Name:	Target Grade:	Actual Grade:

BRIGHT CULTURE

CELLS
MCQ and STRUCTURED QUESTIONS

READ THESE INSTRUCTIONS FIRST

INSTRUCTIONS TO CANDIDATES

1. Find a quiet, comfortable spot free place from distractions.

2. Spend one minute on each mark.

3. Time yourself for every single question.

4. Every chapter has their own question types. Ensure that you know the different question type for each chapter.

5. Make a conscientious effort to remember your mistakes, especially in terms of answering techniques. E.g Take a picture for the mistakes that you made, keep it in a photo album, and revise it over and over again.

6. Highlight question types that you tend to keep making mistakes and review them nearing exams.

7. Always review the common questions and question type that you tend to make mistakes nearing exams.

8. During exams, classify the question type and recall what you have learnt, how you need to analyse the questions for the different question type, what you need to take note of and answer with the correct answering techniques!

✨ **Wishing you all the best for this test!**

You've got this!

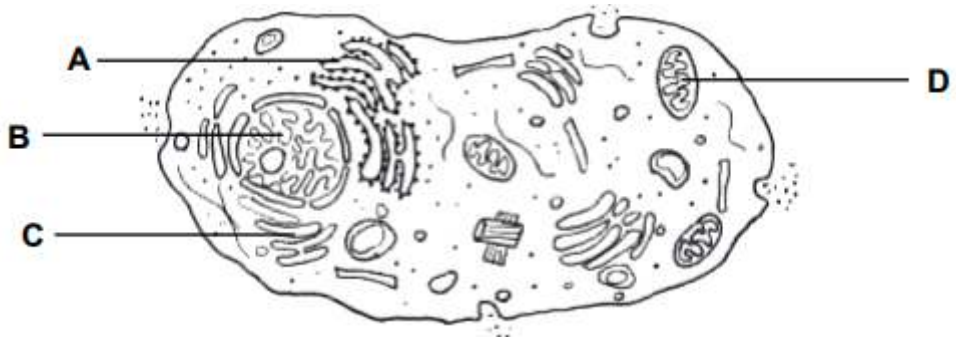
💡 **With lots of love,**
Bright Culture 💛

GOOD LUCK FOR YOUR EXAM!

MARKS

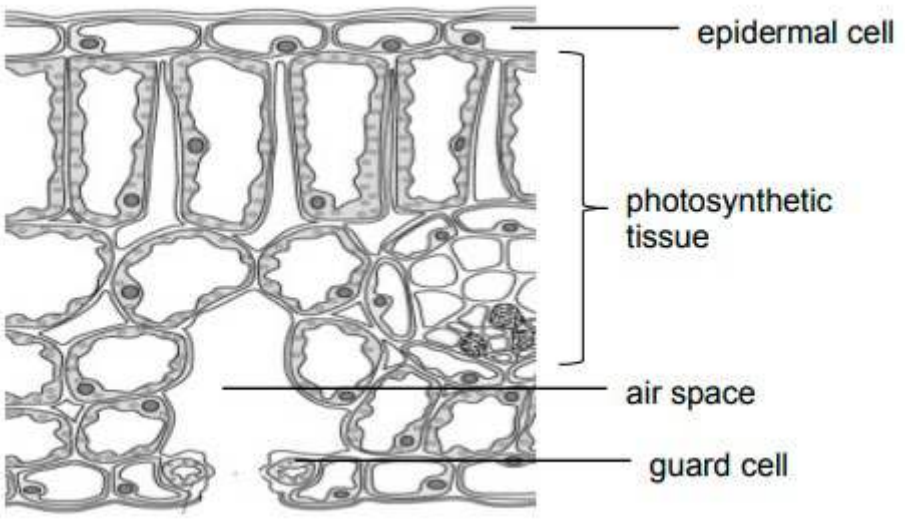
CELLS MCQ

1 The diagram below shows an animal cell.



Which of the structures above is the place where aerobic respiration takes place?

2 The following image shows part of a leaf.



Which of the following terms best describes what a leaf functions as?

A cells
B organ
C system
D tissue

3 An amoeba had its nucleus removed. For several days, it continued to move and feed, but it did not reproduce. An intact amoeba, used as a control, reproduced twice in that time. What can you conclude from this experiment about the role of the nucleus in amoeba?

A The nucleus controls the normal activity of the cell.
B The nucleus is essential for cell division.
C The nucleus is essential for life.
D The nucleus is the only part of the cell that contains DNA.

4 Which of the following statements best explains why a root hair cell does not need chloroplasts?

A Its elongated structure makes it more suited for absorption of water.
B It is unable to obtain the carbon dioxide needed for photosynthesis.
C It is underground and not exposed to sunlight.
D Its main purpose is to absorb water from the soil.

5 Which of the following statements shows the benefit of division of labour in multicellular organisms?

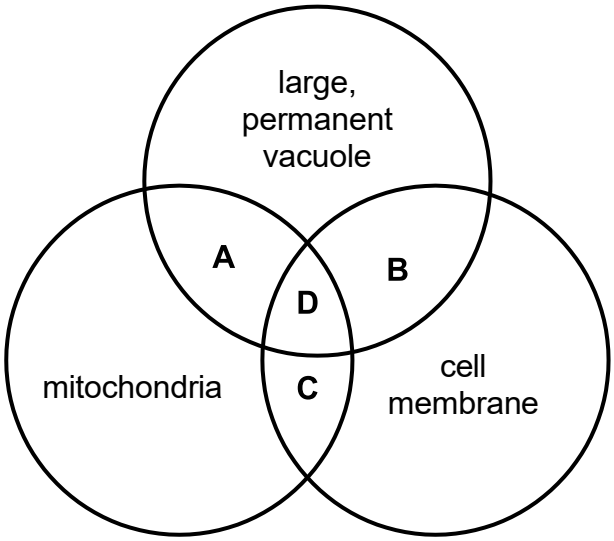
A All the cells perform the same task to improve efficiency.
B It does not require energy from food.
C Different processes can take place at the same time.
D It reduces the needs for growing more new cells.

6 Which of the following best describes a cell membrane?

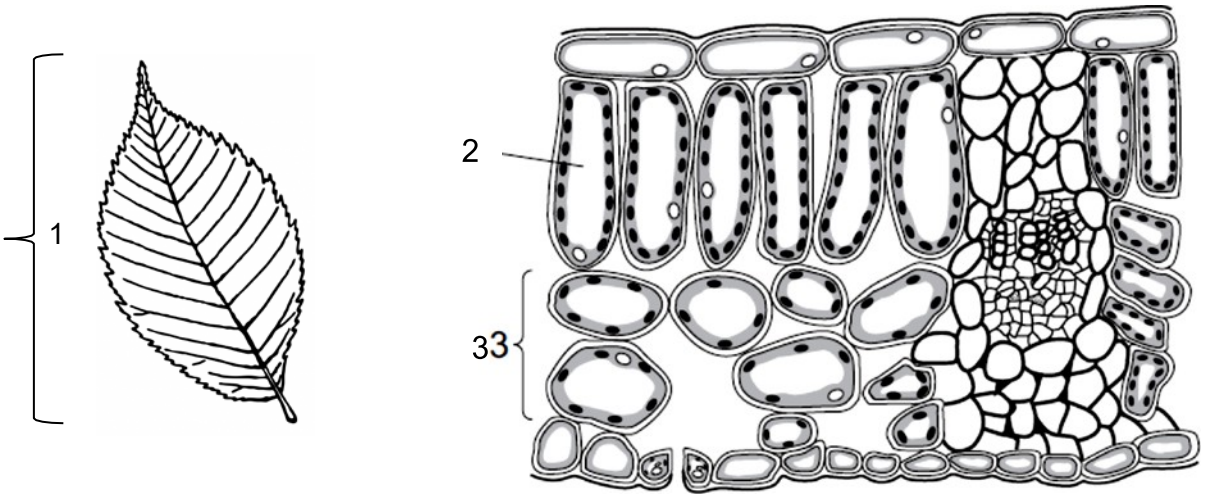
A jelly-like substance where chemical reactions take place
B jelly-like substance which controls the activities of the cell
C thick layer around the cell that supports the cell and gives it shape
D thin layer around the cell that allows some substances to pass through

7 The diagram refers to some structures found in cells.

Which area represents structures found in **both** typical animal and plant cells?



