

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

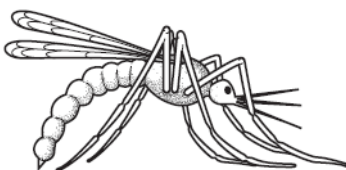
2. Nov/2021/Paper_11/No.2

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 |

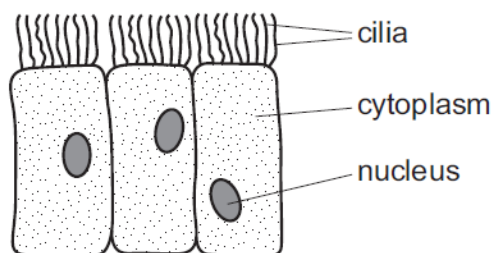
4. Nov/2021/Paper_11/No.4

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 \times image size \times 100
- B** magnification = actual size \div image size
- C** magnification = image size \div actual size
- D** magnification = actual size \times 100 \div 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

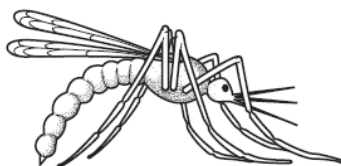
The table shows features of some animals.

Which animal is a mammal?

	gills	hair	scales	wings	
A	✓	x	x	x	key ✓ = present x = absent
B	✓	x	✓	x	
C	x	✓	x	✓	
D	x	x	✓	✓	

9. Nov/2021/Paper_12/No.3

The diagram shows an animal.

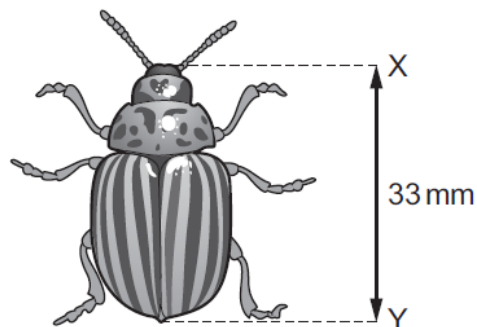


What is the animal?

- 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**

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.

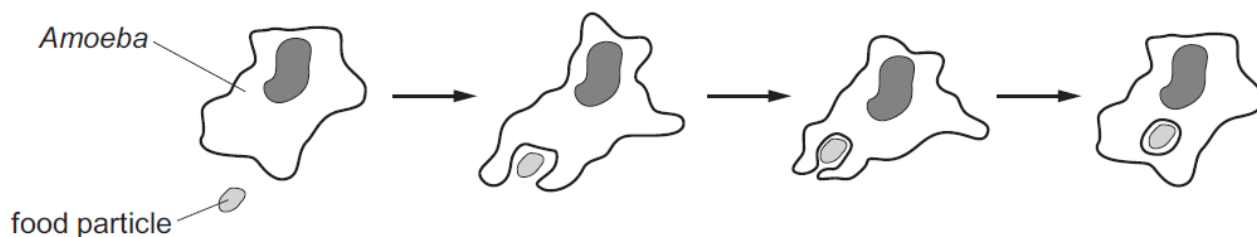
What is the magnification of the image?

- A $\times 0.45$ B $\times 2.2$ C $\times 48$ D $\times 495$

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

12. Nov/2021/Paper_13/No.2

The binomial names for five different species are listed.

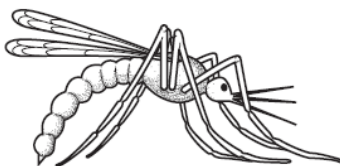
- 1 *Calluna vulgaris*
- 2 *Garra rufa*
- 3 *Primula veris*
- 4 *Primula vulgaris*
- 5 *Vespula rufa*

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

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** $\times 5$ **B** $\times 45$ **C** $\times 5000$ **D** $\times 45\,000$

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.

