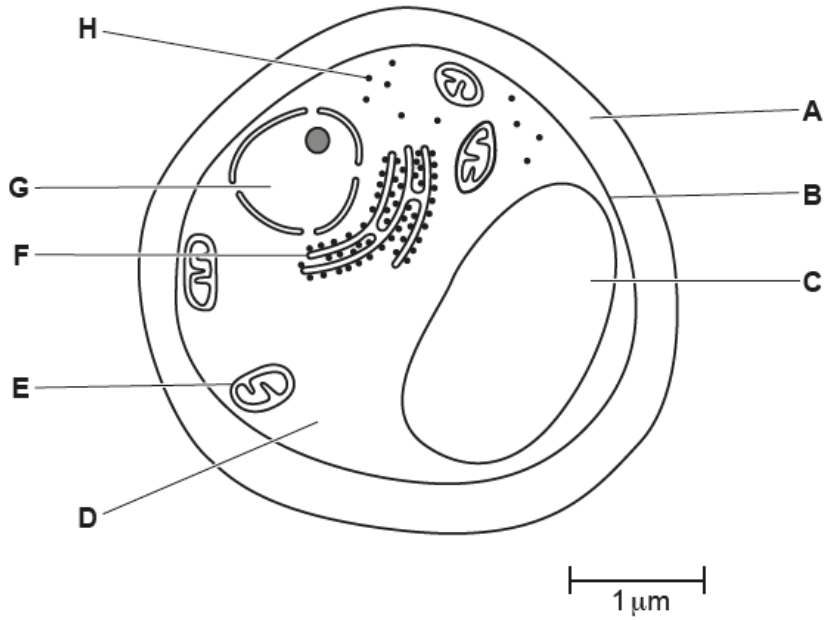


Fig. 1.1

(i) State **one other** kingdom that contains organisms that all have structure **A**.

..... [1]

(ii) Table 1.1 shows some cell functions.

Complete Table 1.1 by naming the cell structure responsible for each cell function and give the letter that identifies each cell structure in Fig. 1.1.

Table 1.1

cell function	cell structure	letter from Fig. 1.1
storage of genes		
aerobic respiration		
amino acids are assembled to make protein		

[3]

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(b) A student made a drawing of one *Escherichia coli* bacterium. Fig. 1.2 shows the student's drawing.

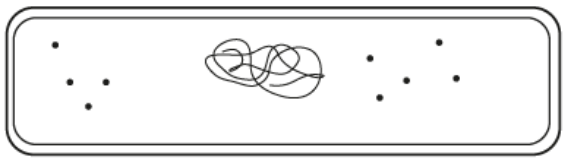


Fig. 1.2

The actual length of the bacterial cell is 2 μm.

(i) Convert the actual length of the cell to millimetres.

..... mm [1]

(ii) State the other information that the student needs in order to calculate the magnification of the drawing in Fig. 1.2.

..... [1]

(c) Describe the similarities **and** differences between the structure of the yeast cell and the structure of the bacterial cell.

Use the information in Fig. 1.1 and Fig. 1.2 in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

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(d) Some bacteria are involved in the nitrogen cycle.

Fig. 1.3 shows part of the nitrogen cycle.

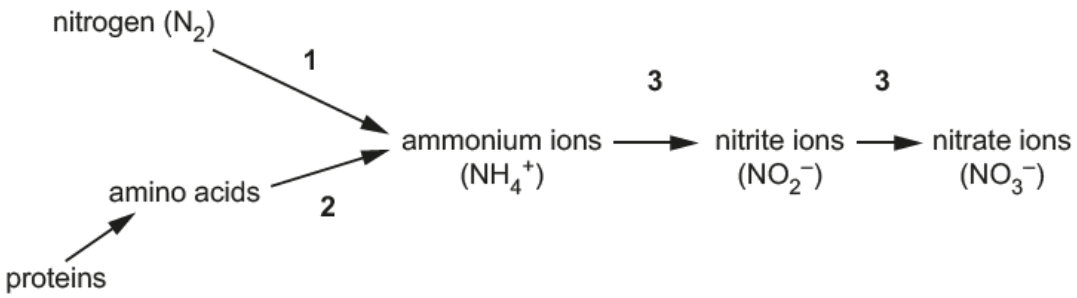


Fig. 1.3

State the processes that are represented by **1**, **2** and **3** on Fig. 1.3.

1 .....

2 .....

3 .....

[3]

[Total: 15]

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31. June/2021/Paper_42/No.2

The classification of giant pandas, *Ailuropoda melanoleuca*, is debated by many scientists.

Fig. 2.1 shows a giant panda eating bamboo plants.



Fig. 2.1

Fig. 2.2 shows a red panda, *Ailurus fulgens*, and a polar bear, *Ursus maritimus*.



red panda eating bamboo plants



polar bear eating fish

Fig. 2.2

(a) State **one** dietary component that is more likely to be found in bamboo plants than in fish.

..... [1]

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Morphology can also be used to classify species. Some scientists think that morphology suggests that the giant panda is more closely related to the red panda than it is to the polar bear.

Discuss the evidence for **and** against the giant panda being more closely related to the red panda than it is to the polar bear. Use the information in Fig. 2.1, Fig. 2.2 and Fig. 2.3 in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(iii) State one **other** type of evidence that is used to classify species.

..... [1]

[Total: 9]

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Characteristics and classification of living organisms – 2020 IGCSE 0610

1. Nov/2020/Paper_11/No.1

Hedgehogs are mammals. Touching a hedgehog causes it to roll into a ball to protect itself.

Which characteristics is it displaying?

A excretion and movement

B growth and sensitivity

C movement and growth

D movement and sensitivity

2. Nov/2020/Paper_11/No.2

According to the binomial system, how should a human be named?

A *Homo Sapiens*

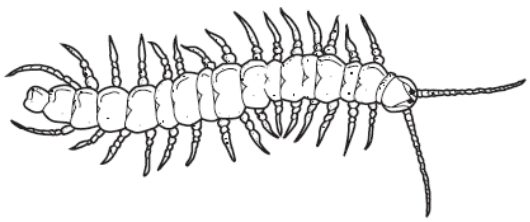
B *Homo sapiens*

C *homo Sapiens*

D *homo sapiens*

3. Nov/2020/Paper_11/No.3

The diagram shows an arthropod.



Which group does this arthropod belong to?

A arachnid

B crustacean

C insect

D myriapod

4. Nov/2020/Paper_12/No.1

Which process is carried out by all organisms?

A growth

B photosynthesis

C sexual reproduction

D transpiration

5. Nov/2020/Paper_12/No.2

According to the binomial system, how should a human be named?

A *Homo Sapiens*

B *Homo sapiens*

C *homo Sapiens*

D *homo sapiens*

6. Nov/2020/Paper_13/No.2

According to the binomial system, how should a human be named?

A *Homo Sapiens*

B *Homo sapiens*

C *homo Sapiens*

D *homo sapiens*

7. Nov/2020/Paper_21/No.1

Hedgehogs are mammals. Touching a hedgehog causes it to roll into a ball to protect itself.

Which characteristics is it displaying?

A excretion and movement

B growth and sensitivity

C movement and growth

D movement and sensitivity

8. Nov/2020/Paper_21/No.2

What are features of the leaves of a plant that is a dicotyledon?

	broad leaves	parallel veins
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

9. Nov/2020/Paper_22/No.1

Which process is carried out by all organisms?

A growth

B photosynthesis

C sexual reproduction

D transpiration

10. Nov/2020/Paper_22/No.2

What are features of the leaves of a plant that is a dicotyledon?

	broad leaves	parallel veins
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

11. Nov/2020/Paper_22/No.26

Which characteristic of viruses prevents them from being affected by antibiotics?

A They cannot reproduce on their own.

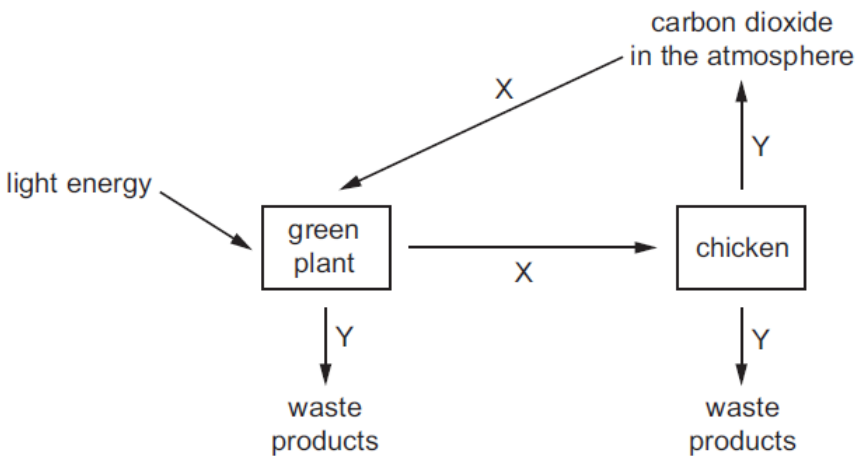
B They contain DNA or RNA.

C They have no cell structure.

D They are much smaller than bacteria.

12. Nov/2020/Paper_23/No.1

The diagram shows some of the processes carried out by living organisms.



Which two characteristics of living organisms are represented by arrows X and Y?

A excretion and sensitivity

B nutrition and excretion

C respiration and growth

D sensitivity and reproduction

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13. Nov/2020/Paper_31/No.1

(a) Fig. 1.1 is a diagram of an animal cell.

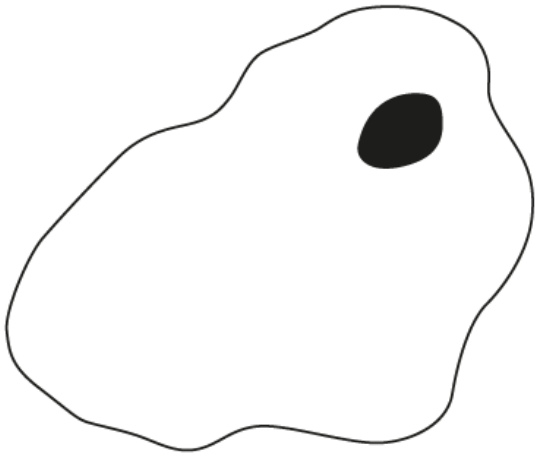


Fig. 1.1

Label **three** structures **on the cell** shown in Fig. 1.1, using label lines and the names of the structures. [3]

(b) State **two** structures that are found in plant cells but **not** in animal cells.

1 .....

2 .....
[2]

[Total: 5]

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14. Nov/2020/Paper_31/No.2

(a) Fig. 2.1 is a photograph of a lobster, which is an arthropod.

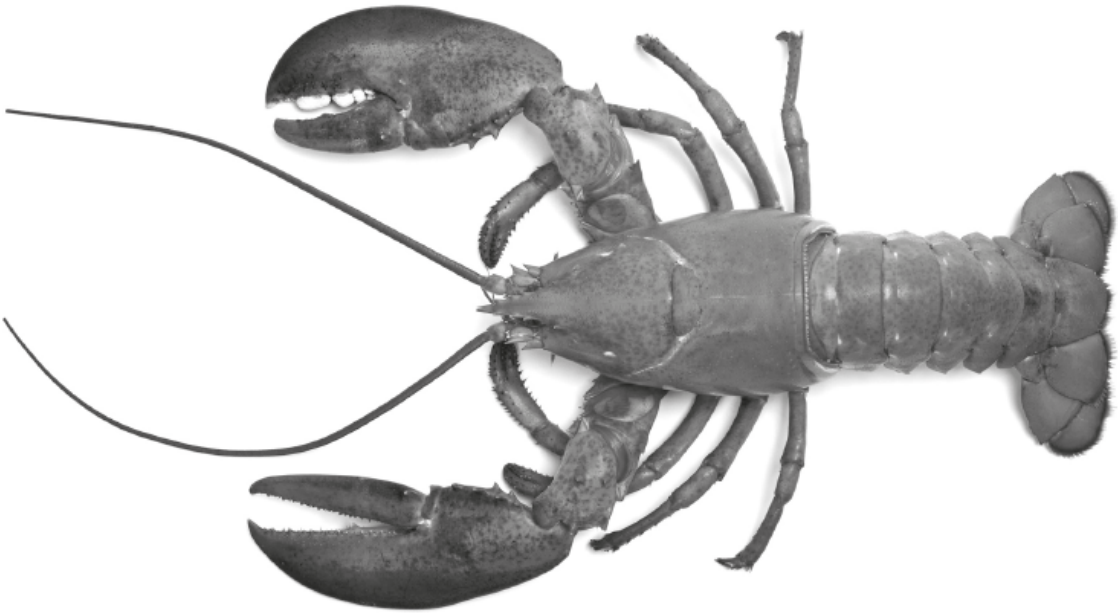


Fig. 2.1

Describe **two** pieces of evidence visible in Fig. 2.1 that identify this organism as an arthropod.

1 .....

2 .....

[2]

(b) The scientific name of the arthropod in Fig. 2.1 is *Homarus americanus*.

State the genus name.

..... [1]

(c) The arthropod shown in Fig. 2.1 is a crustacean.

State the names of **two other** groups of arthropods.

1 .....

2 .....

[2]

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(d) Many species of crustaceans live in seas and oceans.

Some of these species have become endangered.

Describe reasons why some marine crustacean species have become endangered.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 8]

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15. Nov/2020/Paper_32/No.1

All living organisms have the same characteristics.

Two of these characteristics are movement and nutrition.

(a) State **three other** characteristics of living organisms.

1 .....

2 .....

3 .....

[3]

(b) Fig. 1.1 shows animals that belong to one vertebrate group.

State the name of this vertebrate group and give **one visible** characteristic feature of this group.



Fig. 1.1

name of group .....

feature of group .....

[2]

(c) State the names of **two other** groups of vertebrates.

1 .....

2 .....