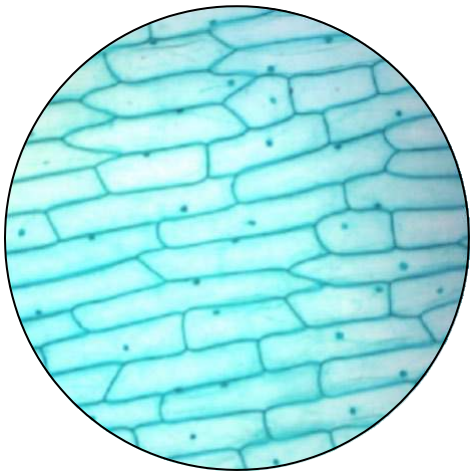
8 The diagrams show a leaf and its internal structure.



What are the levels of organisation of the labelled parts?

	1	2	3
A	cell	tissue	organ system
B	organ	cell	tissue
C	organ system	tissue	cell
D	tissue	cell	organ

9 A student prepared a microscope slide to observe some onion epidermal cells.

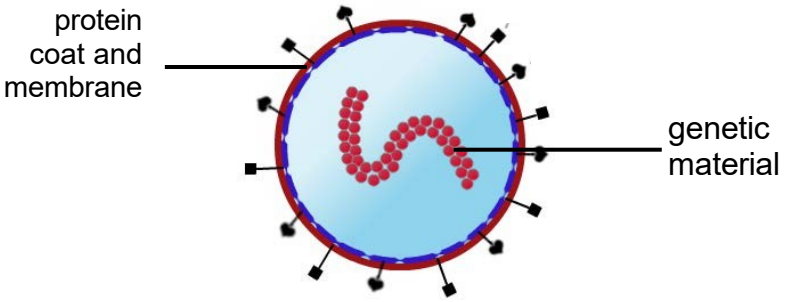


Which part/s of the microscope should he adjust to observe the above cells in clear focus at higher magnification?

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

10 Infuenza, commonly known as the "flu", is a contagious disease that can affect anyone including healthy people. It attacks the respiratory tract in humans (nose, throat, and lungs). It can be spread when an infected person coughs, sneezes, or speaks. The flu viruses are transmitted through air in small respiratory droplets and other people breathe in the viruses.

Viruses do not reproduce, grow nor excrete. They consist of genetic material surrounded by a protein coat. Flu viruses have an additional membrane, derived from the host cell which it infects. The diagram shows a simplified structure of a flu virus.



A student made four comparisons between a typical animal cell and a flu virus.

	typical animal cell	flu virus
1	contains organelles	contains protein coat
2	genetic material found within nucleus	genetic material found within entire virus
3	has an external wall	has an external protein coat
4	reproduce by dividing	replicate by infecting host cell

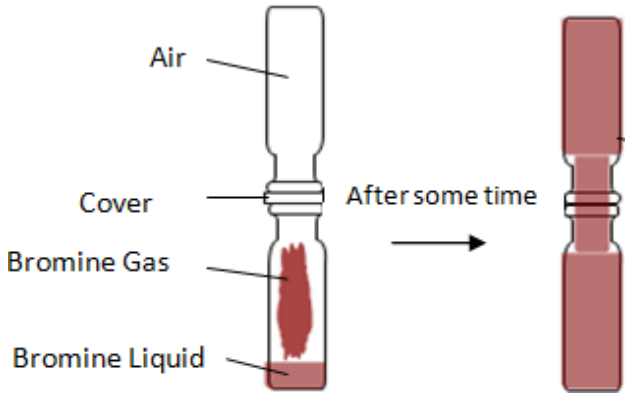
Which comparisons are correct and valid?

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

11 Liquid bromine is placed at the bottom of a gas jar and another inverted jar of air is placed above it.

Two observations were made after some time:

- Brown bromine gas is formed
- Brown colour slowly spreads throughout the gas jar



Which two physical processes explain the two observations?

1 The liquid bromine cools and freezes.
2 The liquid bromine evaporates.
3 The gaseous bromine molecules vibrate.
4 The gaseous bromine molecules and the air particles are in constant motion.

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

12 The volume of a balloon increases when the pressure inside it increases. The balloon becomes larger when it is left in the Sun.

Which of the following explains the above phenomenon?

A The air molecules inside the balloon all move outwards when it is heated.
B The air molecules inside the balloon become larger when it is heated.
The number of air molecules inside the balloon increases when it is heated.
The air molecules inside the balloon move more quickly when it is heated.

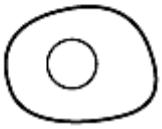
13 The diagram shows six different types of cells.

P

R

T

Q



S

U

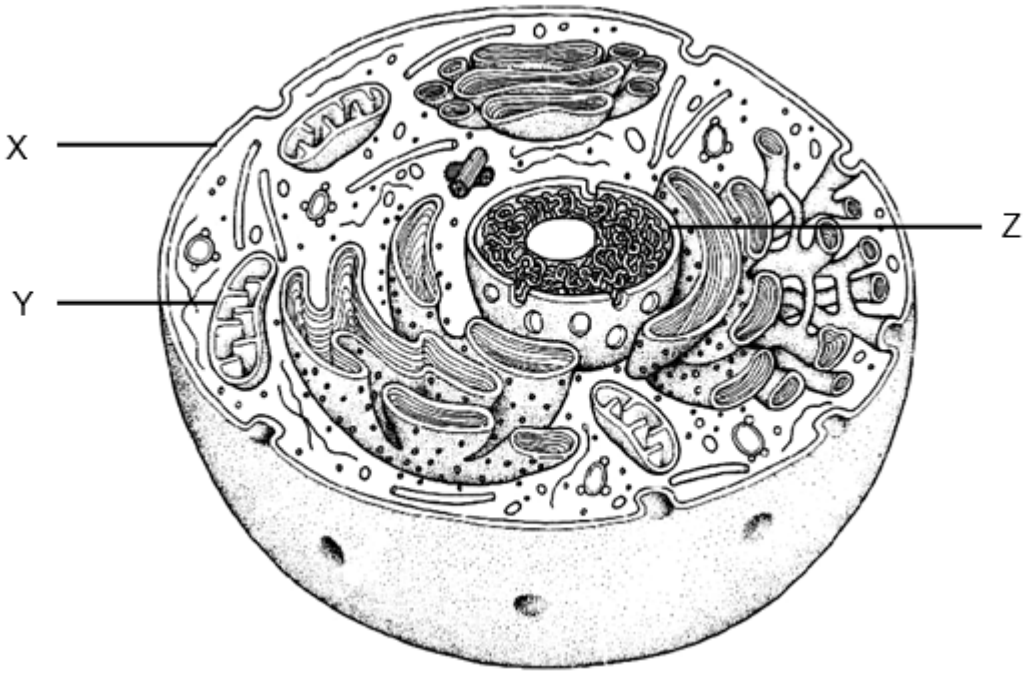
Differentiate the six cells into animal and plant cells.

	plant cells	animal cells
A	P, R, U	Q, S, T
B	P, Q, S, T	R, U
C	Q, T, U	P, R, S
D	R, S	P, Q, T, U

14 Which of the following explains why the shape of a plant cell does **not** change?

A It contains a nucleus.
B It contains mitochondria.
C It has a cell wall made of cellulose.
D It has a large central vacuole.