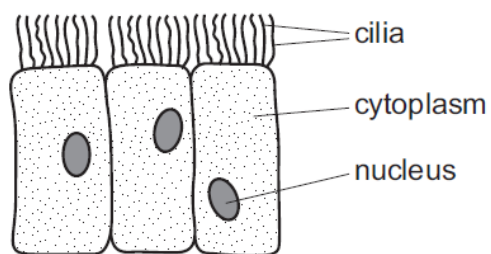
The actual length of the mitochondrion is 3 μm .

What is the magnification of the photomicrograph?

- A** $\times 5$ **B** $\times 45$ **C** $\times 5000$ **D** $\times 45\,000$

19. Nov/2021/Paper_22/No.5

The diagram shows some cells.



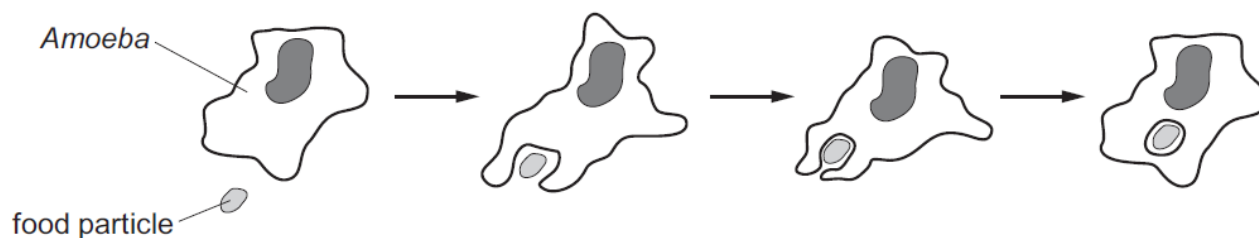
Where are these cells found?

