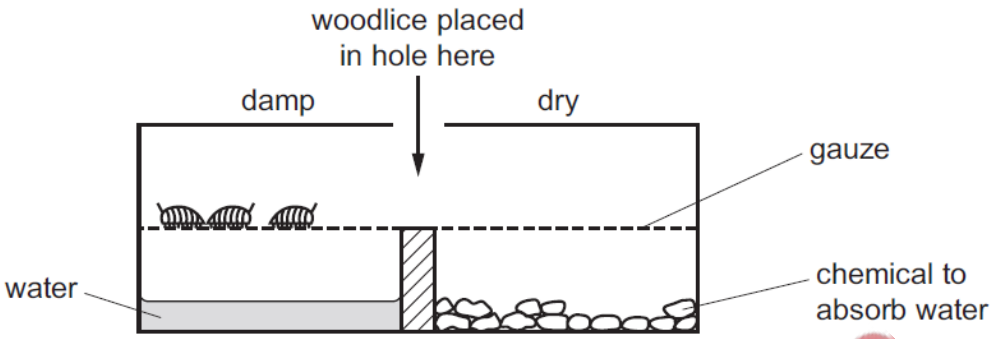
Characteristics and classification of living organisms – 2021 IGCSE 0610

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

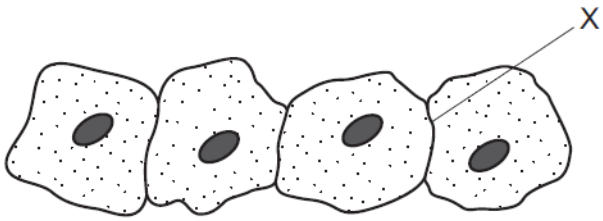
B arachnids → insects → myriapods → crustaceans

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

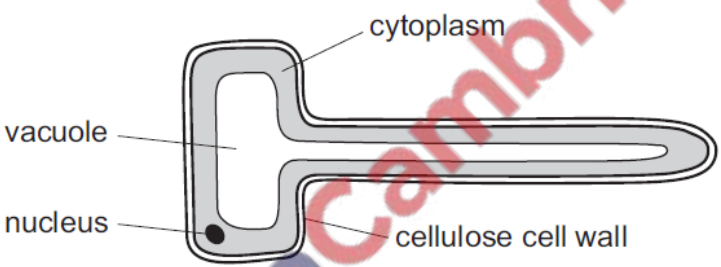
B one cell wall

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.

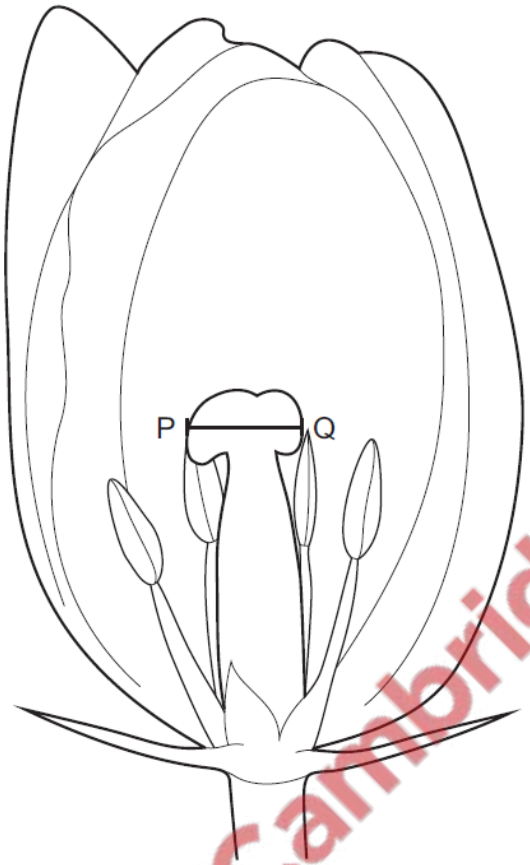
B It has a thin layer of cytoplasm.