15 The diagram shows a 3-dimensional drawing of an animal cell.

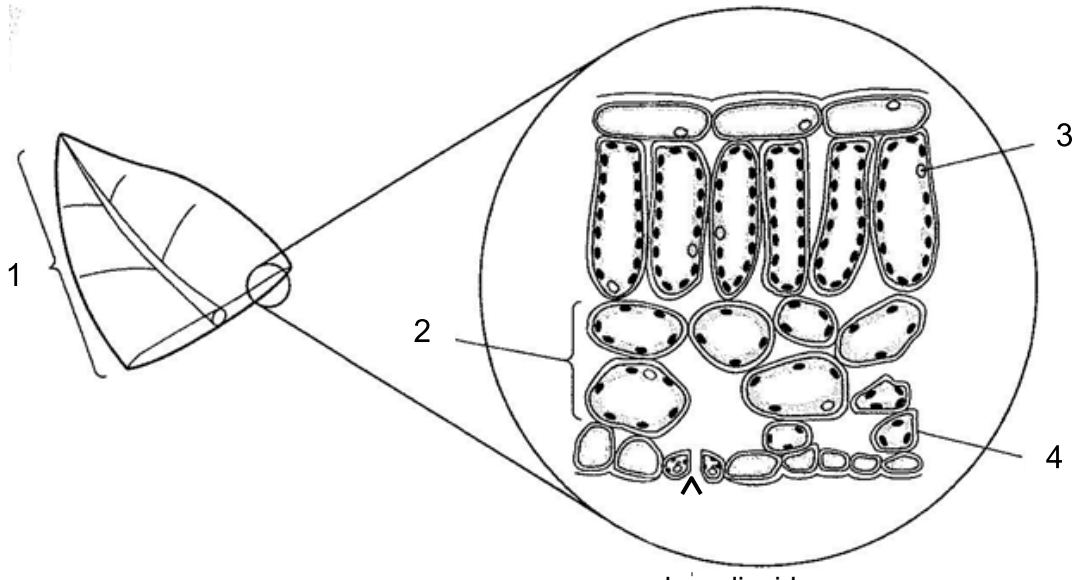


Which of the following statements about this animal cell is/are true?

1 X controls the movement of substances in and out of the cell.
2 Y stores food substances.
3 Z is the site where energy is released.
4 Both Y and Z are present only in animal cells and absent in plant cells.

A 1 only
B 2 and 3 only
C 3 and 4 only
D all of the above

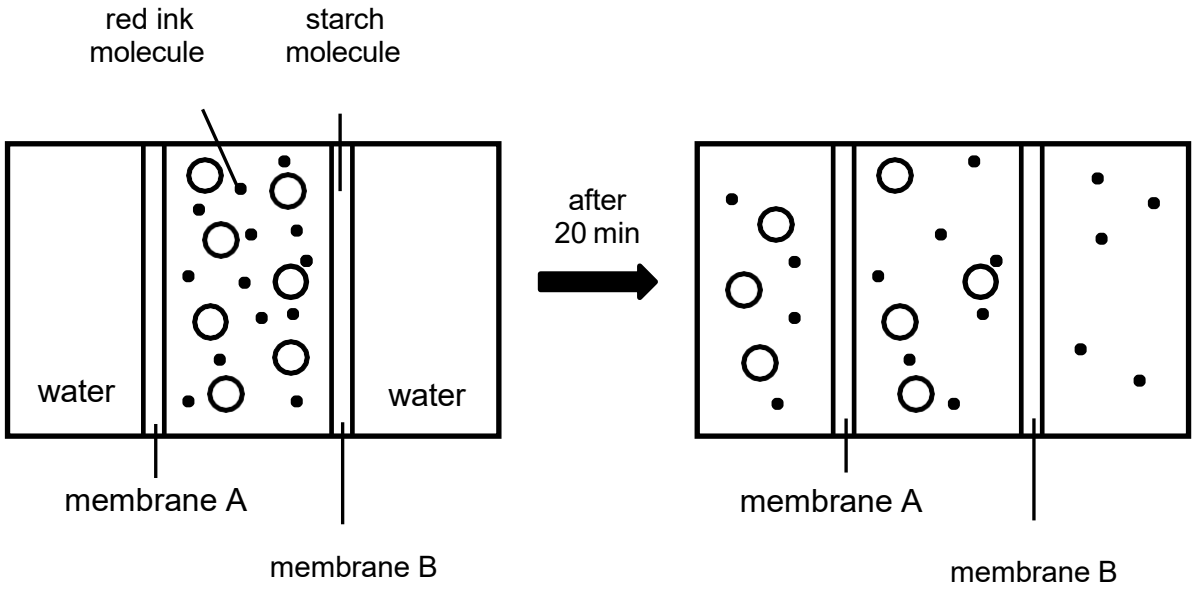
16 The diagram shows a section of a leaf and an enlarged view of its cross section.



Which row correctly describes the labels?

	organelle	cell	tissue	organ
A	1	2	3	4
B	2	3	4	1
C	3	4	2	1
D	3	1	4	2

17 The diagram shows an experimental set-up to determine the permeability of the membranes A and B.



Which membrane(s) is/are partially permeable?

A membrane A only
B membrane B only
C both membranes A and B
D neither membrane A nor B

CELLS STRUCTURED QUESTIONS

1 Fig. 5.1 shows the structure of an organism, Chlamydomonas which lives in fresh water.

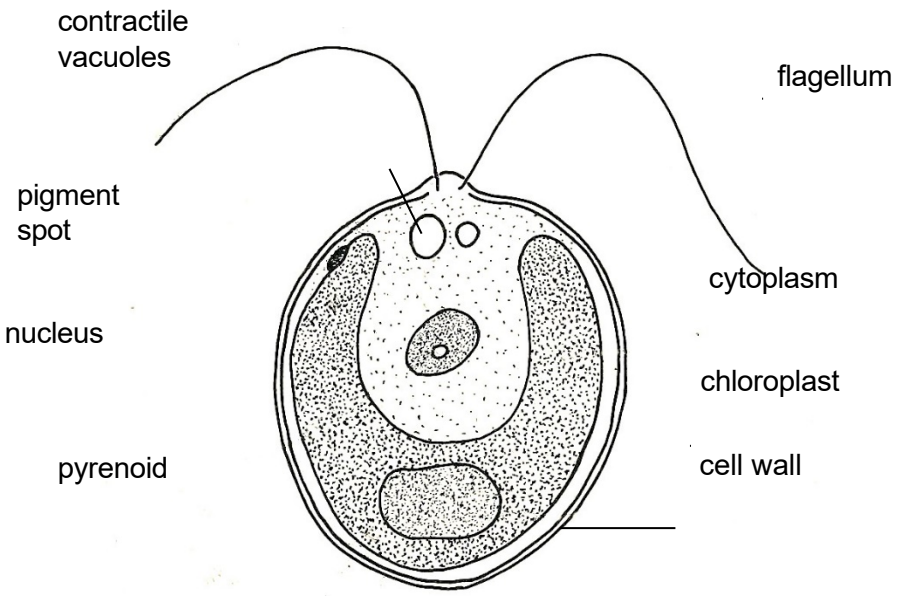


Fig. 5.1

(a) Is this organism unicellular or multicellular? [1]

.....

(b) State two similarities between the Chlamydomonas and a typical plant cell. [2]

.....

.....

.....

(c) This organism has been suggested to be like an animal. Give a reason for this suggestion.

[1]

.....

.....

(d) State the function of the cell wall in the Chlamydomonas.
[1]

.....

.....

Total [5]

2 Figure 5.1 shows a photograph of two cheek cells as observed under the light microscope. The actual length of one of the cells, measured from **P** to **Q**, is 0.006 cm.