- 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

21. Nov/2021/Paper_31/No.1

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

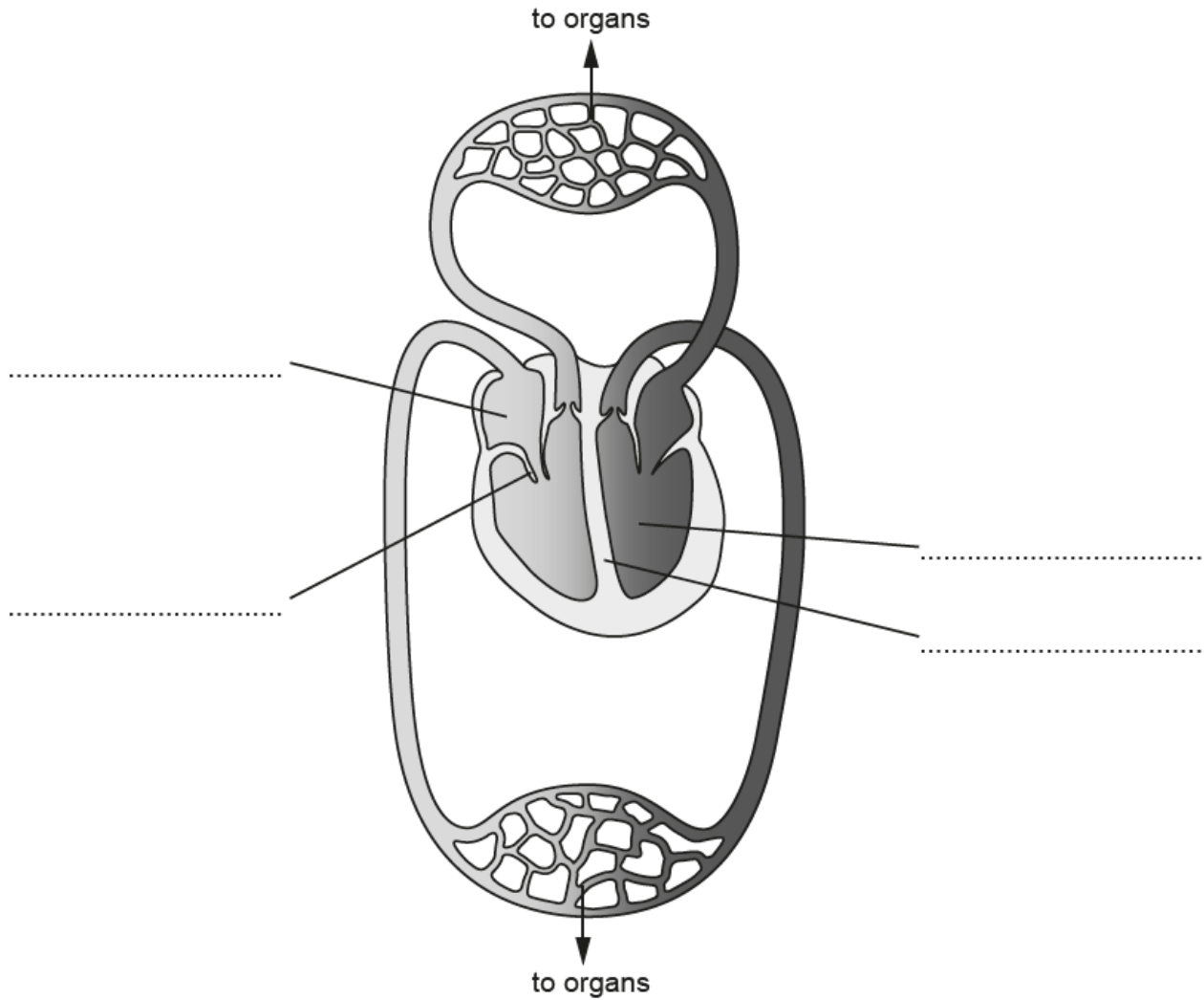


Fig. 1.1

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

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

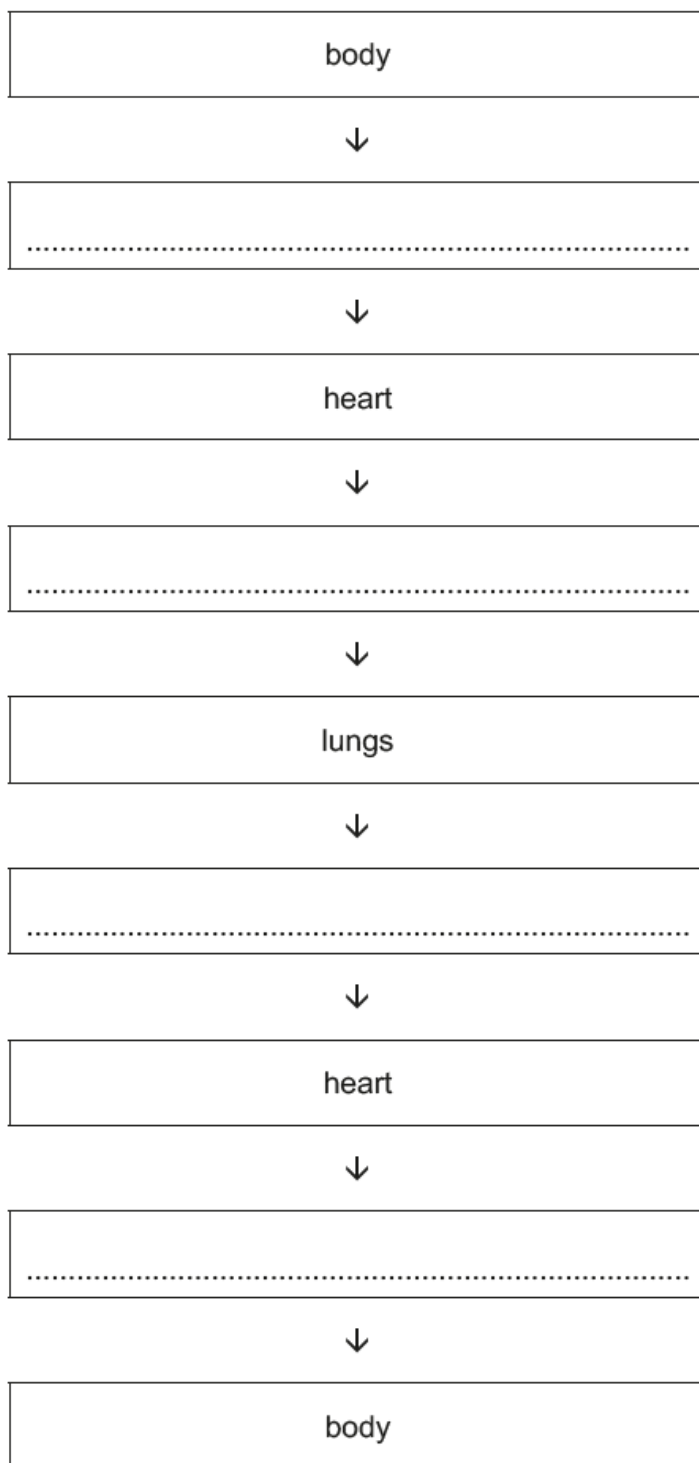
[4]