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

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

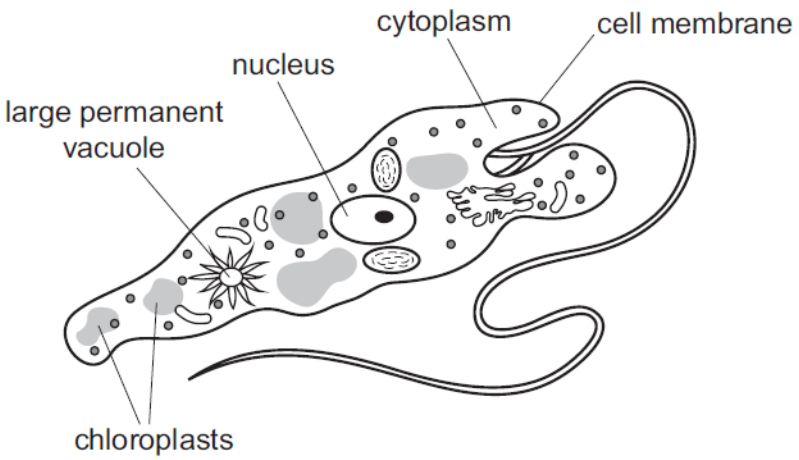
B crustaceans

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

26. June/2021/Paper_31/No.1

Fig. 1.1 is a dichotomous key. It can be used to identify different types of tree by using their leaves.

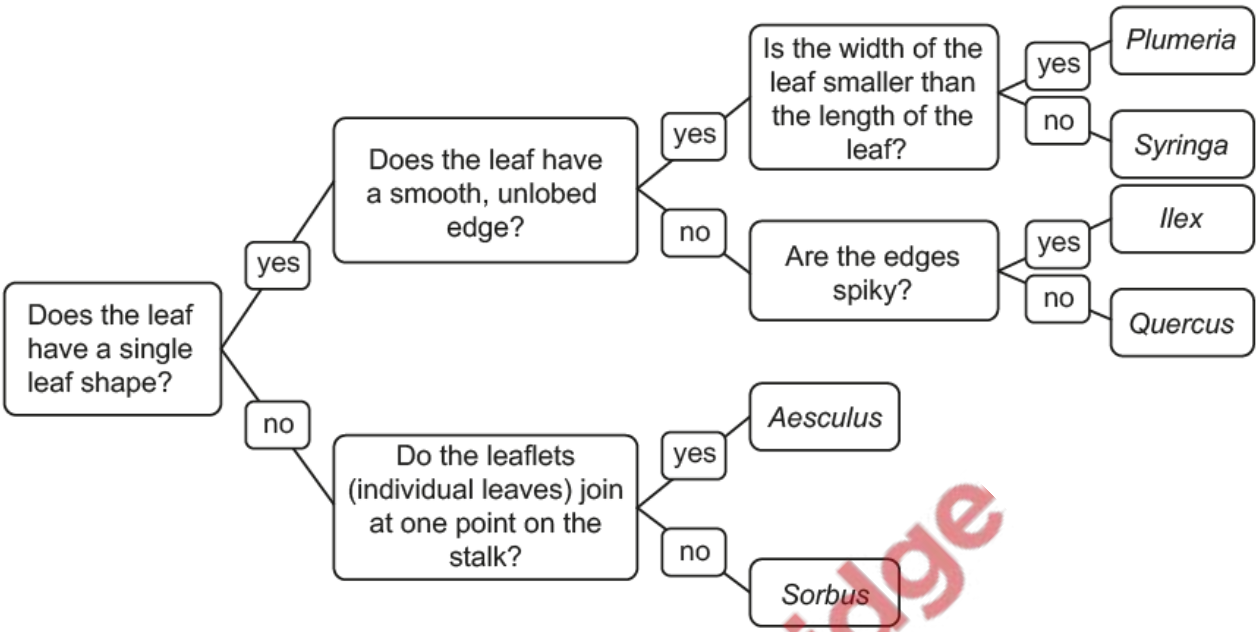
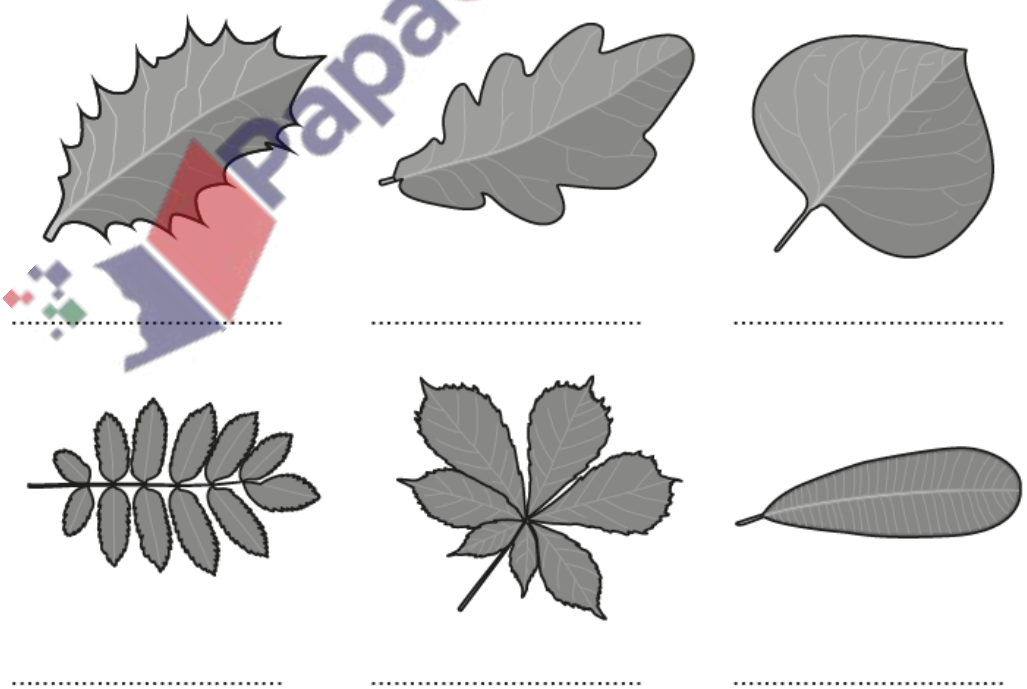