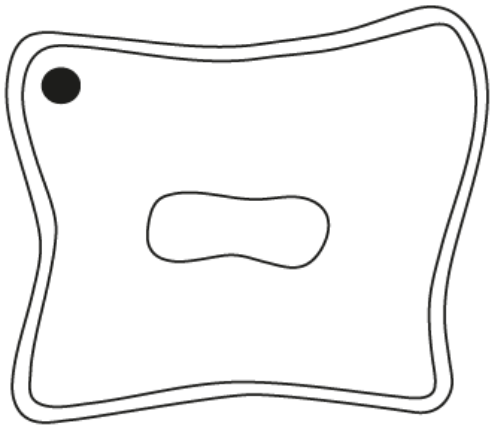
[2]

[Total: 7]

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16. Nov/2020/Paper_32/No.2

Fig. 2.1 shows a plant cell after it has been in a solution of glucose for fifteen minutes.



cell membrane

cytoplasm

vacuole

Fig. 2.1

(a) Draw label lines **on Fig. 2.1** to link each label to the correct structure. [3]

(b) The plant cell in Fig. 2.1 was then placed in distilled water.

Fig. 2.2 shows the appearance of the cell after fifteen minutes in distilled water.

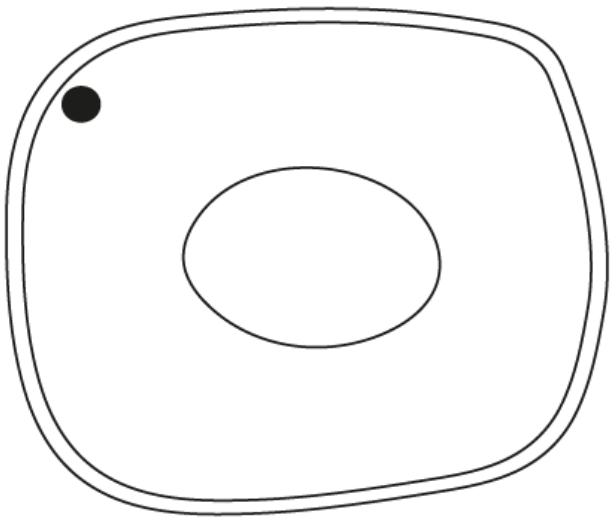


Fig. 2.2

(i) State **two** ways in which the plant cell has changed.

1 .....

.....

2 .....

.....

[2]

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(ii) Explain why the plant cell changed when it was placed in distilled water.

.....

.....

.....

.....

.....

..... [3]

[Total: 8]

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Characteristics and classification of living organisms – 2020 IGCSE 0610

1. March/2020/Paper_12/No.1

Which characteristic do **all** living organisms show?

A breathing

B excretion

C photosynthesis

D tropism

2. March/2020/Paper_12/No.2

Using the binomial naming system, the Arctic fox is called *Vulpes lagopus*.

Which row is correct?

	Vulpes	*lagopus*
A	genus	kingdom
B	genus	species
C	species	genus
D	species	kingdom

3. March/2020/Paper_12/No.3

What is a characteristic of both insects and arachnids?

A eight legs

B exoskeleton

C three pairs of legs

D wings

4. March/2020/Paper_22/No.1

Which characteristic do **all** living organisms show?

A breathing

B excretion

C photosynthesis

D tropism

5. March/2020/Paper_22/No.2

Using the binomial naming system, the Arctic fox is called *Vulpes lagopus*.

Which row is correct?

	Vulpes	*lagopus*
A	genus	kingdom
B	genus	species
C	species	genus
D	species	kingdom

6. March/2020/Paper_22/No.3

What is a characteristic of both insects and arachnids?

A eight legs

B exoskeleton

C three pairs of legs

D wings

7. March/2020/Paper_22/No.4

What structures can be found in both plant and animal cells?

A cell walls and cell membranes

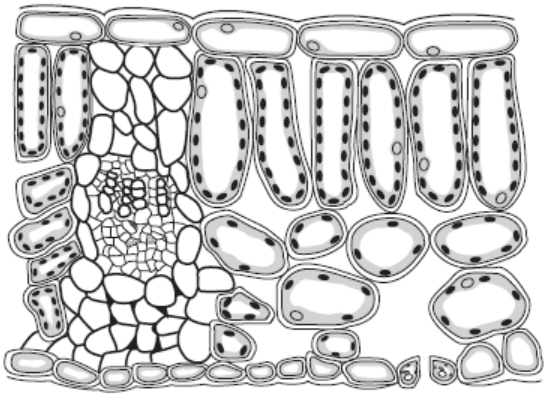
B nuclei and cell walls

C cytoplasm and chloroplasts

D cell membranes and nuclei

8. March/2020/Paper_22/No.5

The actual thickness of the leaf shown in the diagram is 2000 μm, but its thickness in the diagram is 50 mm.



What is the magnification of the diagram?

A ×0.025 **B** ×25 **C** ×100 **D** ×100 000

9. March/2020/Paper_32/No.1

(a) Fig. 1.1 shows six species of reptiles.

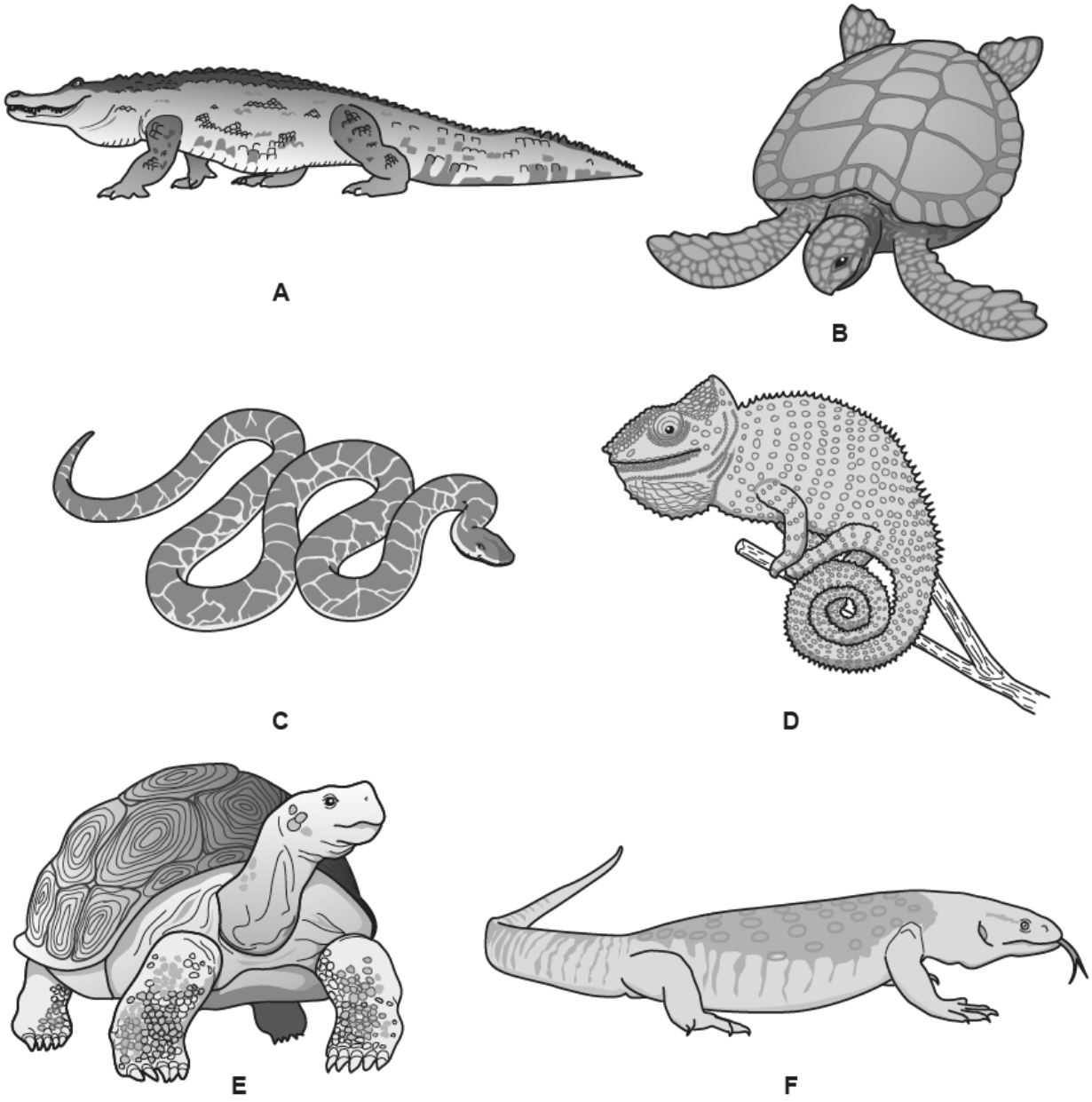


Fig. 1.1

(i) Use the key to identify each species. Write the letter of each species (**A**–**F**) in the correct empty box beside the key.

Key:

1 (a)	organism has a shell (hard covering on its back)	go to 2	
(b)	organism does not have a shell	go to 3	
2 (a)	organism has flat limbs (flippers)	*Caretta caretta*	
(b)	organism has legs and feet	*Chelonoidis nigra*	
3 (a)	organism has limbs	go to 4	
(b)	organism has a long body and no limbs	*Crotalus viridis*	
4 (a)	organism has ridges on its back	go to 5	
(b)	organism has no ridges on its back	*Varanus bengalensis*	
5 (a)	organism has a coiled tail	*Chamaeleo calyptratus*	
(b)	organism has a straight tail	*Alligator mississippiensis*	

[5]

(ii) Define the term species.

.....

.....

.....

.....

..... [2]

(b) The binomial system of naming organisms tells us the species and the genus of the organism.

State the genus name for *Chamaeleo calyptratus*.

..... [1]

(c) Table 1.1 shows some features of animals.

Place ticks (✓) next to **two** features of most reptiles.

Table 1.1

compound eyes	
fertilisation is internal	
wings	
lay eggs	
moist skin	

[2]

(d) State **two** features of cells that are shared by **all** living organisms.

1 .....

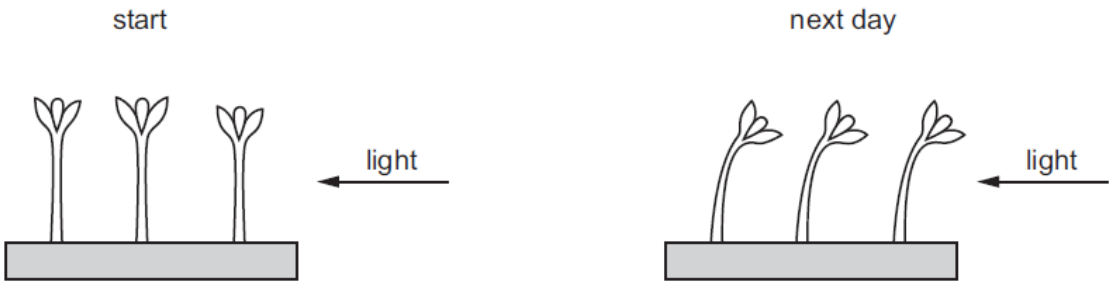
2 .....

[2]

[Total: 12]

10. June/2020/Paper_11/No.1

The diagram shows what happened in an experiment with plant seedlings.



Which characteristic of living things made the seedlings grow towards the light?

A excretion

B nutrition

C respiration

D sensitivity

11. June/2020/Paper_11/No.2

A rat has the scientific name *Rattus rattus*.

What do the two parts of this name refer to?

A genus and species

B kingdom and genus

C kingdom and species

D variety and genus

12. June/2020/Paper_11/No.3

An animal can swim, has a backbone and produces milk.

To which group does it belong?

A amphibians

B fish

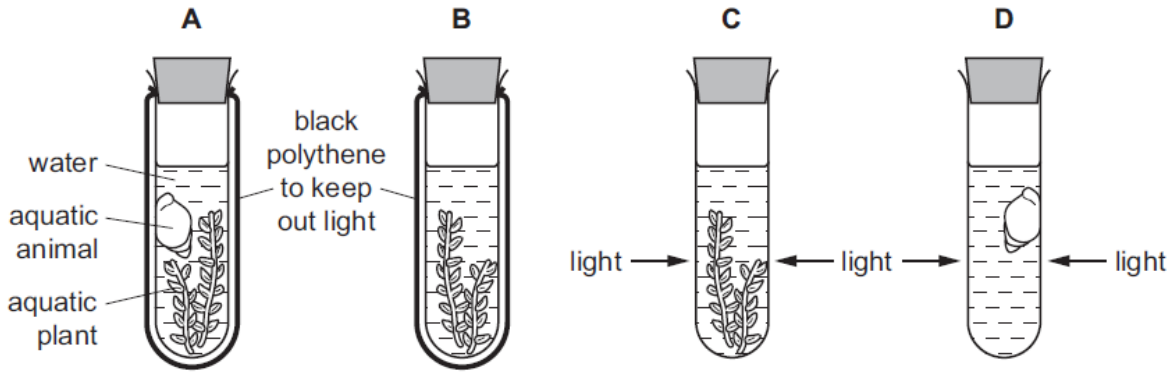
C mammals

D reptiles

13. June/2020/Paper_11/No.10

Four test-tubes are set up as shown.

Which test-tube contains the least carbon dioxide after one hour?



14. June/2020/Paper_11/No.30

What happens during respiration in germinating seeds?

A Seed temperature decreases.

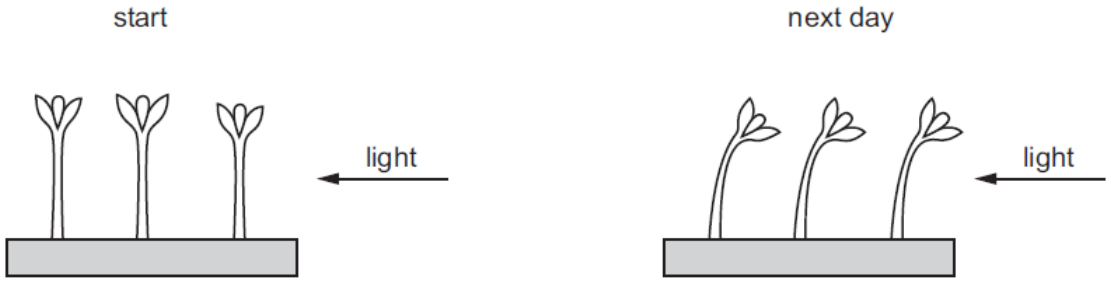
B Carbon dioxide is taken up by the seeds.