- (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**



(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]

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]

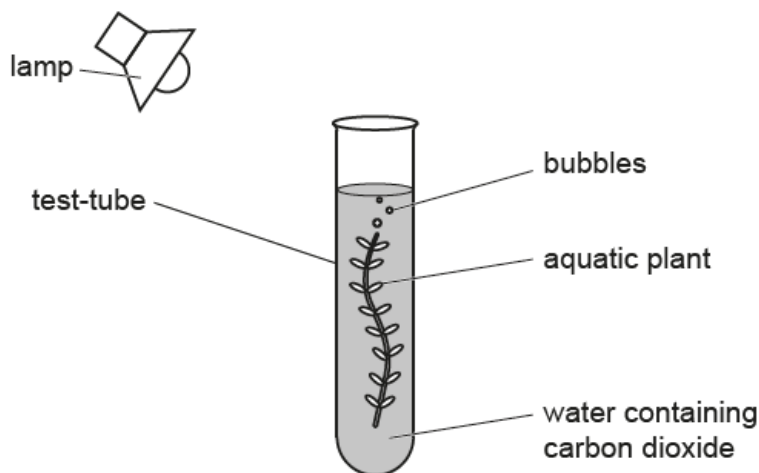
(iii) State the name of the structure in a cell where photosynthesis takes place.

..... [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.



not to scale

Fig. 6.1

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

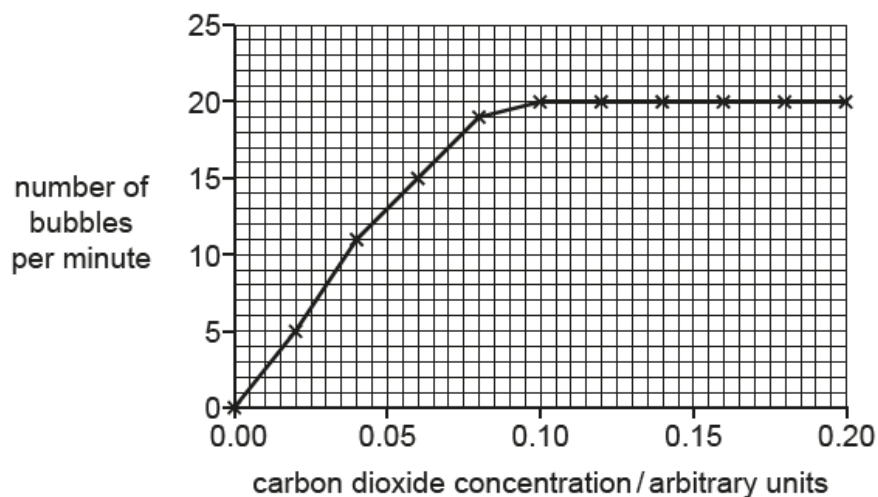


Fig. 6.2

- (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]

(c) Carbon dioxide is a greenhouse gas.