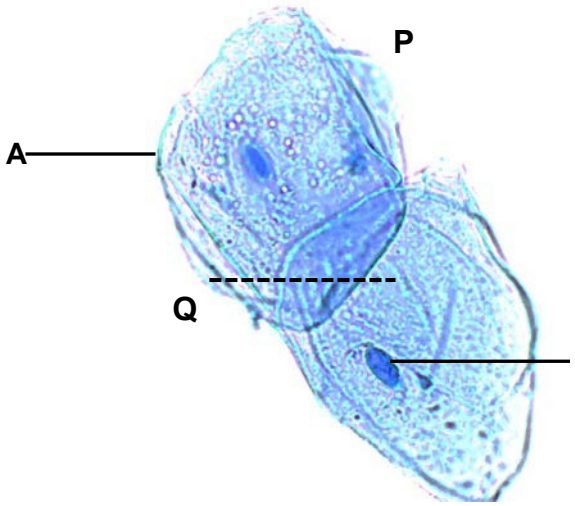


Figure 5.1

(a) Identify the structures labelled **A** and **B**. [1]

A: .....

B: .....

(b) Explain how structure **A** is adapted to perform its function. [2]

.....

.....

.....

.....

(c) Calculate the magnification of the photograph shown in Figure 5.1. Show your working clearly. [1]

Total [4]

3 Figure 6.1 shows a section through *Hydra*, a simple organism that lives in water. Part of its body wall has been enlarged to show cell detail.

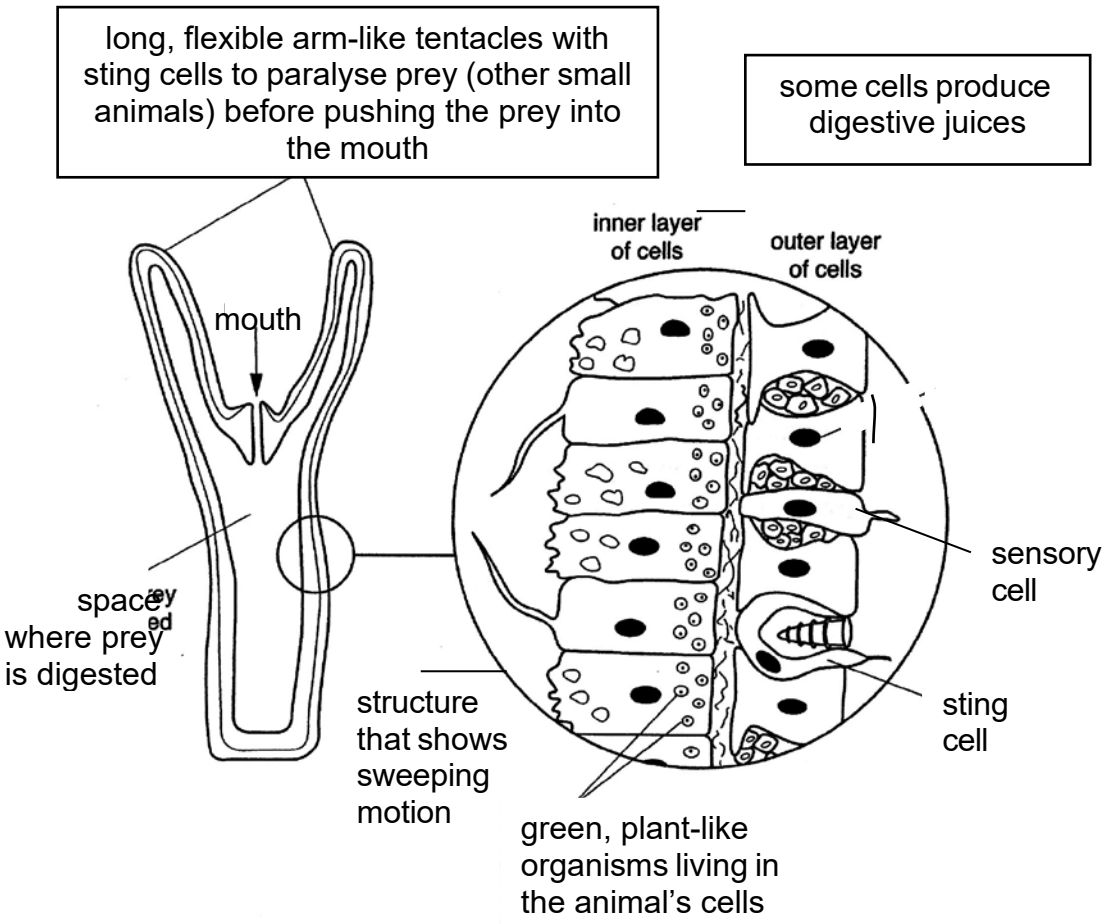


Figure 6.1

a. In some of the cells are small plant-like organisms which are green because they contain the same pigment as green plants.

Name the pigment. [1]

.....

b. Suggest and explain how this organism might benefit from the presence of these plant-like organisms. [2]

.....

.....

.....

.....

c. Using Figure 6.1, explain the significance of division of labour in the survival of *Hydra*. [2]

.....

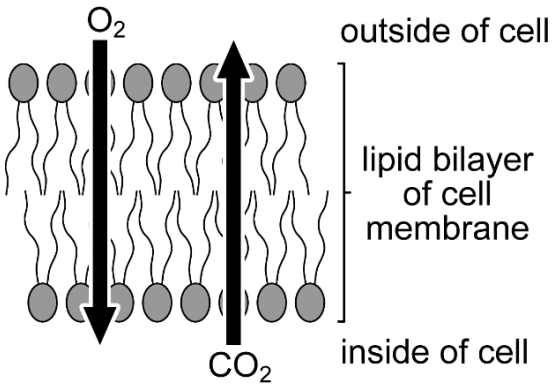
.....

.....

.....

Total [5]

4 The diagram below represents a simple model of a cell membrane. The direction in which oxygen, O_2, and carbon dioxide, CO_2, diffuse across the cell membrane is indicated by two arrows.



Diffusion is evidence that particles are in a constant state of random motion, which forms part of kinetic particle theory. Kinetic particle theory is a model that scientists use to describe the behaviour of matter.

a. Models help scientists understand complex ideas.
In addition to this, give one generalisation about models.

.....

.....

..... [1]

b. Based upon the information given in the diagram, which side of the cell membrane has the *lower* concentration of oxygen? Explain your answer.

.....

.....

.....

..... [2]

c. Calculate the relative molecular masses (M_r) of oxygen, O_2, and carbon dioxide, CO_2. Show your working.

[2]

d. Explain the effect of relative molecular mass (M_r) on the rate of diffusion of oxygen and carbon dioxide.

.....

..... [1]

e. The temperature of a healthy person is 37.0□C. A patient in hospital is suffering from a high fever of 40.5□C. Explain **how** and **why** this increase in temperature affects the rates at which oxygen and carbon dioxide diffuse across the patient's cell membranes.

.....

.....

.....

..... [2]

f. Apart from diffusion across cell membranes, give one more example of a phenomenon that supports the theory that particles are in a constant state of random motion.

.....

..... [1]

g. In addition to science, describe an example from another discipline where models are used to help understand complex ideas.

.....

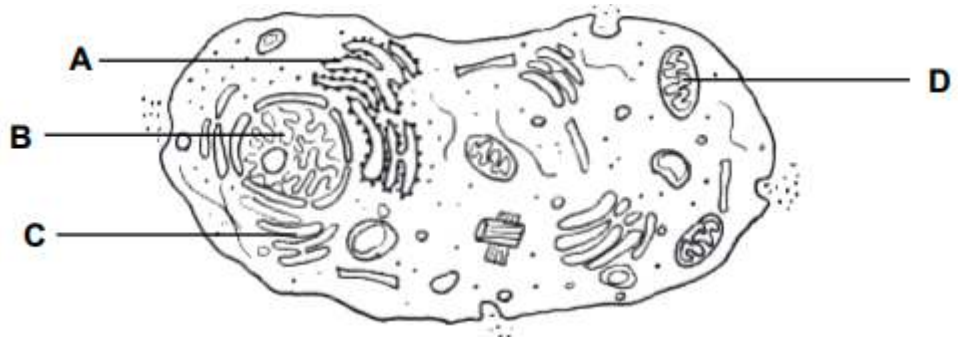
.....