C Glucose is used up by the seeds.

D Oxygen is given out by the seeds.

15. June/2020/Paper_12/No.1

The diagram shows what happened in an experiment with plant seedlings.



Which characteristic of living things made the seedlings grow towards the light?

A excretion

B nutrition

C respiration

D sensitivity

16. June/2020/Paper_12/No.2

A rat has the scientific name *Rattus rattus*.

What do the two parts of this name refer to?

A genus and species

B kingdom and genus

C kingdom and species

D variety and genus

17. June/2020/Paper_12/No.3

Which list contains **only** arthropods?

A amphibians, insects, myriapods

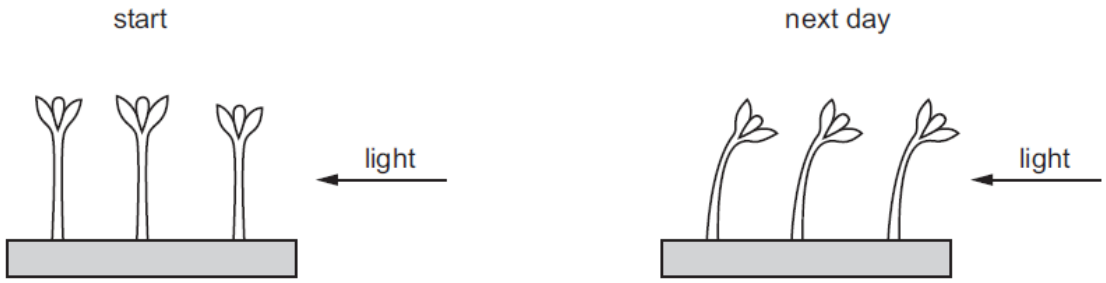
B arachnids, crustaceans, myriapods

C crustaceans, insects, fish

D insects, myriapods, reptiles

18. June/2020/Paper_13/No.1

The diagram shows what happened in an experiment with plant seedlings.



Which characteristic of living things made the seedlings grow towards the light?

A excretion

B nutrition

C respiration

D sensitivity

19. June/2020/Paper_13/No.2

A rat has the scientific name *Rattus rattus*.

What do the two parts of this name refer to?

A genus and species

B kingdom and genus

C kingdom and species

D variety and genus

20. June/2020/Paper_13/No.3

Explorers have found an unknown animal living in a rainforest. The animal

- lives on land but has also been seen in water
- lays soft-shelled eggs on land
- does not have gills
- has scaly skin
- is 1.0 m long
- does not produce milk.

To which group is the animal most likely to belong?

A amphibians

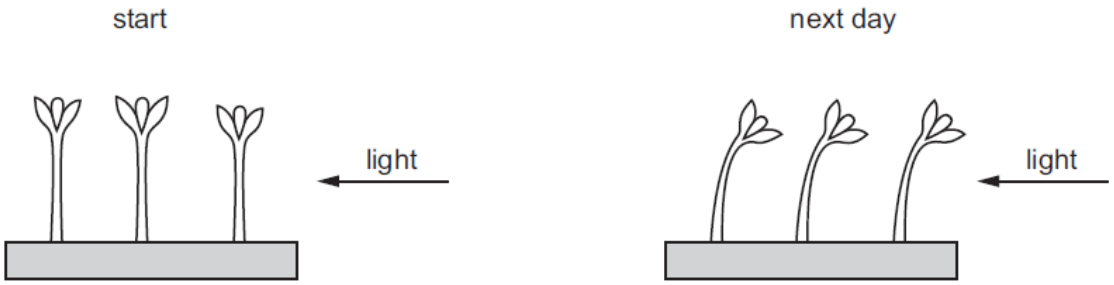
B arthropods

C mammals

D reptiles

21. June/2020/Paper_21/No.1

The diagram shows what happened in an experiment with plant seedlings.



Which characteristic of living things made the seedlings grow towards the light?

A excretion

B nutrition

C respiration

D sensitivity

22. June/2020/Paper_21/No.2

A rat has the scientific name *Rattus rattus*.

What do the two parts of this name refer to?

A genus and species

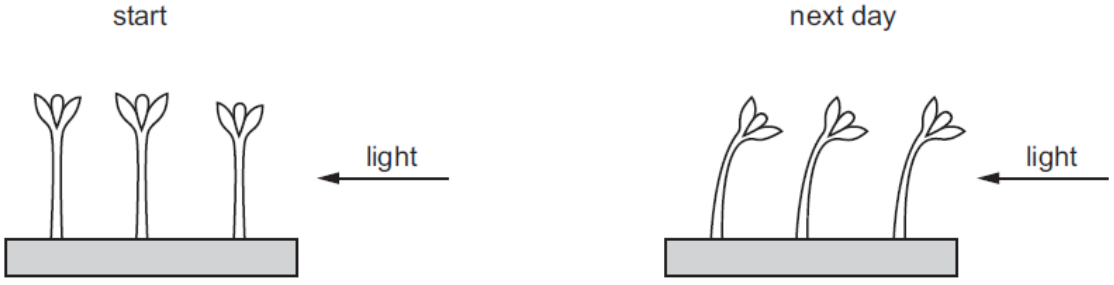
B kingdom and genus

C kingdom and species

D variety and genus

23. June/2020/Paper_22/No.1

The diagram shows what happened in an experiment with plant seedlings.



Which characteristic of living things made the seedlings grow towards the light?

A excretion

B nutrition

C respiration

D sensitivity

24. June/2020/Paper_22/No.2

A rat has the scientific name *Rattus rattus*.

What do the two parts of this name refer to?

A genus and species

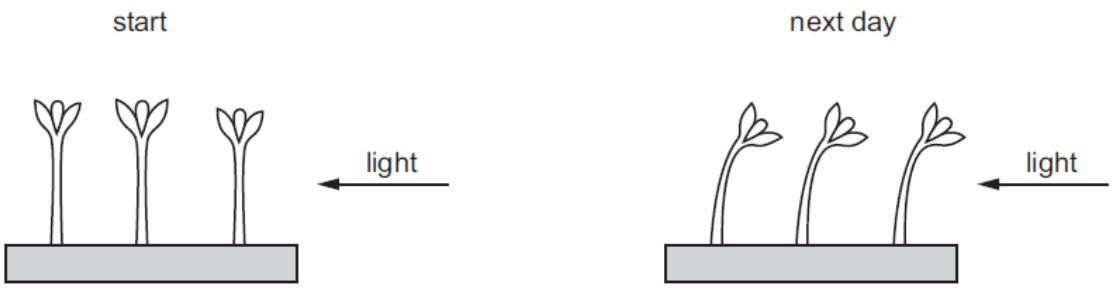
B kingdom and genus

C kingdom and species

D variety and genus

25. June/2020/Paper_23/No.1

The diagram shows what happened in an experiment with plant seedlings.



Which characteristic of living things made the seedlings grow towards the light?

A excretion

B nutrition

C respiration

D sensitivity

26. June/2020/Paper_23/No.2

A rat has the scientific name *Rattus rattus*.

What do the two parts of this name refer to?

A genus and species

B kingdom and genus

C kingdom and species

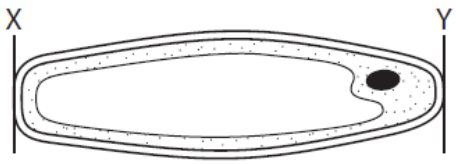
D variety and genus

27. June/2020/Paper_23/No.4

The diagram shows an onion plant epidermal cell.

The distance between X and Y on the diagram is 60 mm.

The actual length of the cell between X and Y was 150 μm.



What is the magnification of the cell?

A ×40 **B** ×250 **C** ×400 **D** ×2500

28. June/2020/Paper_32/No.5

(a) Fig. 5.1 is a photograph of part of a flower.

Some of the outer structures have been removed to show the internal parts.



Fig. 5.1

(i) Label these structures on Fig. 5.1 with a label line and the name:

- anther
- petal
- stigma.

[3]

(ii) Describe **two** features visible in Fig. 5.1 that suggest that this is an insect-pollinated flower.

1 .....

.....

2 .....

.....

[2]

(b) Many living organisms can be classified as plants or animals.

Table 5.1 shows some features of animals and plants.

Place ticks (✓) in the boxes to show the correct features of animals and plants.

Table 5.1

feature	animals	plants
can respire		
can grow		
can make their own food		
contain DNA		
can respond to changes in their environment		

[5]

(c) State **two** structures that are present in plant cells but **not** in animal cells.

1 .....

2 .....

[2]

[Total: 12]

29. June/2020/Paper_41/No.5

Ciliates are classified in the kingdom Protoctist. Bacteria are classified in the kingdom Prokaryote.

(a) State **two structural** features that distinguish the cells of a protoctist from a prokaryote.

1 .....

.....

2 .....

.....

[2]

(b) Fig. 5.1 shows five species of ciliate that are found in sewage treatment works.

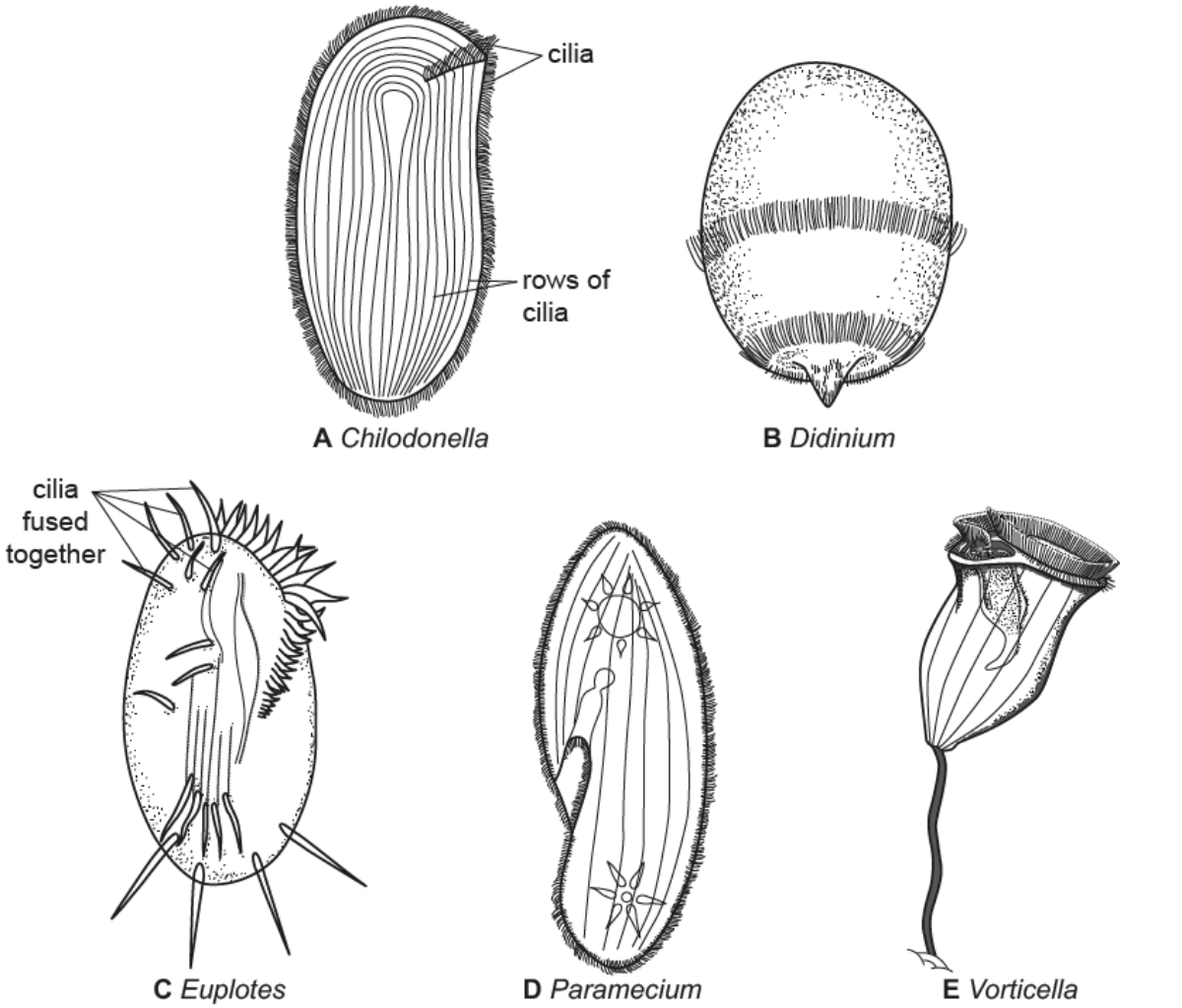


Fig. 5.1

Fig. 5.2 is a dichotomous key to identify the ciliates shown in Fig. 5.1.