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

..... [1]

[Total: 10]

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.

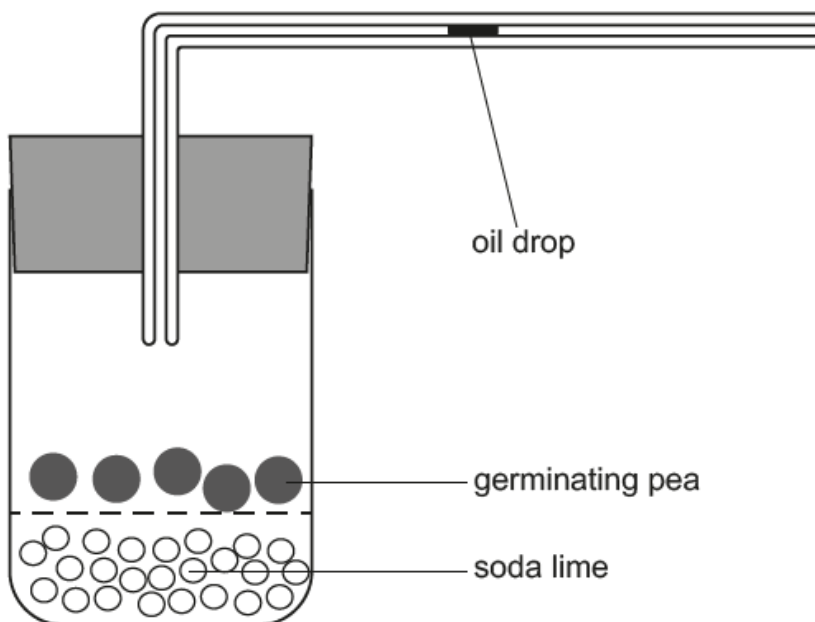


Fig. 1.1

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]

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]

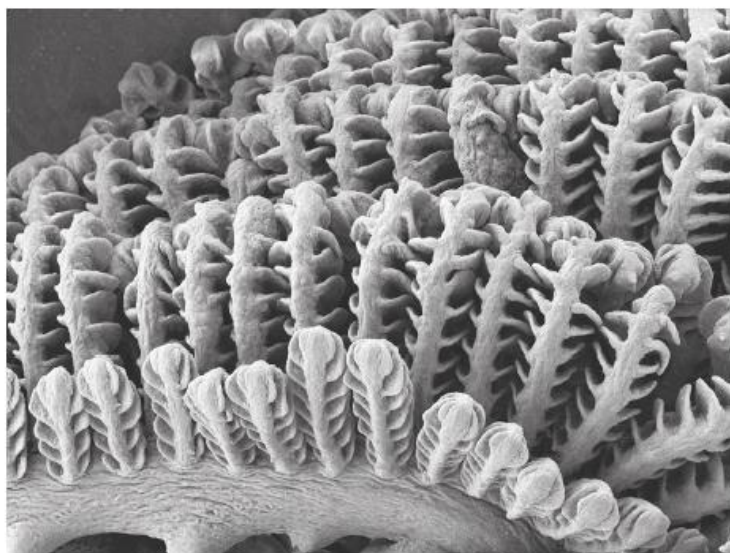
(ii) Complete Table 1.1 to compare the features of fish, mammals and birds.

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]

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



magnification $\times 110$

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]

(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.