..... [1]

[Total: 10m]

ANSWERS FOR CELLS MCQ

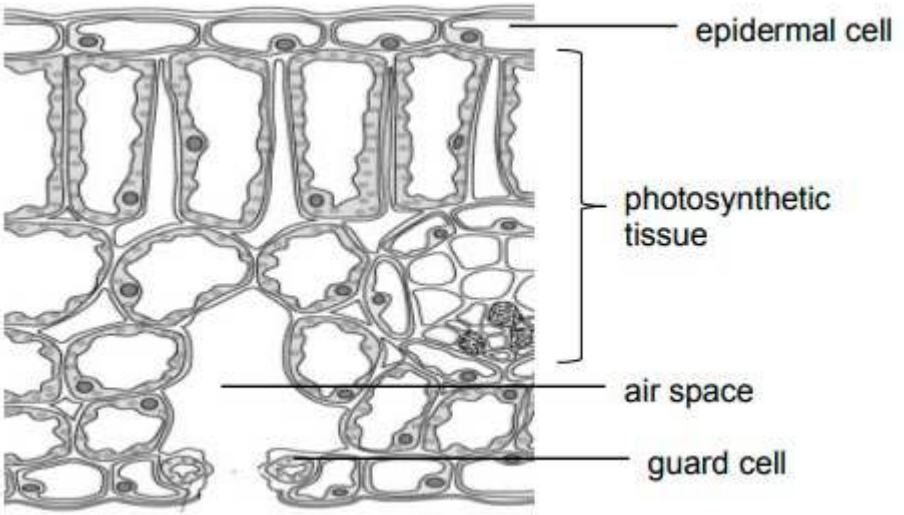
1 The diagram below shows an animal cell.



Which of the structures above is the place where aerobic respiration takes place?

Ans : D

2 The following image shows part of a leaf.



Which of the following terms best describes what a leaf functions as?

A cells
B organ
C system
D tissue

3 An amoeba had its nucleus removed. For several days, it continued to move and feed, but it did not reproduce. An intact amoeba, used as a control, reproduced twice in that time. What can you conclude from this experiment about the role of the nucleus in amoeba?

A The nucleus controls the normal activity of the cell.
B The nucleus is essential for cell division.
C The nucleus is essential for life.
D The nucleus is the only part of the cell that contains DNA.

4 Which of the following statements best explains why a root hair cell does not need chloroplasts?

A Its elongated structure makes it more suited for absorption of water.
B It is unable to obtain the carbon dioxide needed for photosynthesis.
C It is underground and not exposed to sunlight.
D Its main purpose is to absorb water from the soil.

5 Which of the following statements shows the benefit of division of labour in multicellular organisms?

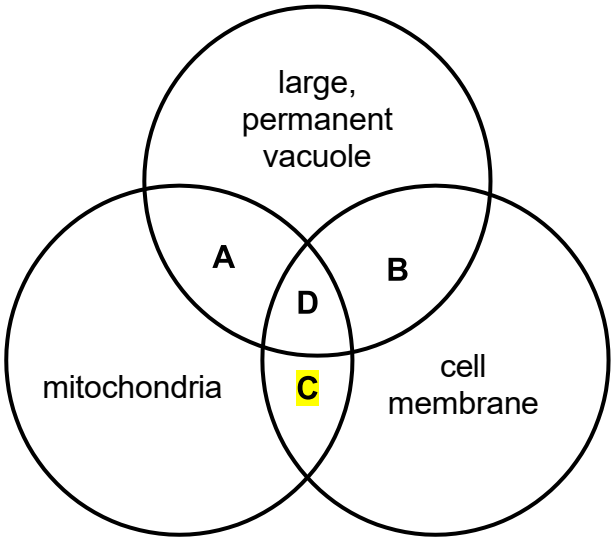
A All the cells perform the same task to improve efficiency.
B It does not require energy from food.
C Different processes can take place at the same time.
D It reduces the needs for growing more new cells.

6 Which of the following best describes a cell membrane?

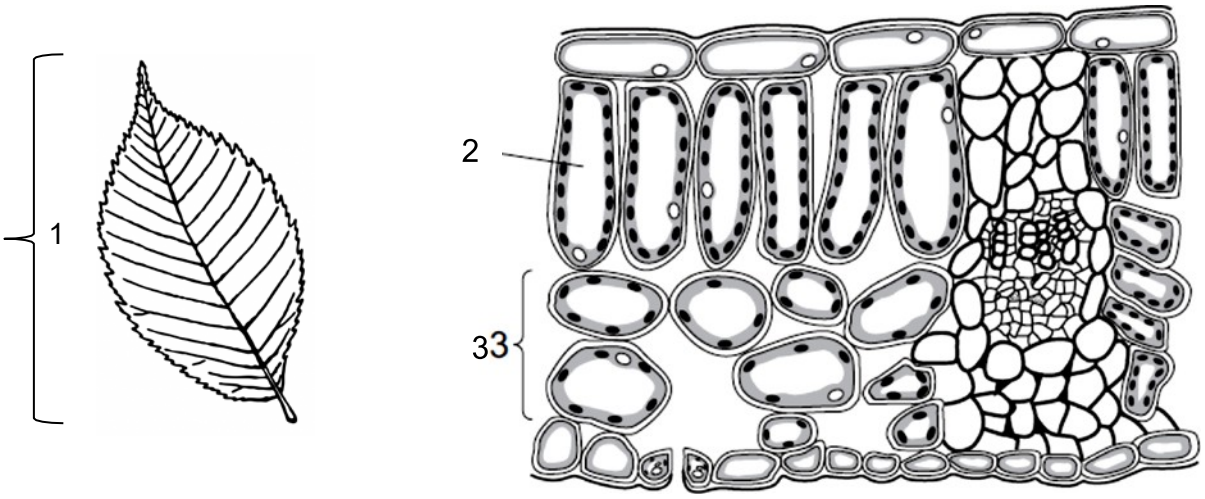
A jelly-like substance where chemical reactions take place
B jelly-like substance which controls the activities of the cell
C thick layer around the cell that supports the cell and gives it shape
D thin layer around the cell that allows some substances to pass through

7 The diagram refers to some structures found in cells.

Which area represents structures found in **both** typical animal and plant cells?



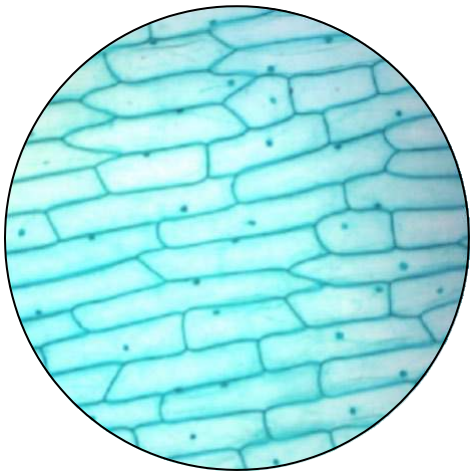
8 The diagrams show a leaf and its internal structure.



What are the levels of organisation of the labelled parts?

	1	2	3
A	cell	tissue	organ system
B	organ	cell	tissue
C	organ system	tissue	cell
D	tissue	cell	organ

9 A student prepared a microscope slide to observe some onion epidermal cells.

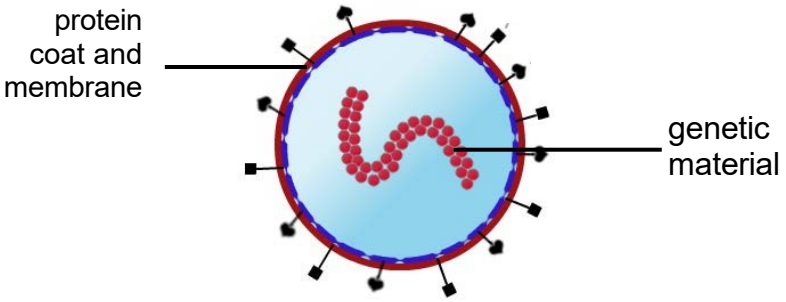


Which part/s of the microscope should he adjust to observe the above cells in clear focus at higher magnification?