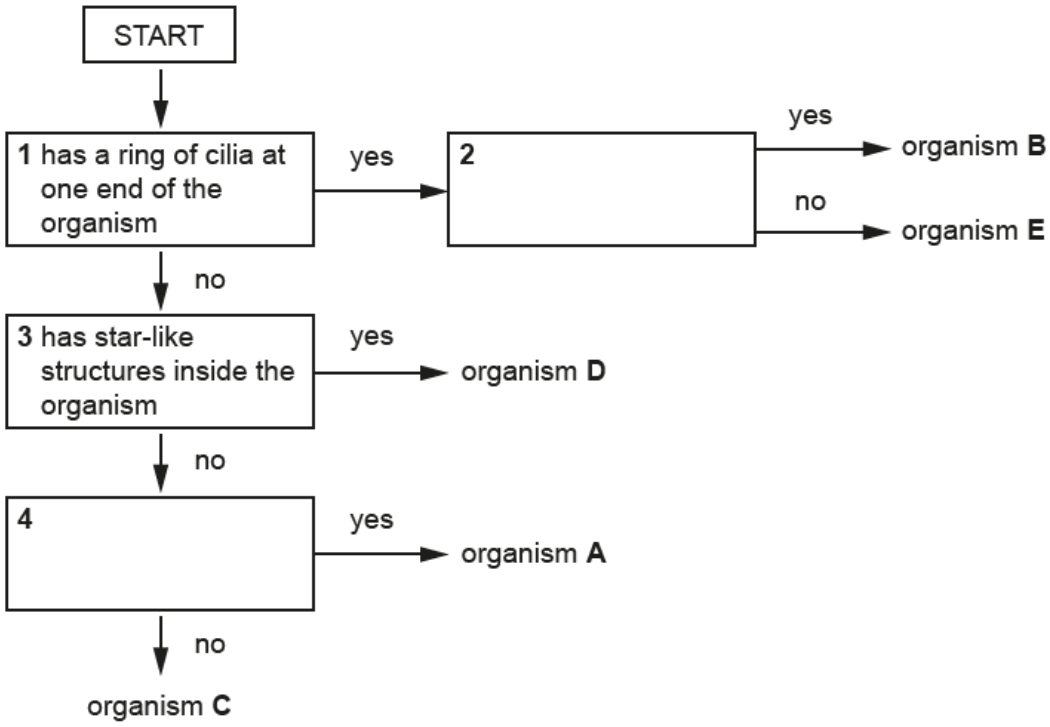


Fig. 5.2

Complete the key in Fig. 5.2 by writing suitable statements:

- for box 2 to distinguish species **B** and **E**
- for box 4 to distinguish species **A** and **C**.

text for box 2 .....

.....

.....

text for box 4 .....

.....

.....

[2]

(c) *Didinium* is a predatory ciliate. A video recording was made of one *Didinium* feeding on a *Paramecium*. Fig. 5.3 shows a sequence of still photographs taken from the video.

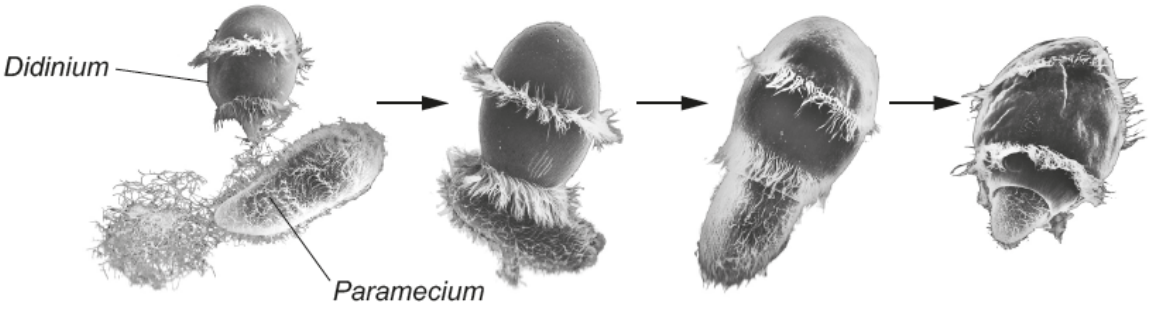


Fig. 5.3

Complete the table by putting a tick (✓) by each characteristic of life that can be seen in the still photographs from the video in Fig. 5.3.

excretion		nutrition	
growth		reproduction	
movement		respiration	

[1]

(d) Fig. 5.4 is a food web for some of the microorganisms in a sewage treatment works.

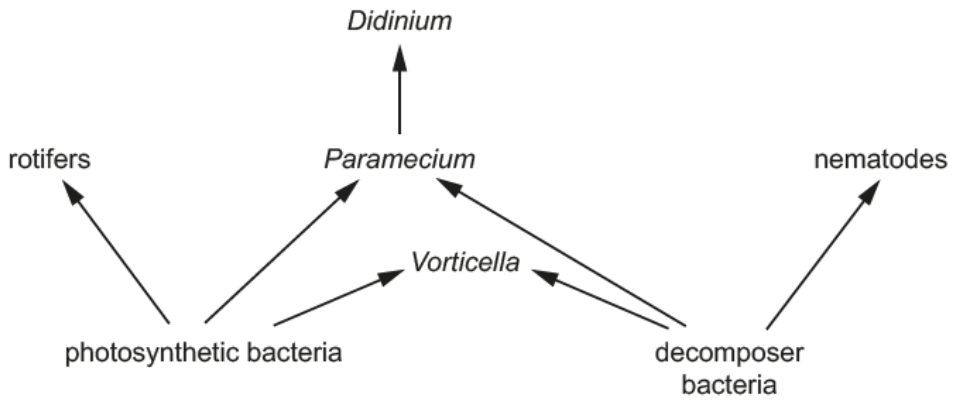
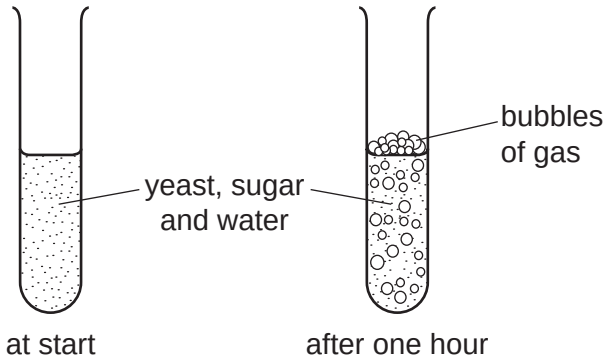


Fig. 5.4

(i) Construct **one** food chain with three trophic levels that use energy derived from the breakdown of sewage. Do **not** draw the organisms.

1. 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

2. Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

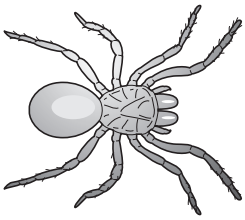
B a kingdom

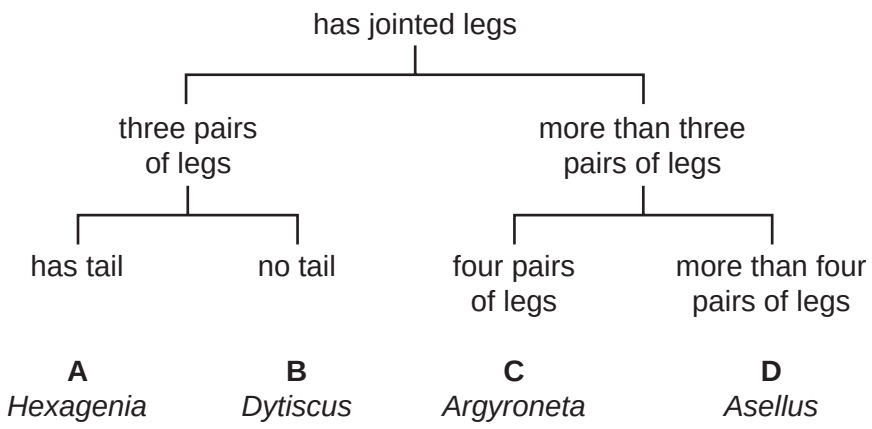
C a species

D an organ system

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3. Use the key to identify the animal shown in the diagram.





4 A rat has the scientific name *Rattus rattus*.

What do the two parts of this name refer to?

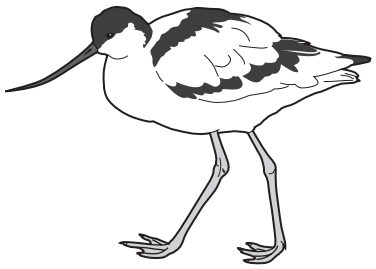
A genus and species

B kingdom and genus

C kingdom and species

D variety and genus

5. The diagram shows a bird that lives near rivers.



Use the key to identify the bird shown in the diagram.

1	toes joined by a flap of skin	go to 2
	toes separate	**A** heron
2	beak as long or longer than the head	go to 3
	beak not as long as the head	**B** little grebe
3	top of head black	**C** avocet
	top of head white	**D** mute swan

6. Phototropism demonstrates which two characteristics of living organisms?

A growth and nutrition

B growth and sensitivity

C movement and nutrition

D nutrition and sensitivity

7. The table shows the scientific names and the common names of four plants.

scientific name	common name
Althea officinalis	marsh mallow
Hottonea palustris	water violet
Viola palustris	marsh violet
Viola tricolor	wild pansy

Which word in their names shows that two of the plants share the greatest number of features?

A marsh

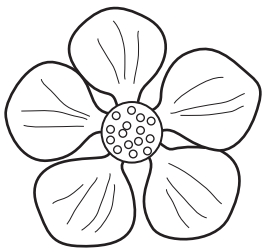
B *palustris*

C *Viola*

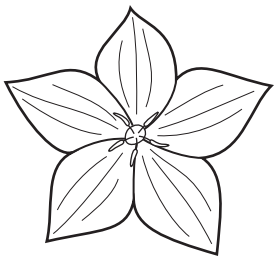
D violet

8. Which diagram shows a flower from a monocotyledon?

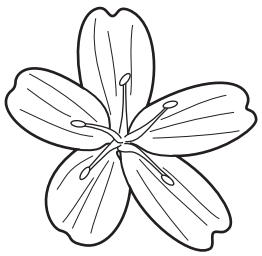
A



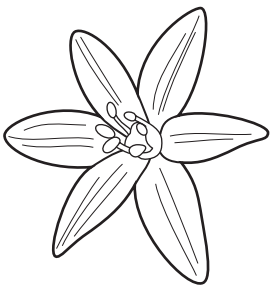
B



C



D



9. During the process of nutrition, all organisms need to absorb mineral ions and water from their environment.

Which other substances do plants and animals need to absorb during this process?

	plants	animals
A	carbon dioxide	inorganic compounds
B	carbon dioxide	organic compounds
C	oxygen	inorganic compounds
D	oxygen	organic compounds

10. The equation shows a chemical reaction that occurs in living organisms.

glucose + oxygen $\rightarrow$ carbon dioxide + water

Which of these characteristics of living organisms is this equation associated with?

	respiration	nutrition
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

11. What is a correct way of naming an organism using the binomial system?

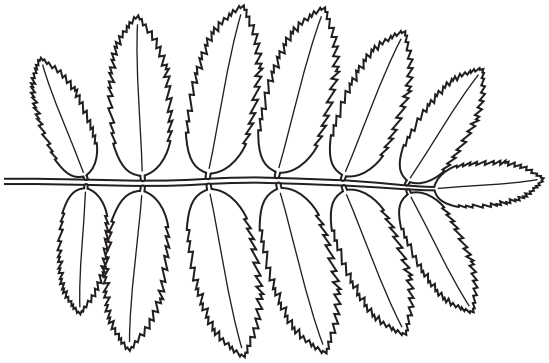
A *Common buttercup*

B ranunculus acris

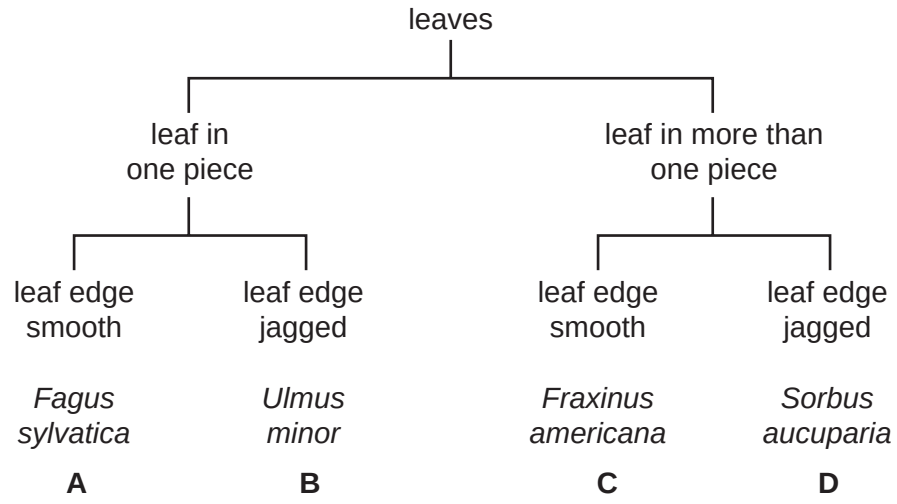
C *Ranunculus acris*

D Ranunculus sp.

12. The diagram shows a leaf.

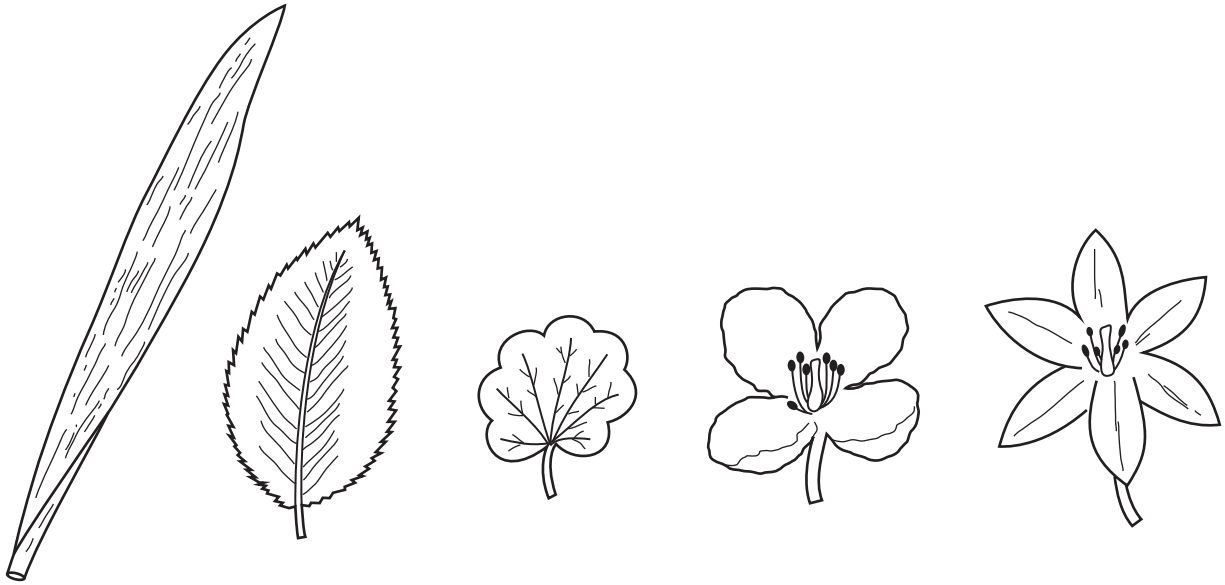


Use the key to identify the plant to which the leaf belongs.