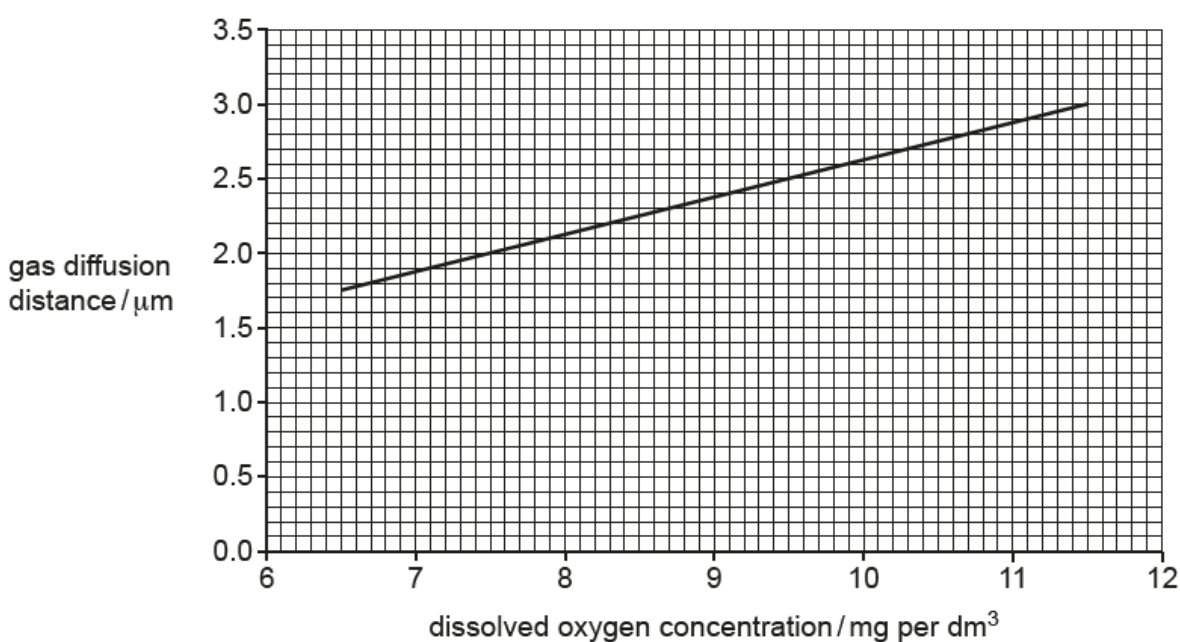


Fig. 1.2

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

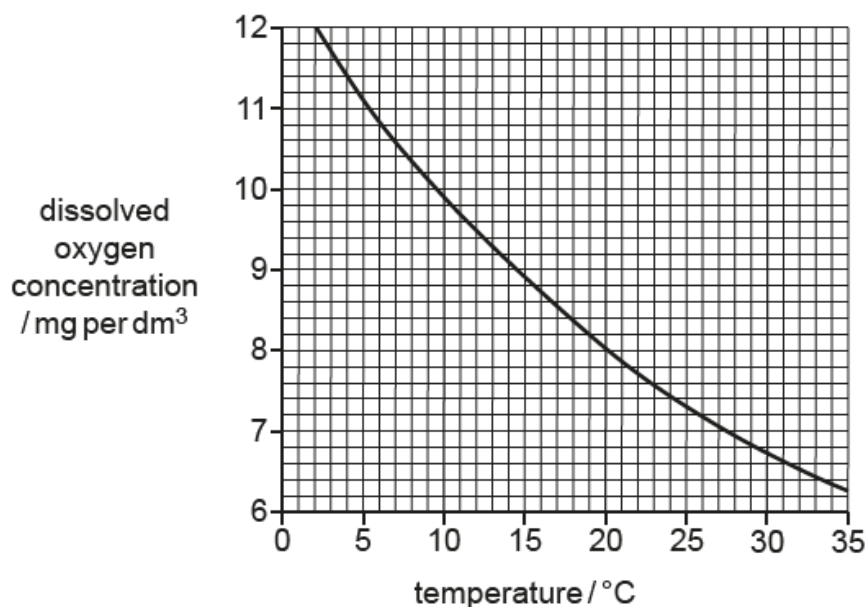


Fig. 1.3

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 dm³ 25 °C: mg per dm³

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]