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

10 Infuenza, commonly known as the "flu", is a contagious disease that can affect anyone including healthy people. It attacks the respiratory tract in humans (nose, throat, and lungs). It can be spread when an infected person coughs, sneezes, or speaks. The flu viruses are transmitted through air in small respiratory droplets and other people breathe in the viruses.

Viruses do not reproduce, grow nor excrete. They consist of genetic material surrounded by a protein coat. Flu viruses have an additional membrane, derived from the host cell which it infects. The diagram shows a simplified structure of a flu virus.



Source: https://biology.tutorvista.com/cell/viruses.html

A student made four comparisons between a typical animal cell and a flu virus.

	typical animal cell	flu virus
1	contains organelles	contains protein coat
2	genetic material found within nucleus	genetic material found within entire virus
3	has an external wall	has an external protein coat
4	reproduce by dividing	replicate by infecting host cell

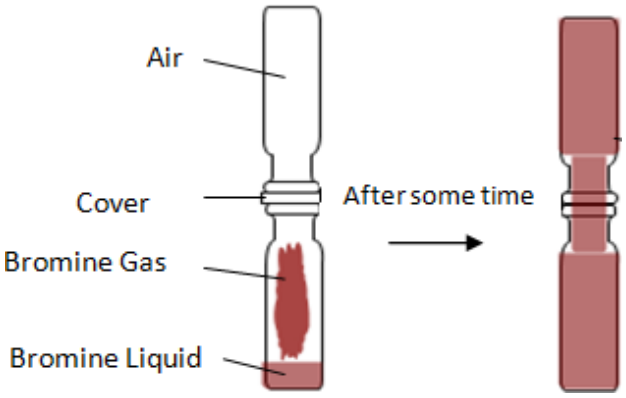
Which comparisons are correct and valid?

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

11 Liquid bromine is placed at the bottom of a gas jar and another inverted jar of air is placed above it.

Two observations were made after some time:

- Brown bromine gas is formed
- Brown colour slowly spreads throughout the gas jar

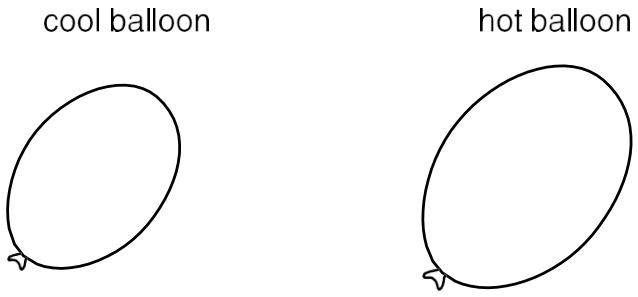


Which two physical processes explain the two observations?

1 The liquid bromine cools and freezes.
2 The liquid bromine evaporates.
3 The gaseous bromine molecules vibrate.
4 The gaseous bromine molecules and the air particles are in constant motion.

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

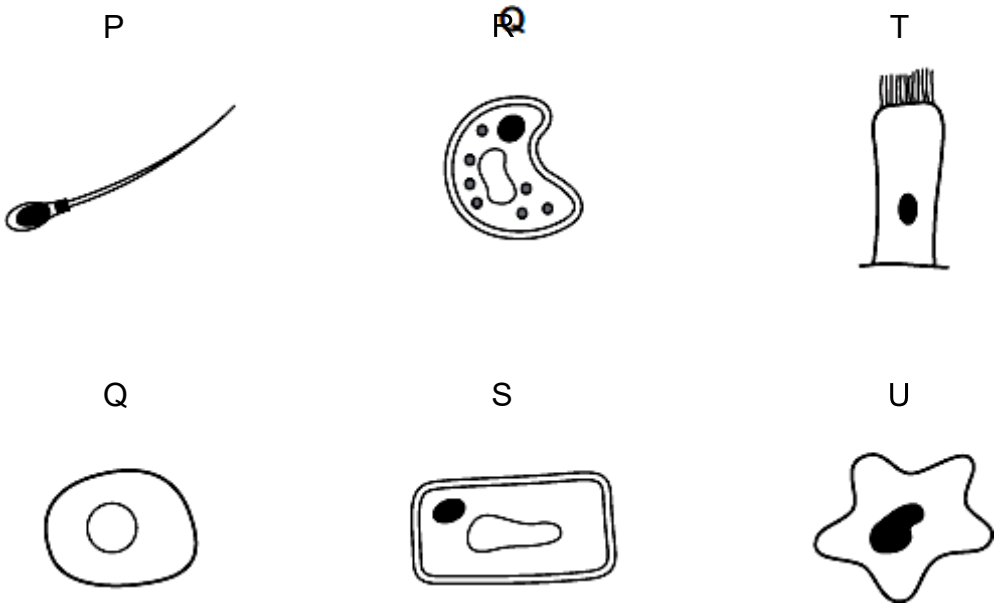
12 The volume of a balloon increases when the pressure inside it increases. The balloon becomes larger when it is left in the Sun.



Which of the following explains the above phenomenon?

A The air molecules inside the balloon all move outwards when it is heated.
B The air molecules inside the balloon become larger when it is heated.
C The number of air molecules inside the balloon increases when it is heated.
D The air molecules inside the balloon move more quickly when it is heated.

13 The diagram shows six different types of cells.



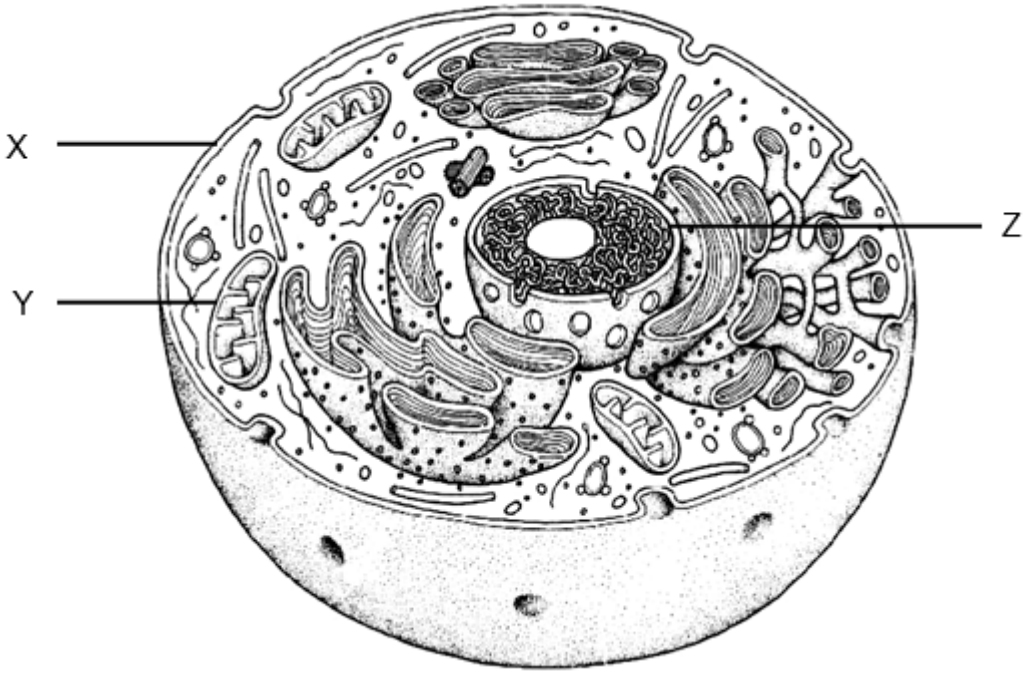
Differentiate the six cells into animal and plant cells.

	plant cells	animal cells
A	P, R, U	Q, S, T
B	P, Q, S, T	R, U
C	Q, T, U	P, R, S
D	R, S	P, Q, T, U

14 Which of the following explains why the shape of a plant cell does **not** change?

A It contains a nucleus.
B It contains mitochondria.
C It has a cell wall made of cellulose.
D It has a large central vacuole.