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13. The diagram shows some leaves and flowers of different plants.



1 2 3 4 5

Which are from monocotyledons?

A 1 and 3 **B** 1 and 5 **C** 2 and 4 **D** 2 and 5

14. The list shows the scientific names for eight animals, using the binomial system.

Alderia modesta

Arenicola cristata

Arenicola marina

Austrominius modestus

Bittium reticulatum

Botrylloides leachii

Botryllus schlosseri

Clypeostoma reticulatum

Which two animals are most closely related?

A *Alderia modesta* and *Austrominius modestus*

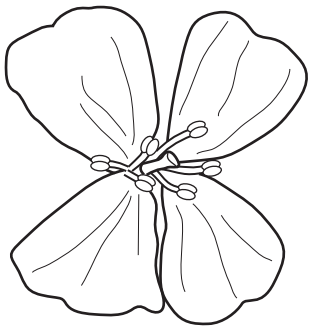
B *Arenicola cristata* and *Arenicola marina*

C *Bittium reticulatum* and *Clypeostoma reticulatum*

D *Botryllus schlosseri* and *Botrylloides leachii*

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15. The diagram shows a flower seen from above.



Use the key to find the name of the family to which it belongs.

1	four petals	.....	go to 2
	five petals	.....	go to 3
2	two stamens	.....	**A** *Scrophulariaceae*
	six stamens	.....	**B** *Brassicaceae*
3	petals joined	.....	**C** *Caryophyllaceae*
	petals separate	.....	**D** *Rosaceae*

16. Some lizards detach their tails when threatened by a predator.

Which characteristic is shown?

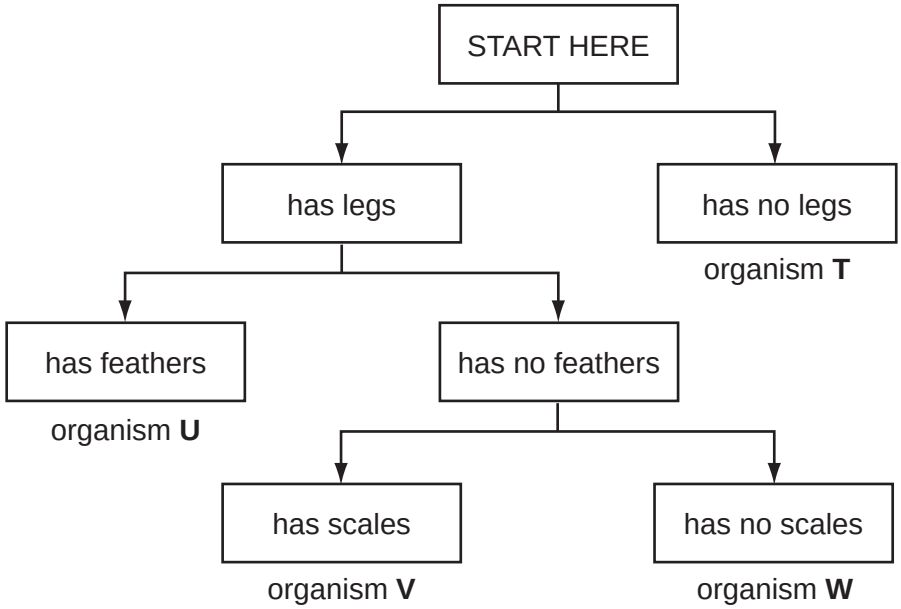
A excretion

B growth

C reproduction

D sensitivity

17. The diagram shows a key for five vertebrates.



Which class of vertebrates does organism **W** belong to?

A amphibians

B birds

C fish

D reptiles

18. The diagram shows an animal whose scientific name is *Rattus rattus*.



Which genus does it belong to?

A mammal

B *rattus*

C *Rattus*

D vertebrate

19. What are the characteristics of bony fish?

	maintain constant body temperature	external ears present	jelly-covered eggs	scales
A	✓	✓	✗	✗
B	✓	✗	✓	✓
C	✗	✓	✗	✗
D	✗	✗	✓	✓

20. What are the features of the leaves of a plant that is a eudicotyledon (dicotyledon)?

	broad leaves	parallel veins
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

21. Many snakes that belong to the viper family are unusual in that they give birth to live young.

This is usually a characteristic of which vertebrate group?

A amphibians

B birds

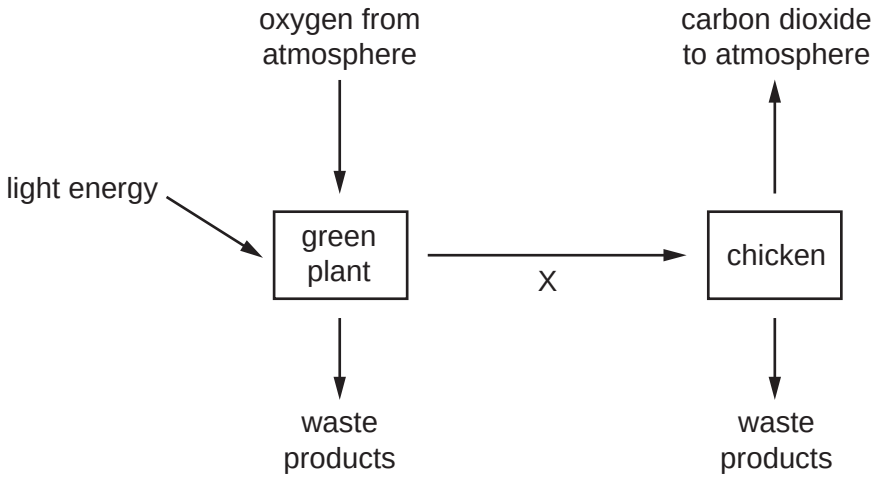
C bony fish

D mammals

22. Use the key to identify which group is amphibians.

1	hair present ……	mammals
	hair absent …….	go to 2
2	feathers present ……..……	group **A**
	feathers absent ……..…….	go to 3
3	dry scaly skin……..…..	group **B**
	moist skin ……..….....	go to 4
4	four limbs ……..…	group **C**
	no limbs ……...……...…...…	group **D**

23.. The diagram illustrates some of the processes carried out by living organisms.



Which characteristic of living organisms is represented by arrow X?

A excretion

B nutrition

C respiration

D sensitivity

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24. What is a correct way of naming a species, according to the binomial system?

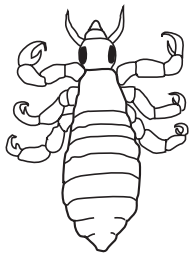
A *Homo sapiens*

B *Homo Sapiens*

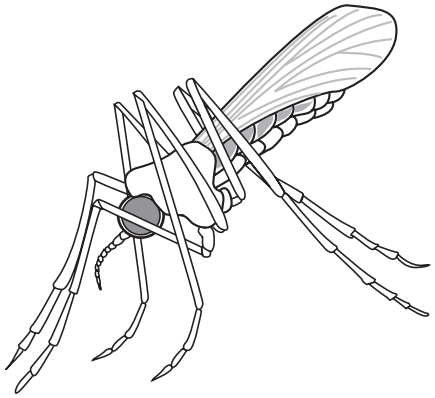
C human being

D sapiens

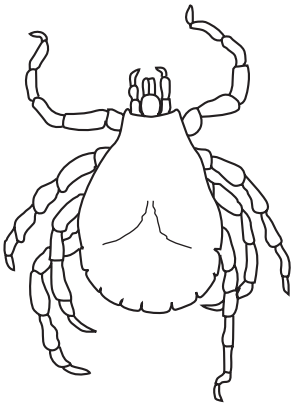
25. The diagram shows four arthropods.



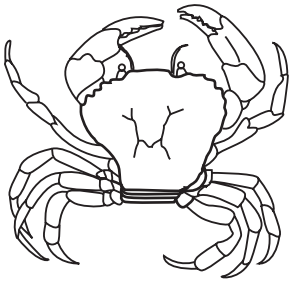
Pediculus ×20



Anopheles ×10



Dermacentor ×7



Carcinus ×0.5

How many of these arthropods are insects?

A 1 **B** 2 **C** 3 **D** 4

26. The statements describe four different plants.

Which plant must be a monocotyledon?

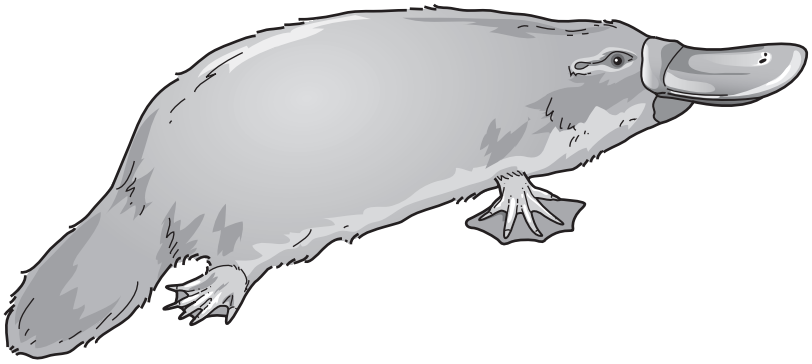
A The flowers are wind-pollinated.

B The flowers each have five petals.

C The leaves are large with a clear network of veins on them.

D The leaves have parallel veins.

27. The diagram shows an animal.



Use the key to identify this animal.

1	body covered with scales	go to 2
	body covered with hair	go to 3
2	has a rounded bill	**A**
	has a pointed bill	**B**
3	has webbed feet	**C**
	does not have webbed feet	**D**

28. All fish, all birds and all mammals are

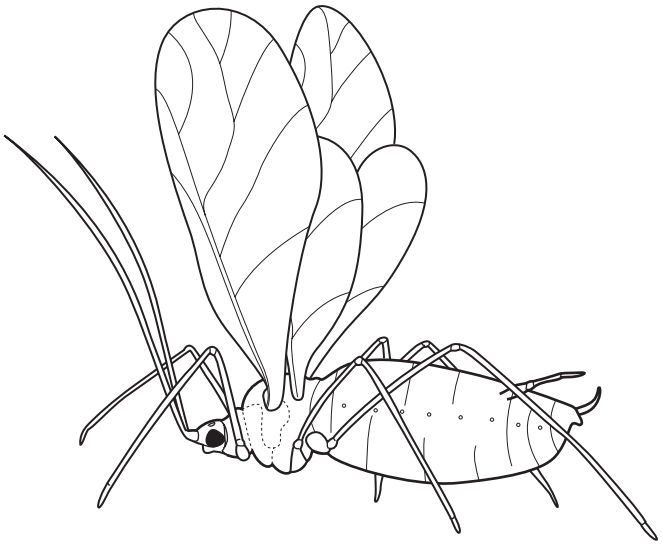
A animals with internal fertilisation.

B carnivores.

C vertebrates.

D warm-blooded animals.

29. The diagram shows an animal.



Use the key to identify the animal.

1	has two wings	go to 2
	has four wings	go to 3
2	has antennae much shorter than legs	**A**
	has antennae about the same length as legs	**B**
3	has feathery antennae	**C**
	has smooth antennae	**D**

30. What is **not** a characteristic of all living organisms?

A excretion

B photosynthesis

C reproduction

D respiration

31. Which characteristics do bony fish have?

	backbone	scales	hair
A	✗	✗	✓
B	✗	✓	✗
C	✓	✓	✗
D	✓	✗	✓

32. The diagram shows an animal whose scientific name is *Falco peregrinus*.



To which species does it belong?

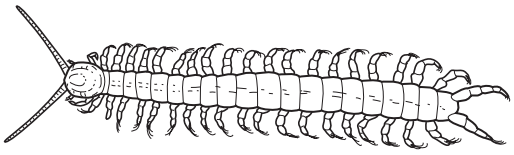
A bird

B *F. peregrinus*

C *Falco*

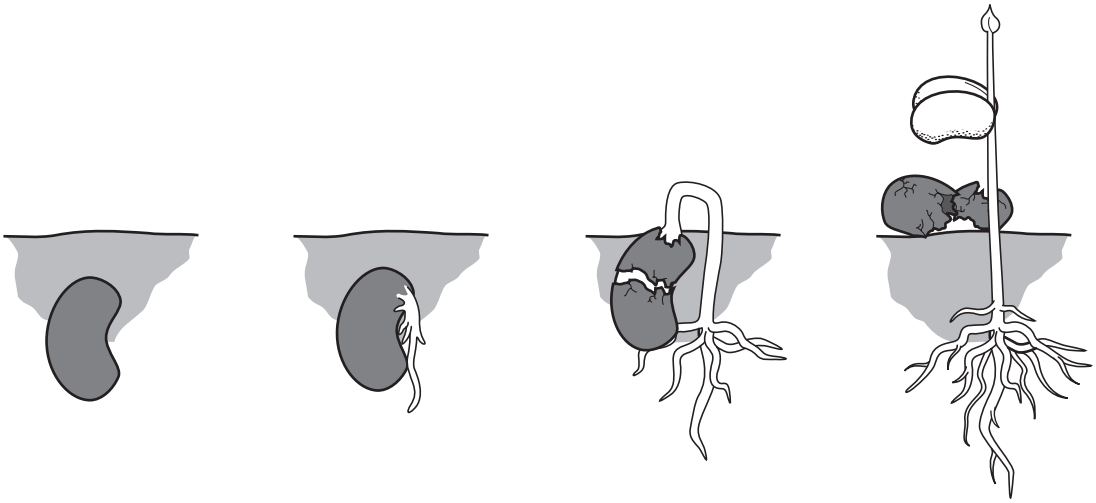
D vertebrate

33. Use the key to identify the arthropod shown.



1	body divided into segments	go to 2
	body not divided into segments	go to 3
2	body has one pair of legs per segment	**A**
	body has two pairs of legs per segment	**B**
3	one pair of antennae	**C**
	two pairs of antennae	**D**

34. The diagram shows how a seed changes after it is planted in well-watered soil.



Which characteristics of living things are demonstrated by this sequence?