Fig. 1.1

Fig. 1.2 shows leaves from six different trees.

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

Write the name of each tree on the lines in Fig. 1.2.



....

....

Fig. 1.2

[5]

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.

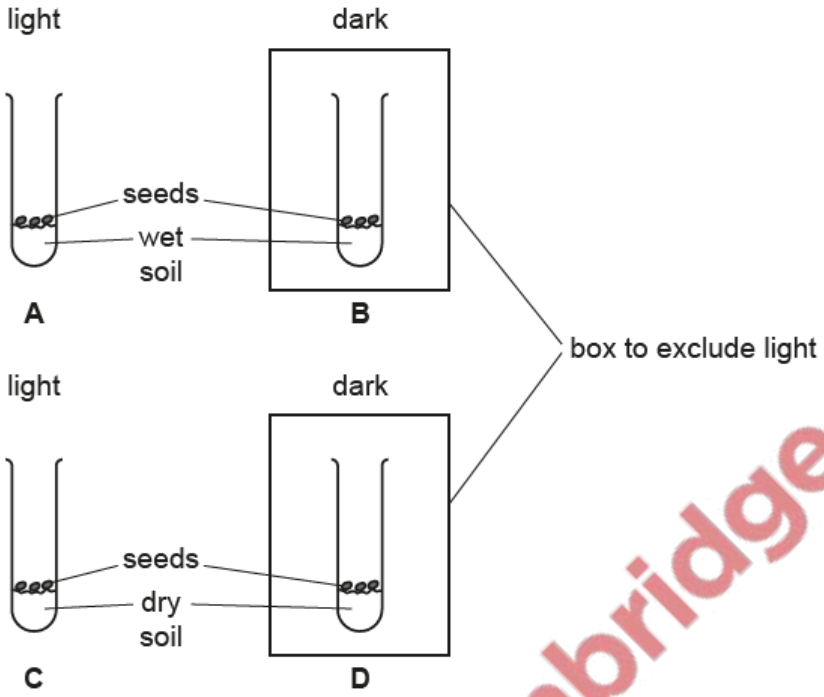


Fig. 8.1

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]

(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]