15 The diagram shows a 3-dimensional drawing of an animal cell.

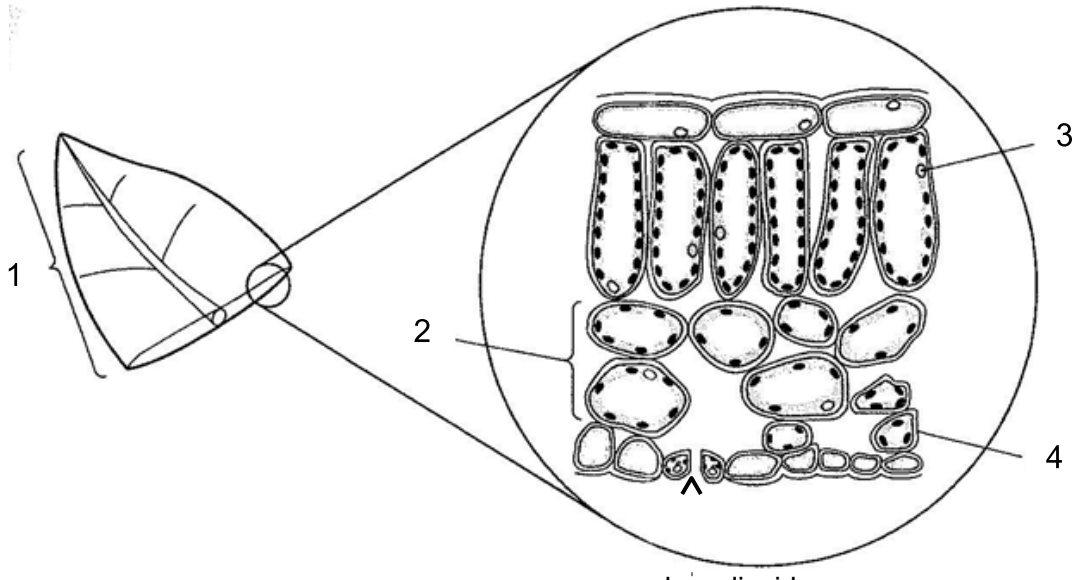


Which of the following statements about this animal cell is/are true?

5 X controls the movement of substances in and out of the cell.
6 Y stores food substances.
7 Z is the site where energy is released.
8 Both Y and Z are present only in animal cells and absent in plant cells.

A 1 only
B 2 and 3 only
C 3 and 4 only
D all of the above

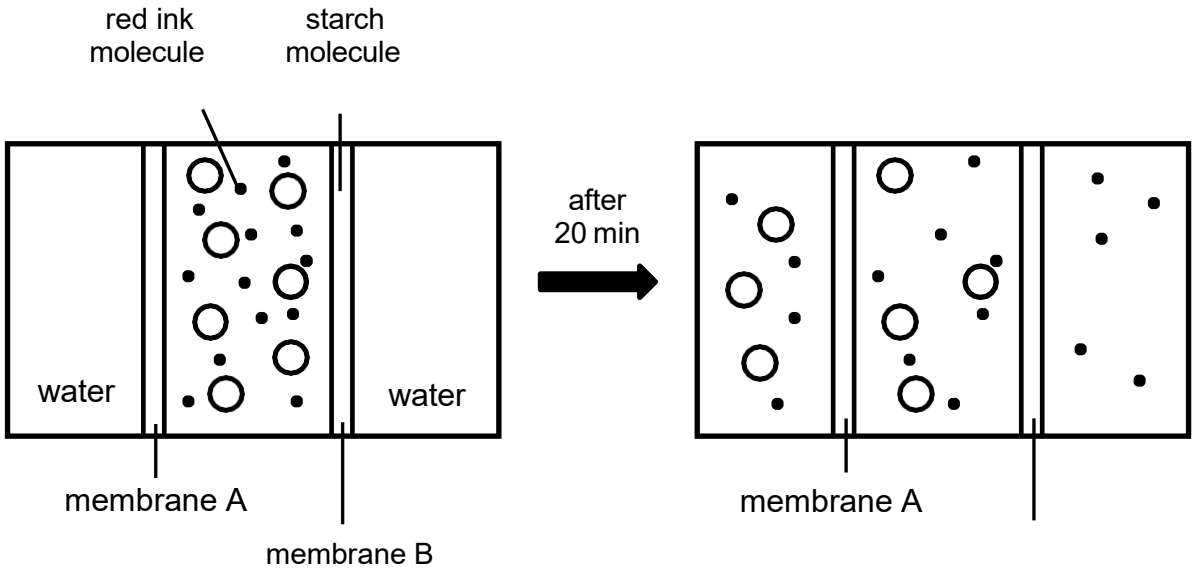
16 The diagram shows a section of a leaf and an enlarged view of its cross section.



Which row correctly describes the labels?

	organelle	cell	tissue	organ
A	1	2	3	4
B	2	3	4	1
C	3	4	2	1
D	3	1	4	2

17 The diagram shows an experimental set-up to determine the permeability of the membranes A and B.



Which membrane(s) is/are partially permeable?

A membrane A only
B membrane B only
C both membranes A and B
D **neither** membrane A nor B

ANSWERS FOR CELLS STRUCTURED QUESTIONS

1 Fig. 5.1 shows the structure of an organism, Chlamydomonas which lives in fresh water.

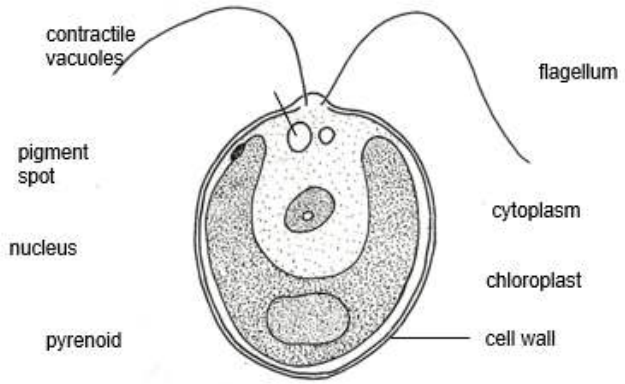


Fig. 5.1

Is this organism unicellular or multicellular? [1]

Unicelluar

(a) State two similarities between the Chlamydomonas and a typical plant cell. [2]

Having a cell wall [1] and a chloroplast [1]

(b) This organism has been suggested to be like an animal. Give a reason for this suggestion.

[1]

Presence of flagellum that allows it to move from one place to another which is a characteristic of animals

(c) State the function of the cell wall in the Chlamydomonas. [1]

To provide structural support for the cell/to protect and support the cell/prevents the cell from bursting

Total [5]

2 Figure 5.1 shows a photograph of two cheek cells as observed under the light microscope. The actual length of one of the cells, measured from **P** to **Q**, is 0.006 cm.

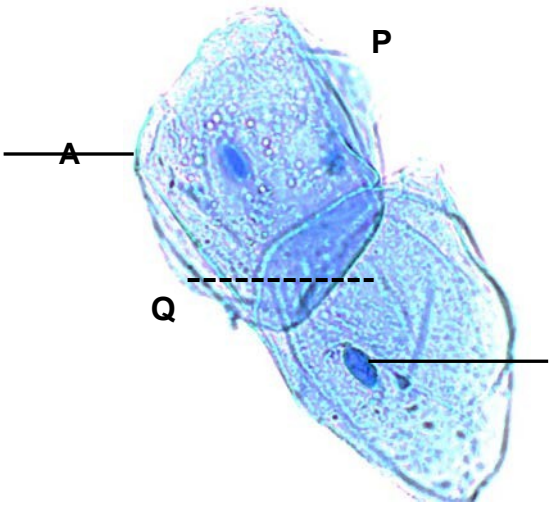


Figure 5.1

(a) Identify the structures labelled **A** and **B**.
[1]

A: cell/plasma membrane
B: nucleus

(b) Explain how structure **A** is adapted to perform its function.
[2]

partially/selectively permeable

(c) Calculate the magnification of the photograph shown in Figure 5.1. Show your working clearly.
[1]

length of PQ: A 3.7-3.9 cm
Magnification = (3.7 – 3.9 cm)/0.006 cm = _____ times

accurate

measurement and calculation with “times or X”

Total [4]

3 Figure 6.1 shows a section through *Hydra*, a simple organism that lives in water. Part of its body wall has been enlarged to show cell detail.