A growth and reproduction

B growth and sensitivity

C nutrition and reproduction

D nutrition and sensitivity

35. The diagram shows an animal.



Use the key to identify the animal.

1 front limbs with five fingers ..... go to 2

front limbs with four fingers ..... go to 3

2 skin with spots ..... **A**

skin without spots ..... **B**

3 tail with fins ..... **C**

tail without fins ..... **D**

1 In Africa, mammals called jackals are quite common. They feed on small herbivores such as young springboks and dik-diks, hunting in packs to catch their prey. They will also eat larger herbivores such as kudu that have been killed by larger predators such as lions.

A farmer in South Africa found that a number of his sheep, while feeding on grassland, were being killed by jackals. He noted that jackals always kill sheep by attacking their necks. He designed a plastic collar for the sheep that covered their necks. None of his sheep have been killed since fitting these collars. Other farmers are now buying the collars to protect their sheep from jackal attack.

(a) The prey species of the jackal are usually primary consumers.

State the type of food that all primary consumers eat.

.....[1]

(b) Name the two carnivores identified in the text.

1. .....

2. .....[1]

(c) Construct a food chain for the jackal to show its relationship with sheep.

.....[2]

(d) Suggest a reason why jackals survive better when they hunt in packs.

.....

.....[1]

(e) When the farmer started to use collars on his sheep, although none of his sheep were being killed, the population of jackals did not decrease.

Suggest why the number of jackals did not decrease.

.....

.....[1]

(f) Name two structures, found in the neck of a sheep, that could be damaged when jackals attack it.

1. .....

2. .....[2]

(g) Some of the protected sheep die of old age and their remains are eaten by other animals.

Suggest and explain why the collars of the dead sheep could create an environmental problem.

.....

.....

.....[2]

[Total : 10]

2. The Ruddy duck, *Oxyura jamaicensis*, is a native of America.
A flock of 20 birds was introduced into Britain from America before 1950.
The original flock settled quickly in their new habitat and started breeding. Numbers now exceed 6000.
The White-headed duck, *Oxyura leucocephala,* (a native of Spain) is a closely related species to the Ruddy duck.
Female White-headed ducks are more attracted to male Ruddy ducks than to males of their own species.
Cross-breeding between the two species produces a new variety of fertile duck.
The White-headed duck is now threatened with extinction.
Some conservationists are considering a plan to kill the British population of Ruddy ducks to prevent the White-headed duck becoming extinct.

Fig. 6.1 shows a male Ruddy duck.



Fig. 6.1

(a) State two features, visible in Fig. 6.1, that distinguish birds, such as the Ruddy duck, from other vertebrate groups.

1 .....

2 ..... [2]

(b) **(i)** With reference to an example from the passage, describe what is meant by the term *binomial system*.

.....

..... [2]

(ii) State two reasons, based on information in the passage, why the Ruddy duck and White-headed duck are considered to be closely related.

1 .....

.....

2 .....

..... [2]

(c) **(i)** Explain why Ruddy ducks would **not** become extinct, even if British conservationists carried out their plan.

.....

..... [1]

(ii) Suggest **one** factor, other than the breeding habits of the Ruddy duck, that could result in the extinction of a bird such as the White-headed duck.

.....

..... [1]

(d) The Ruddy duck feeds on seeds and insect larvae. The ducks are eaten by foxes and humans.

Explain why these feeding relationships can be displayed in a food web, but not in a food chain.

.....

.....

..... [2]

[Total: 10]

3. Scientists are considering the use of a genetically engineered virus to kill a population of the cane toad, *Bufo marinus*, which is growing out of control in Australia.

This virus will introduce a modified form of genetic material, responsible for hormone production. The normal hormone causes the toads to mature in a similar way to hormones causing puberty in mammals. The modified genetic material will prevent toads maturing, leading to their death.

The toad was introduced into Australia because it eats scarab beetles, a pest of sugar cane plants. Sugar cane is an important crop plant.

Animals such as crocodiles and dingos are predators of the toad, but the toad can kill them by squirting a powerful toxin.

(a) Define the term *genetic engineering*.

.....

..... [2]

(b) State which part of the virus would carry the modified genetic material.

..... [1]

(c) **(i)** Name the hormone that causes puberty in male mammals.

..... [1]

(ii) State two characteristics that develop in a boy when this hormone is produced.

1 .....

2 ..... [2]

The toad population is increasing out of control. In terms of a sigmoid growth curve, it is in the exponential phase.

(d) **(i)** 1. Sketch a sigmoid growth curve using the axes below.
2. Label the axes (units are **not** needed).
3. Label the exponential phase of the curve.



[4]

(ii) Suggest **one** limiting factor, other than viruses or predators, that could stop the toad population rising.

..... [1]

(e) **(i)** Construct a **food web** for the organisms named in this question.

[2]

(ii) Complete the table by writing each of the organisms you used in the food web in the correct column.

carnivore	herbivore	producer

[3]

[Total : 16]

4. The wild dog is one of the smaller African carnivorous mammals. It has disappeared from 25 of the 39 countries where it used to live. Wild dogs hunt in packs, feeding on antelopes, which are grass-eating mammals.

A conservation programme has been started to increase the wild dog population in South Africa. Farmers are worried about numbers getting out of control because wild dogs breed at a very fast rate. However, conservationists are not concerned because the lion is a natural predator of the dogs.

(a) Wild dogs are carnivorous mammals.

(i) Define the term *carnivore*.

.....[1]

(ii) State **one** external feature which distinguishes mammals from other vertebrates.

.....[1]

(b) **(i)** Suggest two reasons why numbers of African wild dogs are decreasing.

1. .....

2. .....[2]

(ii) Suggest what could happen to the species if numbers continue to decrease.

.....

.....[1]

(c) Using the information in the passage above, construct a food chain for a wild dog, including its predator.

Label each organism with its trophic level.

[4]

(d) It is important that the wild dog species is conserved.

(i) Explain the meaning of the term *conservation*.

.....

.....

.....[2]

(ii) Outline the measures that could be taken to conserve a mammal, such as the wild dog.

.....

.....

.....

.....

.....[3]

(e) When wild dogs die, nitrogen compounds in their bodies may become available for plants. Outline the processes that occur to make these nitrogen compounds in the bodies of dead animals available for plants to absorb.

.....

.....

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.....

.....

.....

.....

.....[5]

[Total: 19]

5. Fig. 4.1 shows three species of zebra.

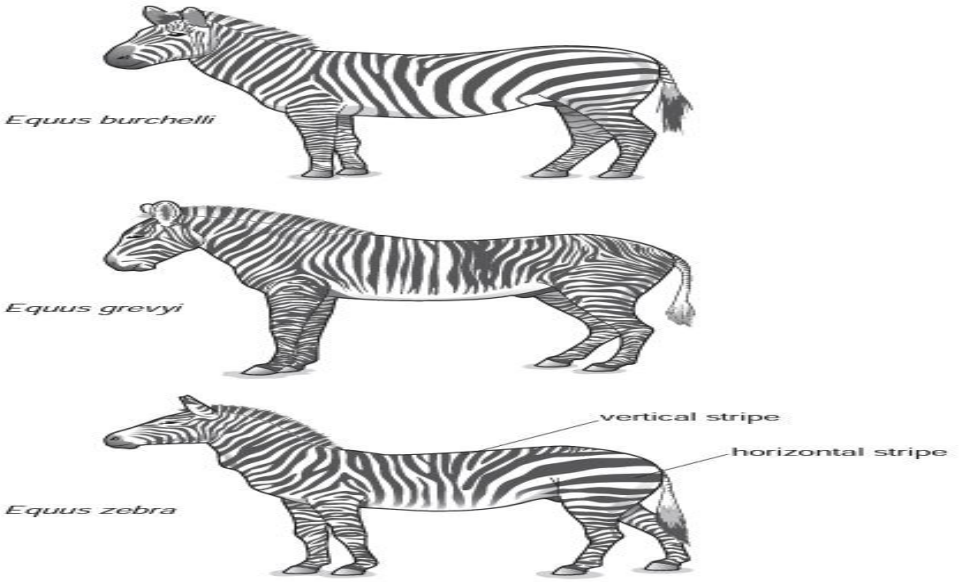


Fig. 4.1

(a) Describe **one** method a scientist could use to show that the zebras shown in Fig. 4.1 are different species.

.....

..... [1]

(b) Studies have shown that the hotter the environment, the more stripes zebras have.

(i) State the type of variation which would result in different numbers of stripes.

..... [1]

(ii) Study Fig. 4.1. Suggest which species of zebra lives in the hottest environment.

..... [1]

(c) Occasionally, zebras are born that are almost completely black. The change in appearance is the result of mutation.

(i) State the term that is used to describe the appearance of an organism.

..... [1]

(ii) Define the term *mutation*.

.....

..... [2]

(d) Tsetse flies attack animals with short fur, sucking their blood and spreading diseases.

Fig. 4.2 shows a tsetse fly. This fly is an insect, belonging to the arthropod group.



Fig. 4.2

(i) State **one** feature, **visible in Fig. 4.2**, which is common to all arthropods.

..... [1]

(ii) State two features, **visible in Fig. 4.2**, which distinguish insects from other arthropod groups.

1. .....

2. ..... [2]

(e) Scientists have discovered that zebras with more horizontal stripes attract fewer tsetse flies.

(i) Suggest why the stripes on the head and neck of the zebra would be an advantage when it feeds on grass on the ground.

.....

..... [2]

(ii) Describe how a species of zebra could gradually develop more horizontal stripes.

.....

.....

.....

..... [3]

[Total: 14]

6. Fig. 2.1 shows *Salvinia molesta*, which is an Australian freshwater plant, introduced to the wetlands of Namibia as a source of animal food. However, in Namibia the plant reproduces much more quickly than in Australia. It quickly covers the surface of the water.

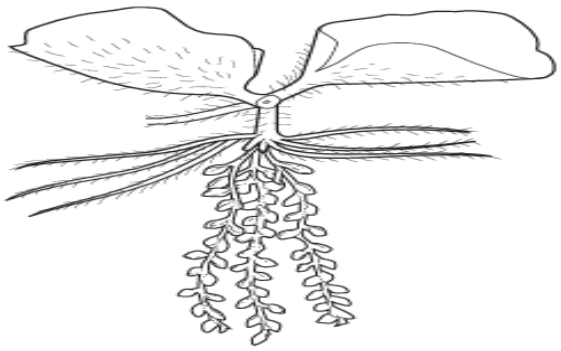


Fig. 2.1

(a) Scientists are concerned about the environmental damage caused by *S. molesta* to the aquatic habitats in the ecosystem of the Namibian wetlands.

(i) Define the term *ecosystem*.

.....

..... [2]

(ii) Outline how *S. molesta* could damage the aquatic habitats of the wetland ecosystem.

.....

.....

.....

.....

.....

.....

[4]

(b) *S. molesta* is being controlled using an Australian beetle, *Cyrtobagous saliniae*. The beetle eats the growing points of the plant.

Suggest and explain why

(i) it is better to use a natural consumer of the plant than to apply herbicides in the water to kill it,

.....

.....

..... [2]

(ii) it could be dangerous to the wetland ecosystem to introduce Australian beetles.

.....

.....

..... [2]

(c) The growth of *S. molesta* is now under control.

Its population growth has followed the pattern of a sigmoid curve.

(i) Using the axes below, sketch a sigmoid growth curve for *S. molesta*. [1]

(ii) Label the phases of the sigmoid growth curve. [3]



(iii) Using the information given in this question (pages 3 and 4), state **one** factor that is limiting the growth of *S. molesta*.

..... [1]

(iv) Explain how two other named factors could also limit the growth of *S. molesta*.

1. .....

.....

.....

2. .....

.....

..... [4]

[Total: 19]

7. Fig. 6.1 shows three different insects.



Vespula flavopilosa
insect 1



Vespula rufa
insect 2



Callicera rufa
insect 3

Fig. 6.1

(a) Insects 1 and 2 are more closely related to each other than to insect 3.

(i) Explain how the binomial names indicate that insects 1 and 2 are more closely related.

.....

.....

.....

..... [2]

(ii) Explain how the appearance of the three insects suggests that insects 1 and 2 are more closely related.

.....

.....

.....

..... [2]

Vespula flavopilosa gives a painful sting. The insect shown in Fig. 6.2 is very similar in appearance to *Vespula flavopilosa* but does not give a sting.



Chrysotoxum cautum

Fig. 6.2

(b) *Chrysotoxum cautum* is very similar in appearance to *Vespula flavopilosa*. Explain how this is an advantage.

.....

.....

.....

..... [2]

(c) It is thought that *Chrysotoxum cautum* evolved from an insect that did not have any stripes.

Suggest how these insects became striped.

.....

.....

.....

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.....

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.....

.....

..... [5]

[Total: 11]

8. Fig. 1.1 shows a goliath beetle, *Goliathus giganteus*.

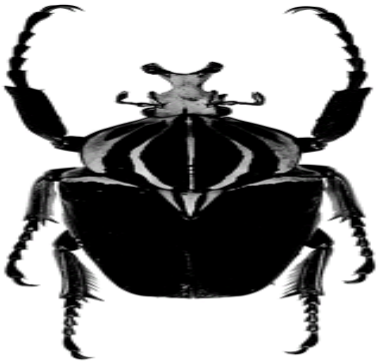


Fig. 1.1

(a) State two features, **visible in Fig. 1.1**, that show that *Goliathus giganteus* is an arthropod.

1 .....

2 ..... [2]

Various arthropods are pests of date palms and cause much damage to this important crop throughout the Middle East.

Fig. 1.2 shows eight species of arthropod that are pests of date palms.