28. June/2021/Paper_32/No.1

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

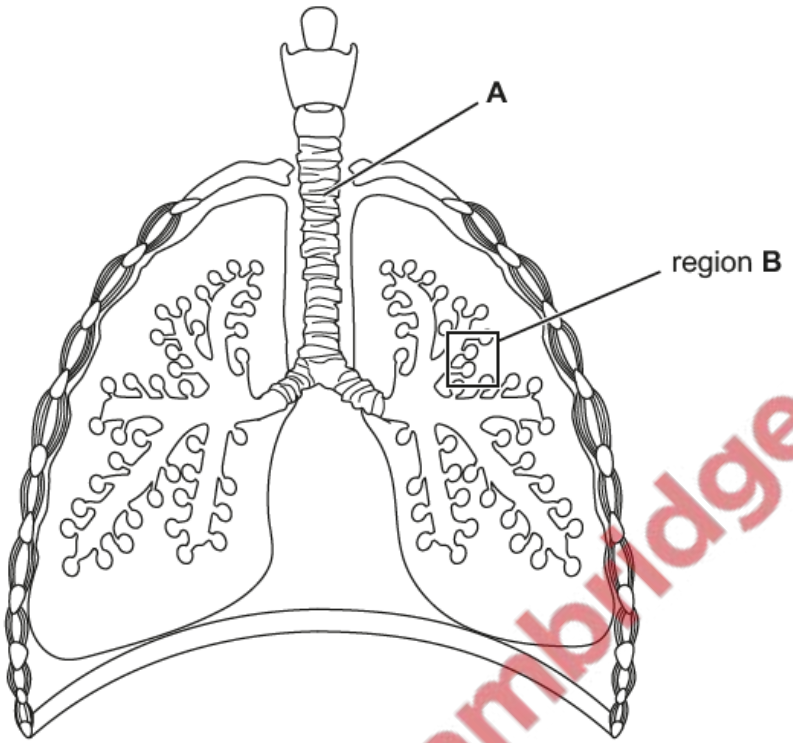


Fig. 1.1

(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]

(iv) State the name of the process that moves oxygen into the red blood cells.

..... [1]

(b) Fig. 1.2 is a magnified image of the exchange surface shown in region **B** in Fig. 1.1.

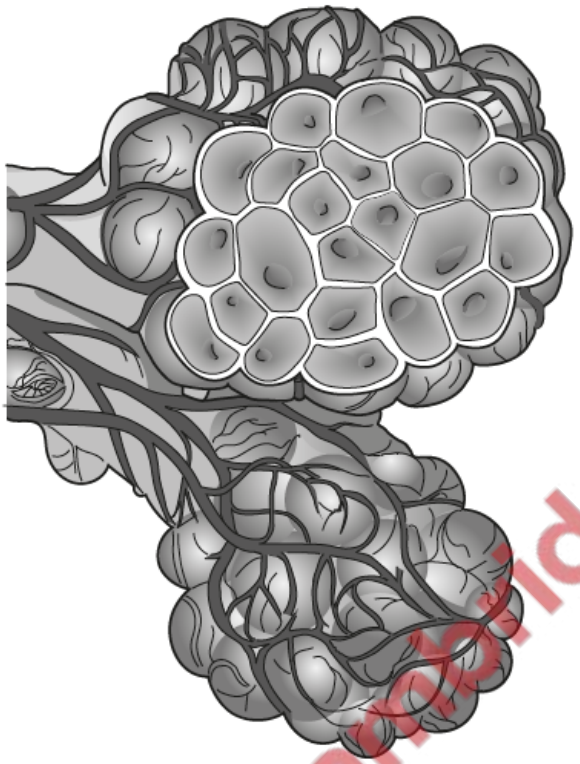


Fig. 1.2

(i) State the name of the main blood vessel that delivers blood to the lungs.

..... [1]

(ii) The gas exchange surface shown in Fig. 1.2 is permeable to make gas exchange efficient.

List **two** other features of gas exchange surfaces.

1 .....

2 .....

[2]

(c) Oxygen concentration is higher in inspired air than in expired air.

State **one** other way the composition of inspired air differs from the composition of expired air.

..... [1]

[Total: 11]

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.