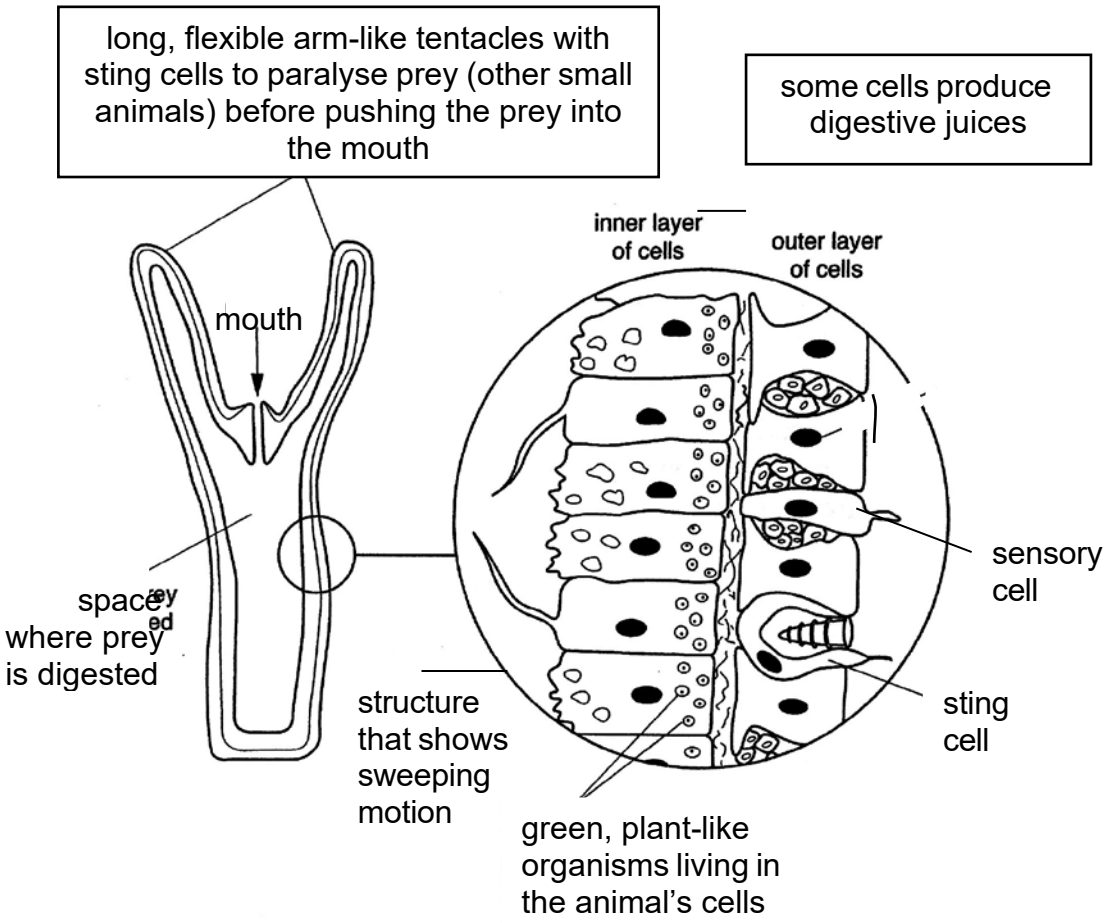


Figure 6.1

Source: GCE Ordinary Level Examination Nov 2005 Paper 2

a In some of the cells are small plant-like organisms which are green because they contain the same pigment as green plants.

Name the pigment. [1]

Chlorophyll

b Suggest and explain how this organism might benefit from the presence of these plant-like organisms. [2]

plant-like organisms photosynthesize to produce glucose/sugar and oxygen; glucose and oxygen can be used by *Hydra* for cellular respiration to release energy;

c Using Figure 6.1, explain the significance of division of labour in the survival of *Hydra*

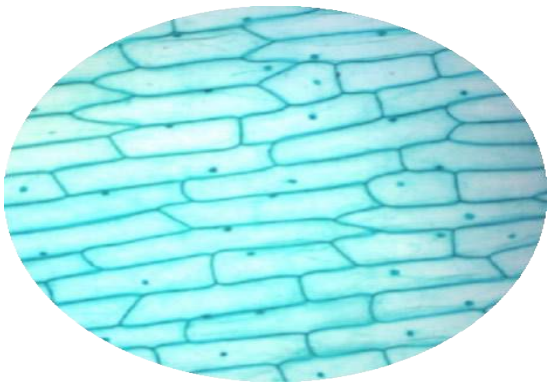
[2]

Hydra is a multicellular organism with different specialised cells performing different functions, for example the sensory cells help to detect changes in the external environment while the sting cells provide protection. [or give descriptions of functions of other cell types shown in the figure, need to give at least two]

these various cell types/tissues work together to increase effectiveness and efficiency of the organism in carrying out different processes.

Total [5]

4 The diagram below represents a simple model of a cell membrane. The direction in which oxygen, O_2, and carbon dioxide, CO_2, diffuse across the cell membrane is indicated by two arrows.



Diffusion is evidence that particles are in a constant state of random motion, which forms part of kinetic particle theory. Kinetic particle theory is a model that scientists use to describe the behaviour of matter.

a. Models help scientists understand complex ideas.
In addition to this, give one generalisation about models.

Models can be conceptual, mathematical or physical. OR
Models allow testing and prediction. OR
Models allow us to simplify complex ideas / phenomena.

[1]

b. Based upon the information given in the diagram, which side of the cell membrane has the *lower* concentration of oxygen? Explain your answer.

The inside of the cell has the lower concentration of oxygen.
Chemicals diffuse from a region of high concentration towards a region of lower concentration. Chemicals move down a concentration gradient.

[2]

c. Calculate the relative molecular masses (M_r) of oxygen, O_2, and carbon dioxide, CO_2. Show your working.

O_2 16 + 16 = 32
CO_2 12 + 16 + 16 = 44
Note questions states that students must show working. Minus one mark if the student fails to show their working.

[2]

d. Explain the effect of relative molecular mass (M_r) on the rate of diffusion of oxygen and carbon dioxide.

The greater a chemical's relative molecular mass, the more slowly it diffuses. OR
The lower / smaller a chemical's relative molecular mass, the faster / more quickly it diffuses.

[1]

e. The temperature of a healthy person is 37.0°C. A patient in hospital is suffering from a high fever of 40.5°C. Explain **how** and **why** this increase in temperature affects the rates at which oxygen and carbon dioxide diffuse across the patient's cell membranes.

The oxygen and carbon dioxide will diffuse faster / more quickly at the higher temperature.
The oxygen and carbon dioxide molecules possess more kinetic energy.

[2]

f. Apart from diffusion across cell membranes, give one more example of a phenomenon that supports the theory that particles are in a constant state of random motion.

Another example of diffusion, *e.g.* smelling perfume / coffee / food.
OR
Brownian Motion – pollen grains on the surface of water / dust or smoke in a beam of light.

[1]

g. In addition to science, describe an example from another discipline where models are used to help understand complex ideas.

Accept any reasonable and sensible idea, *e.g.* using computer models to predict the weather, using scale models of aeroplanes or cars in a wind tunnel.

[1]

[Total: 10m]