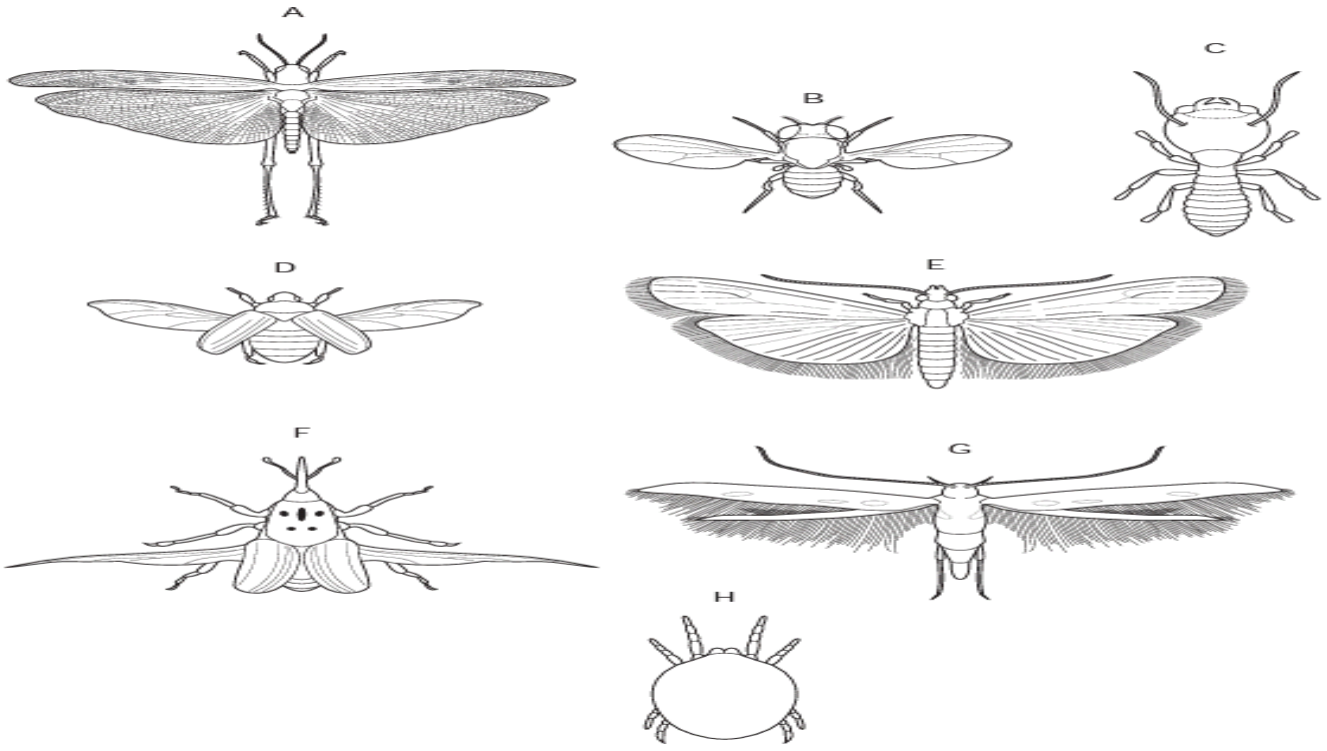


Fig. 1.2

(b) Use the key to identify each species. Write the letter of each species, **B** to **H**, in the correct box in the key. One, **A**, has been done for you.

Key

1 (a)	Wings present	go to 2	
(b)	Wings absent	go to 7	
2 (a)	Back legs adapted for jumping	*Schistocerca gregaria*	**A**
(b)	Back legs not adapted for jumping	go to 3	
3 (a)	Two pairs of wings	go to 4	
(b)	One pair of wings	*Drosophila melanogaster*	.....
4 (a)	Wings with hairs	go to 5	
(b)	Wings with no hairs	go to 6	
5 (a)	Hairs on back wings longer than width of back wing	*Ephestia cautella*	.....
(b)	Hairs on back wings shorter than width of back wing	*Batrachedra amydraula*	.....
6 (a)	Thorax with spots	*Rhynchophorus ferrugineus*	.....
(b)	Thorax with no spots	*Oryctes agamemnon*	.....
7 (a)	Three pairs of legs	*Microcerotermes diversus*	.....
(b)	Four pairs of legs	*Oligonychus afrasiaticus*	.....

[4]

Pesticides can be sprayed onto date palms to kill pests. This can damage the environment.

(c) Outline the damage to the environment that may be done by spraying pesticides.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

An alternative to using pesticides is biological control.

The Senegalese grasshopper is a serious pest in West Africa. A fungal parasite of grasshoppers is used as a means of biological control. Spores of the fungus are sprayed onto populations of grasshoppers.

An investigation was carried out to compare this biological control with a pesticide.

Three fields were treated as follows:

- sprayed with fungal spores
- sprayed with pesticide
- not sprayed

(d) Explain why one field was not sprayed.

.....

..... [1]

The population density of grasshoppers was recorded for 22 days after spraying. The results are shown in Fig. 1.3.

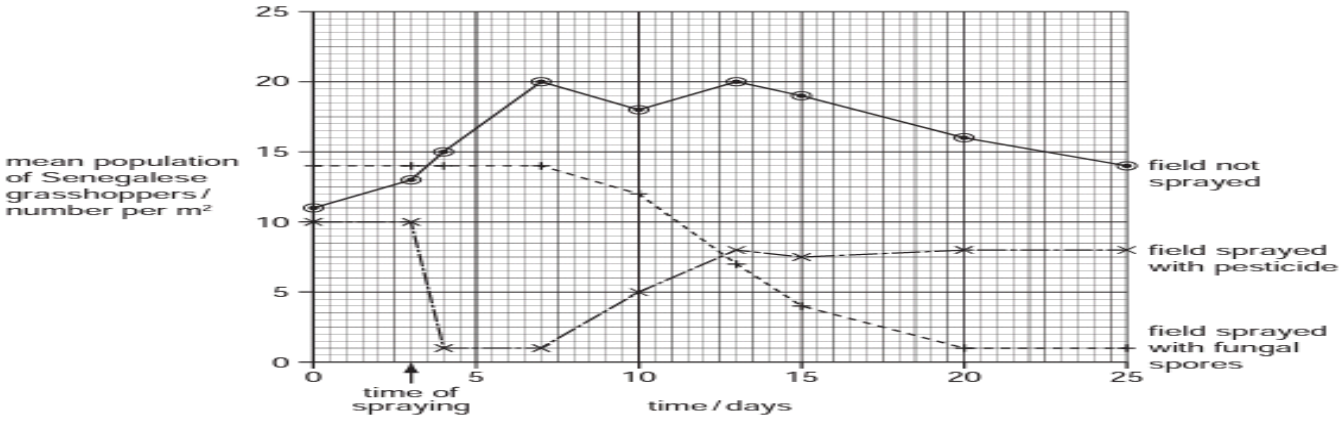


Fig. 1.3

(e) (i) Describe the effects of the two sprays on the populations of grasshoppers. You will gain credit if you use data from Fig. 1.3 to support your answer.

pesticide .....

.....

.....

.....

.....

fungal spores .....

.....

.....

.....

..... [5]

(ii) Explain the differences between the effects of the pesticide and the fungal spores on the grasshoppers, as shown in Fig. 1.3.

.....

.....

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.....

.....

..... [4]

[Total: 20]

9. Fig. 1.1 shows three annelid species and *Ascaris lumbricoides*, a species of nematode.

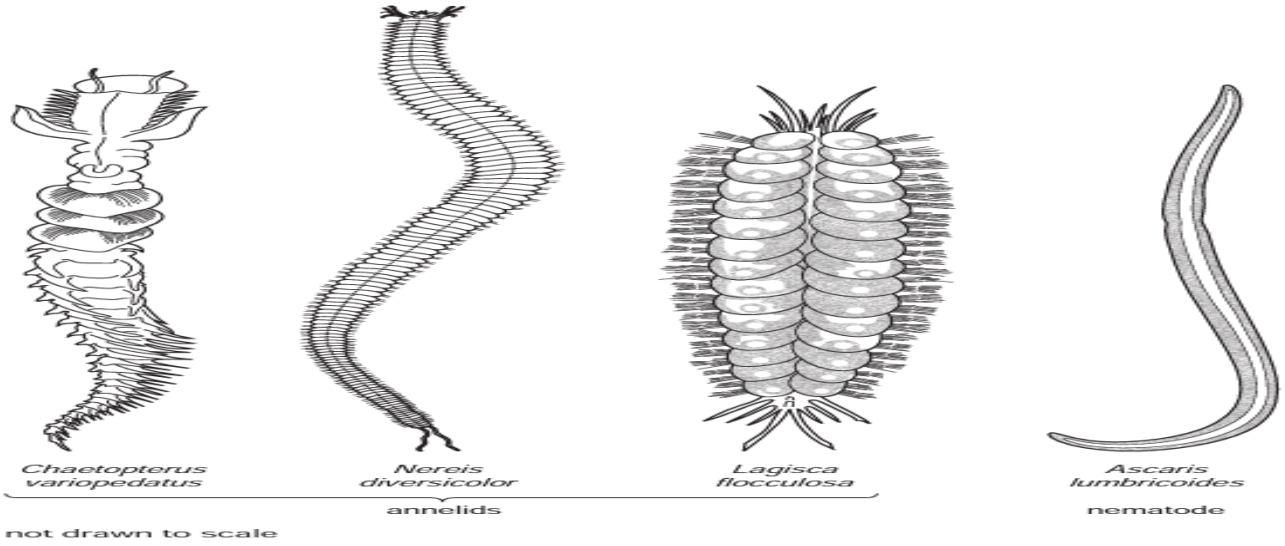


Fig. 1.1

(a) State **three** features shown by the three annelid species that are **not** shown by the nematode species.

1 .....

2 .....

3 ..... [3]

(b) Organisms are given two names, e.g. *Nereis diversicolor*.

State what is meant by the first name.

..... [1]

(c) *N. diversicolor* is a filter feeder. It filters plankton from sea water.

Annelids like *N. diversicolor* form an important part of the ecosystems of estuaries.

Fish feed on annelids when the sea covers the mud in the estuary.

When the tide is out wading birds are the main predators of annelids.

Birds of prey are the main predators of the wading birds.

(i) Explain the term *ecosystem*.

.....

.....

.....

..... [3]

(ii) Use the space below to draw a food chain for the estuary ecosystem **when the tide is out**.

[2]

(iii) Describe the advantages of drawing a food web rather than a food chain for an ecosystem.

.....

.....

.....

.....

..... [2]

(d) The palolo worm is a species of annelid that lives on coral reefs in the Pacific Ocean.

At certain times of the year, all the worms in an area leave their burrows to swim to the surface.
They all release their gametes into the water at the same time.
This is known as mass spawning.

Suggest the advantages of having mass spawning occurring only at certain times of the year and not all year round.

.....

.....

.....

.....

.....

..... [3]

(e) Meiosis is involved in producing gametes in palolo worms.

Describe how meiosis differs from mitosis **and** explain why meiosis is important for the production of gametes.

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 18]

10. Fig. 5.1 shows the nematode, *Caenorhabditis elegans*.



Fig. 5.1

(a) **(i)** State the genus of this nematode.

.....[1]

(ii) State two **structural** features of nematodes.

1 .....

2 .....

[2]

(b) Nematodes feed on dead and decaying material. Explain why this gives nematodes an important role in ecosystems.

.....

.....

.....

.....

.....

.....

.....[3]

(c) Fig. 5.2 shows the life cycle of *C. elegans*. The diploid number of this species is 12.

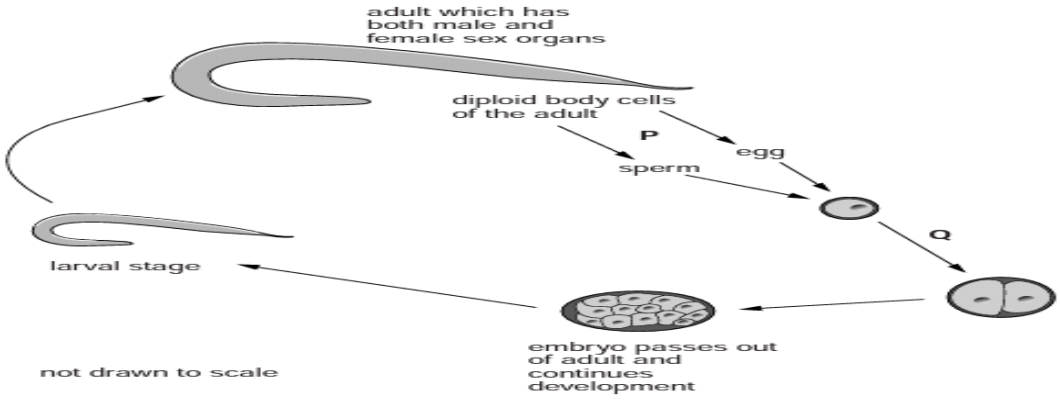


Fig. 5.2

(i) Suggest why there is very little genetic variation in the offspring of the adult nematode shown in Fig. 5.2.

.....

.....

.....

.....

.....[2]

(ii) State the haploid number of *C. elegans*.

.....[1]

(iii) Explain why **meiosis** occurs at **P** and **mitosis** occurs at **Q**.

meiosis at **P** .....

.....

.....

.....

mitosis at **Q** .....

.....

.....

.....[3]

(d) *C. elegans* was one of the first organisms to have its genome sequenced.

An organism's genome is the sum of all its genetic material. Gene sequencing identifies all the component parts of the DNA that makes up the genome.

State where DNA is located in a cell.

.....

.....[2]

[Total: 14]

11. Myriapods are a group of arthropods that are commonly found in soil habitats in many parts of the world. Many myriapods are very small and not easy to identify.

Fig. 6.1 shows four species of myriapod, not drawn to the same scale.