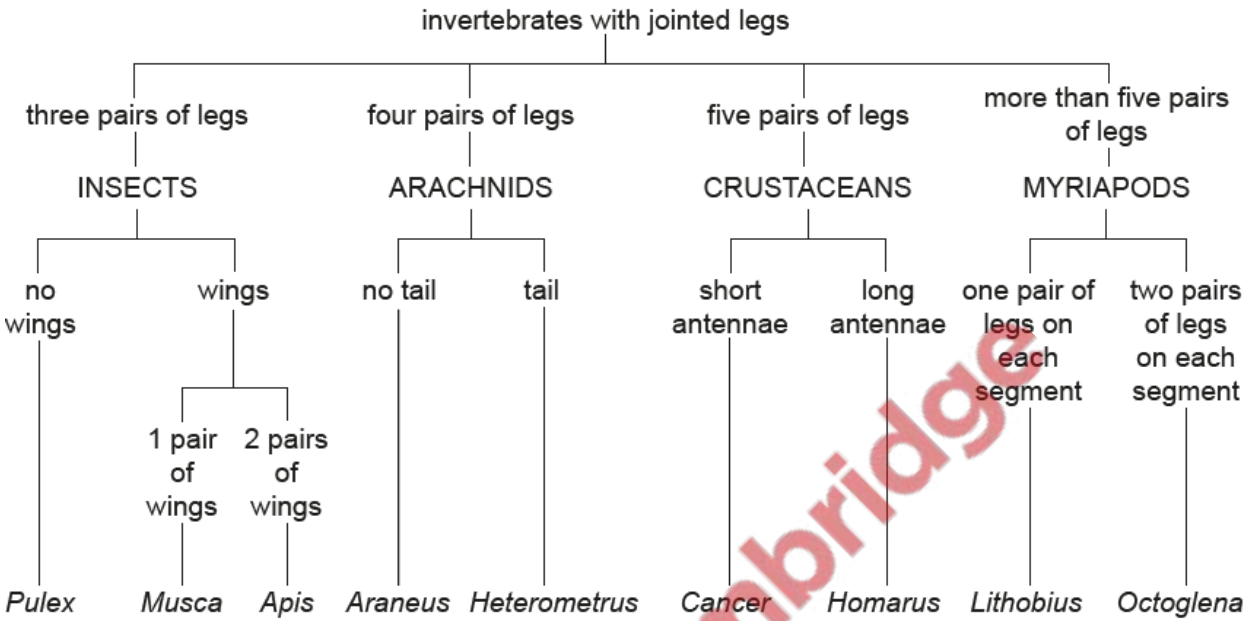


Fig. 1.1

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

1 .....

.....

2 .....

.....

[2]

(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]

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.

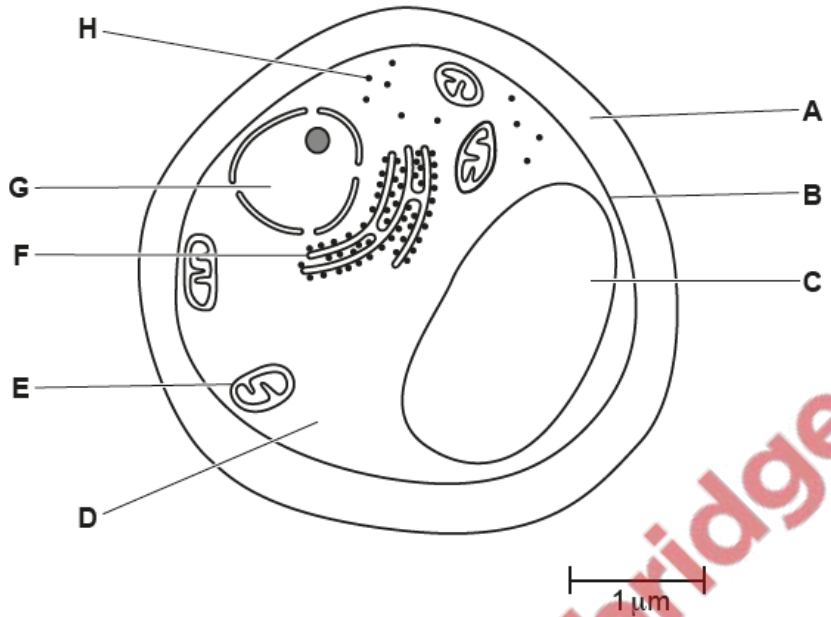


Fig. 1.1

(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]

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

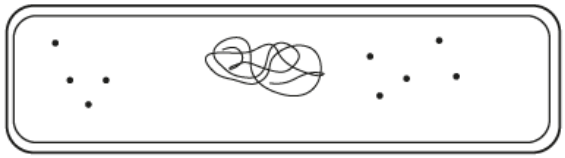


Fig. 1.2

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]

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

Fig. 1.3 shows part of the nitrogen cycle.