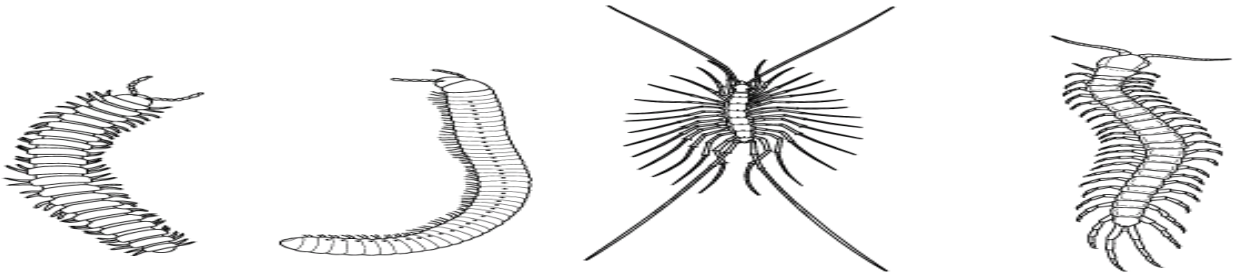


Fig. 6.1

(a) State **three** features of **all** myriapods that are visible in Fig. 6.1.

1 .....

.....

2 .....

.....

3 .....

..... **[3]**

(b) Describe **three** features of myriapods that could be used to make a dichotomous key to distinguish between the four species in Fig. 6.1.

1 .....

.....

2 .....

.....

3 .....

..... **[3]**

(c) Mitochondria are cell structures that contain a small quantity of DNA.

Scientists are sequencing the DNA of one particular gene in mitochondria to help identify different species of many animals including myriapods. The sequences that they find are called 'barcodes'.

(i) State the part of the cell that contains most of the DNA.

..... **[1]**

(ii) Suggest how DNA barcoding might be useful in the conservation of animals, such as myriapods.

.....

.....

.....

.....

..... **[2]**

(iii) State the function of DNA in cells.

.....

.....

.....

.....

..... **[2]**

(d) A student found the following information about the feeding relationships between some organisms in a soil habitat.

Dead organic matter, such as leaves, provides food for bacteria and soil fungi.

Earthworms eat dead leaves.

Many millipedes feed on dead plant matter and also on soil fungi.

Nematodes feed on bacteria and are eaten by springtails.

Centipedes are predators that feed on earthworms, millipedes and springtails.

(i) Draw a food web to show the feeding relationships described above.

[4]

(ii) Describe the roles of the soil organisms in the **carbon** cycle.

.....

.....

.....

.....

..... **[2]**

[Total: 17]

12. **(a)** Fig. 1.1 shows five species of mollusc.

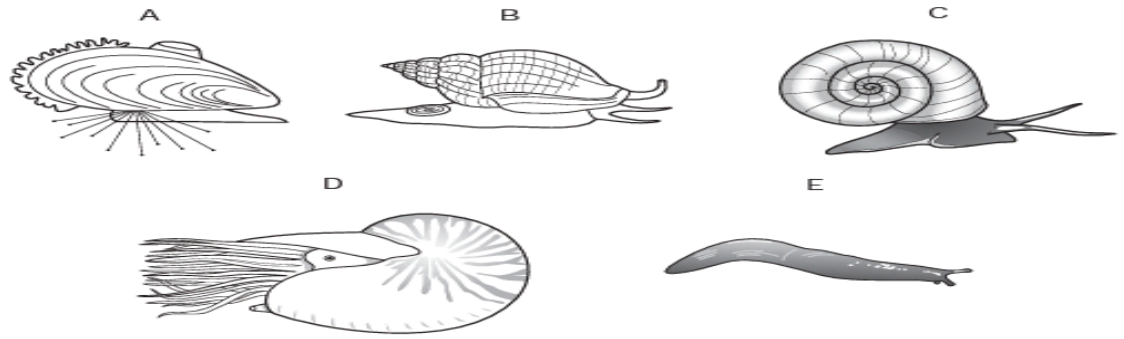


Fig. 1.1

Use the key to identify each species. Write the letter of each species (**A** to **E**) in the correct box beside the key.

Key

1 (a)	body is completely or partly covered in a shell	go to 2	
(b)	body is not completely covered or partly covered in a shell	*Limax flavus*	
2 (a)	shell is attached to rocks by thin threads	*Mytilus edulis*	
(b)	shell is not attached to rocks by thin threads	go to 3	
3 (a)	shell is a spire that comes to a point	*Buccinum undatum*	
(b)	shell is not a spire that comes to a point	go to 4	
4 (a)	animal has tentacles	*Nautilus pompilius*	
(b)	animal has 2 tentacles	*Planorbis planorbis*	

[3]

(b) State **two** features that are shown by all molluscs.

1 .....

2 .....

[2]

[Total: 5]

1 Fig. 1.1 shows seven different species of amphibian.

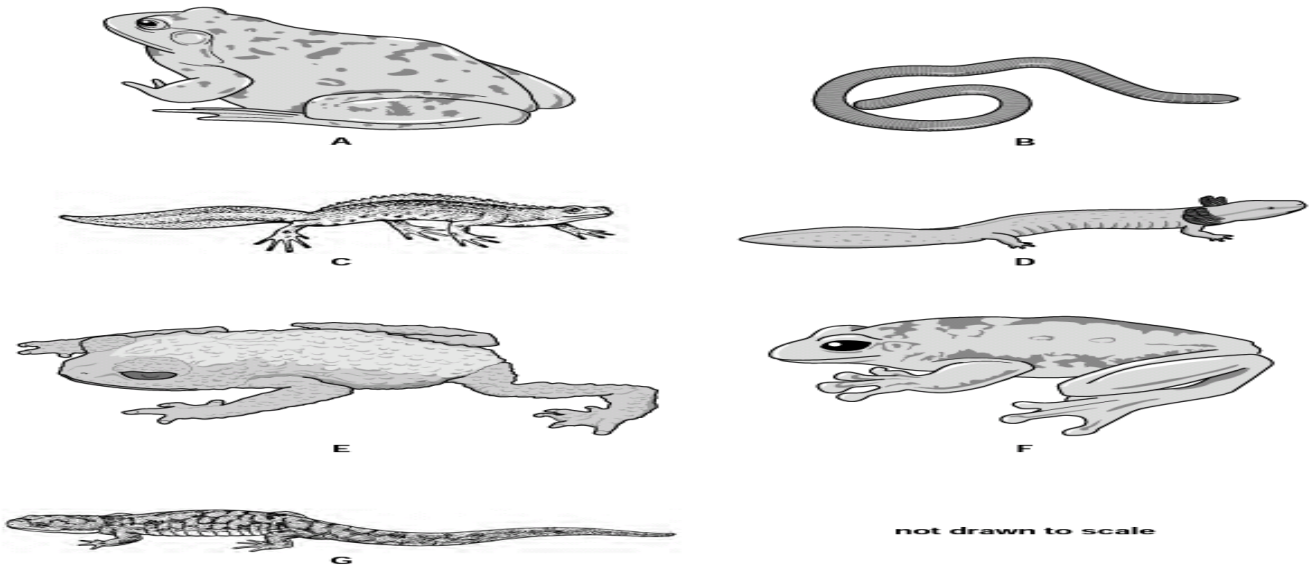


Fig. 1.1

(a) Use the key to identify each species. Write the letter of each species (**A** to **G**) in the correct box beside the key. One has been done for you.

Key

1 (a)	long, narrow body, with or without legs	go to 2	
(b)	body not long and narrow, back legs are larger than the front legs	go to 5	
2 (a)	body without legs	*Gymnopis multiplicata*	**B**
(b)	body with legs which are all of the same size	go to 3	
3 (a)	raised crest along the back of the body	*Triturus cristatus*	
(b)	no crest along the back of the body	go to 4	
4 (a)	gills present	*Necturus maculosus*	
(b)	no gills present	*Ambystoma tigrinum*	
5 (a)	skin is smooth	go to 6	
(b)	skin is not smooth	*Oreophrynella quelchii*	
6 (a)	digits end in swellings	*Polypedates leucomystax*	
(b)	digits do not end in round swellings	*Rana temporaria*	

[3]

13. **6** Fig. 6.1 shows a lizard.



Fig. 6.1

The lizard is observed over a period of two hours.

(a) State two observations, other than movement, you could make about the lizard to show that it is a living organism.

1. .....

2. .....[2]

14. Fig. 6.2 shows the relationship between external and internal temperatures for a lizard and a mammal, such as a cat.

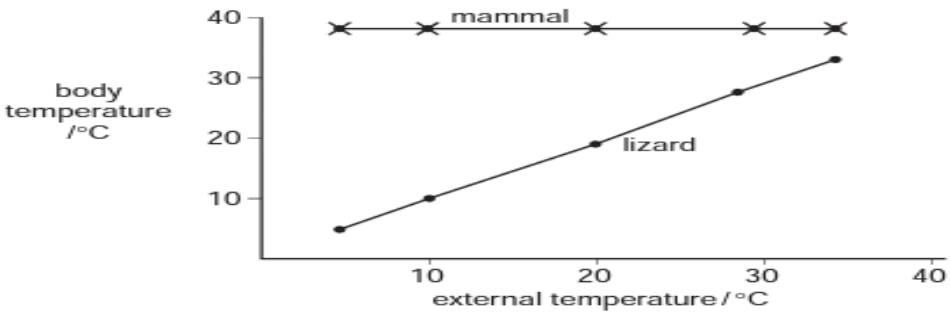


Fig. 6.2

(b) Describe what happens to the body temperature of the lizard as the external temperature drops from 20 °C to 10 °C.

.....

.....

.....[2]

(c) Describe and explain two mechanisms that help to keep the body temperature of the mammal constant when the external temperature drops from 20 °C to 10 °C.

1. .....

.....

.....

.....

2. .....

.....

.....

.....[6]

(d) Suggest why the movement of the lizard becomes slower when the external temperature drops from 20 °C to 10 °C.

.....

.....

.....[2]

[Total: 12]

15. Fig. 1.1 shows five mammals.

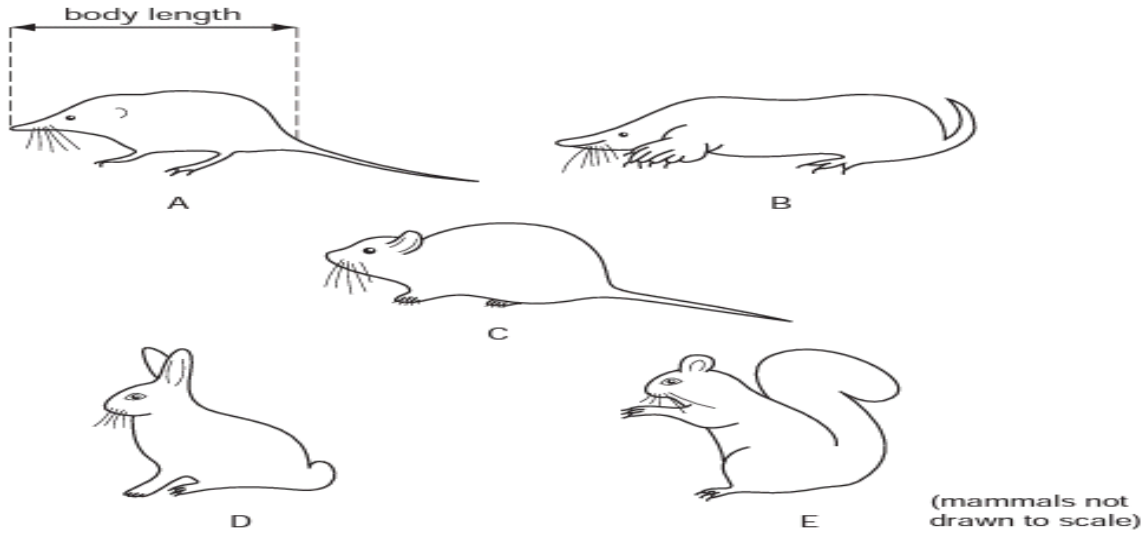


Fig. 1.1

(a) Use the key to identify each of these mammals. Write the letter for each mammal in Table 1.1.

1	tail more than half that of body length	go to 2
	tail less than half that of body length	go to 4
2	ears at top of head, with thick tail	*Sciurus caroliniensis*
	ears at side of head, with thin tail	go to 3
3	nose pointed, nose length longer than its depth	*Sorex araneus*
	nose blunt, nose length shorter than its depth	*Clethrionomys glareolus*
4	front legs as wide or wider than long	*Talpa europaea*
	front legs longer than wide	*Oryctolagus cuniculus*

Table 1.1

name of mammal	letter
Clethrionomys glareolus	.....
Oryctolagus cuniculus	.....
Sciurus caroliniensis	.....
Sorex araneus	.....
Talpa europaea	.....

[4]

(b) Fig. 1.2 shows a young deer feeding from its mother.



Fig. 1.2

State two features of the deer, visible in Fig. 1.2, that distinguish mammals from other vertebrates.

1 .....

2 ..... [2]

[Total: 6]

16. The seaweed, *Caulerpa taxifolia*, lives in tropical oceans but is now also found in the Mediterranean sea, where it grows at twice the rate of local seaweeds. As a result, the local seaweeds are becoming rare.

Although not poisonous, *Caulerpa* produces a chemical in its cells that makes it inedible to Mediterranean herbivores, such as sea urchins. They do not feed on it and their numbers are decreasing. Carnivorous fish populations have also decreased by up to 50 %.

Marine conservationists are very concerned. At first they used chlorine to kill *Caulerpa* but are now considering the introduction of tropical sea slugs (herbivorous molluscs). *Caulerpa* is part of their natural diet.

(a) The seaweed, *Caulerpa taxifolia*, is named using the binomial system.

Explain the term *binomial system*.

.....

.....

.....[2]

(b) **(i)** Suggest why the local seaweeds are becoming rare.

.....

.....[2]

(ii) Sea urchins are herbivores. Define the term *herbivore*.

.....

.....[1]

(iii) Suggest why the populations of carnivorous fish have decreased by up to 50%.

.....

.....

.....[2]

(c) Suggest why using chlorine to kill *Caulerpa* might **not** be a good idea.

.....

.....[1]

(d) **(i)** Suggest why conservationists are concerned about the effects of *Caulerpa* on other organisms in the Mediterranean.

.....

.....

.....[2]

(ii) Explain how the introduction of herbivorous sea slugs from the tropics could be effective in re-establishing a balanced ecosystem.

.....

.....

.....[2]

(iii) Outline the possible dangers of introducing tropical sea slugs.

.....

.....

.....[2]

[Total : 14]