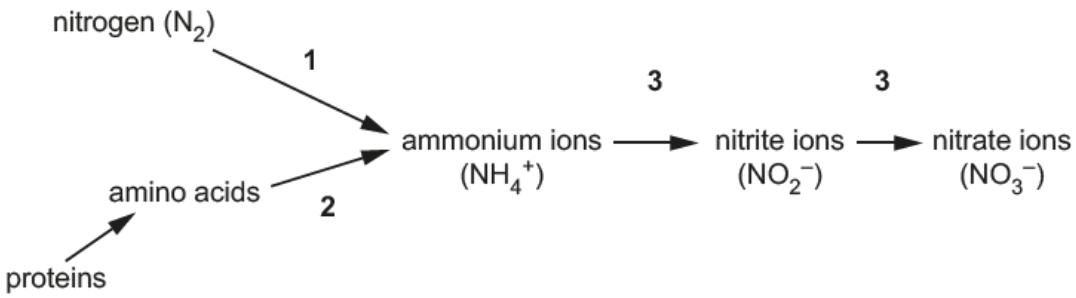


Fig. 1.3

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

1 .....

2 .....

3 .....

[3]

[Total: 15]

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]

(b) (i) State **two** features, visible in Fig. 2.1 and Fig. 2.2, that identify the three animals as all belonging to the same vertebrate group.

1 .....

2 .....

[2]

(ii) DNA can also be used to classify species.

Molecular biologists compared the DNA base sequences of eight species from the same vertebrate group. They used the differences to draw a classification diagram.

Fig. 2.3 shows the classification diagram for these eight species. The shorter the horizontal distance from two species to the branching point that they share, the more similar their DNA sequences are and the more closely the two species are related.

The scale on Fig. 2.3 shows the time at which the molecular biologists estimate that each branching point occurred.

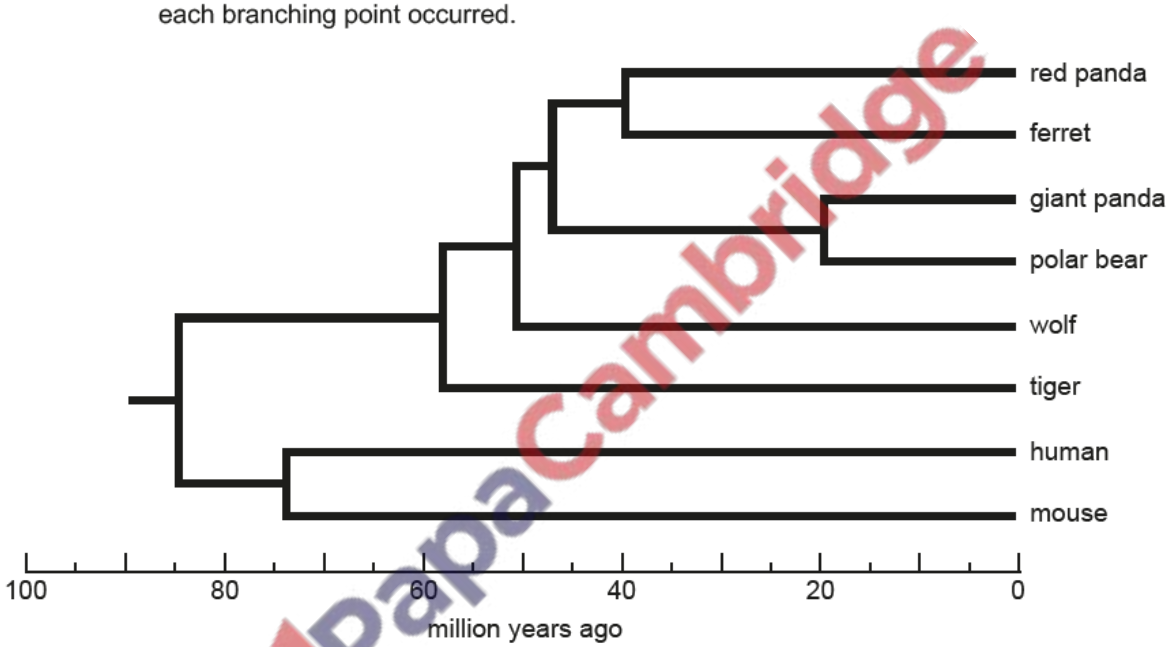


Fig. 2.3

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]