

Preface

Q&A Biology (O-Level) aims to provide a thorough revision experience for students, to apply the knowledge gained from **Complete Guide to Biology (O-Level)**.

Some important features include:

Questions: Basic knowledge recall questions and application questions are arranged topically to provide extra practice for students, to provide exposure and help boost confidence in preparation for examinations.

Answers: Comprehensive model answers with elaborate explanations are given for MCQ and open-ended questions to illustrate the standards that they should strive to adopt in the examinations.

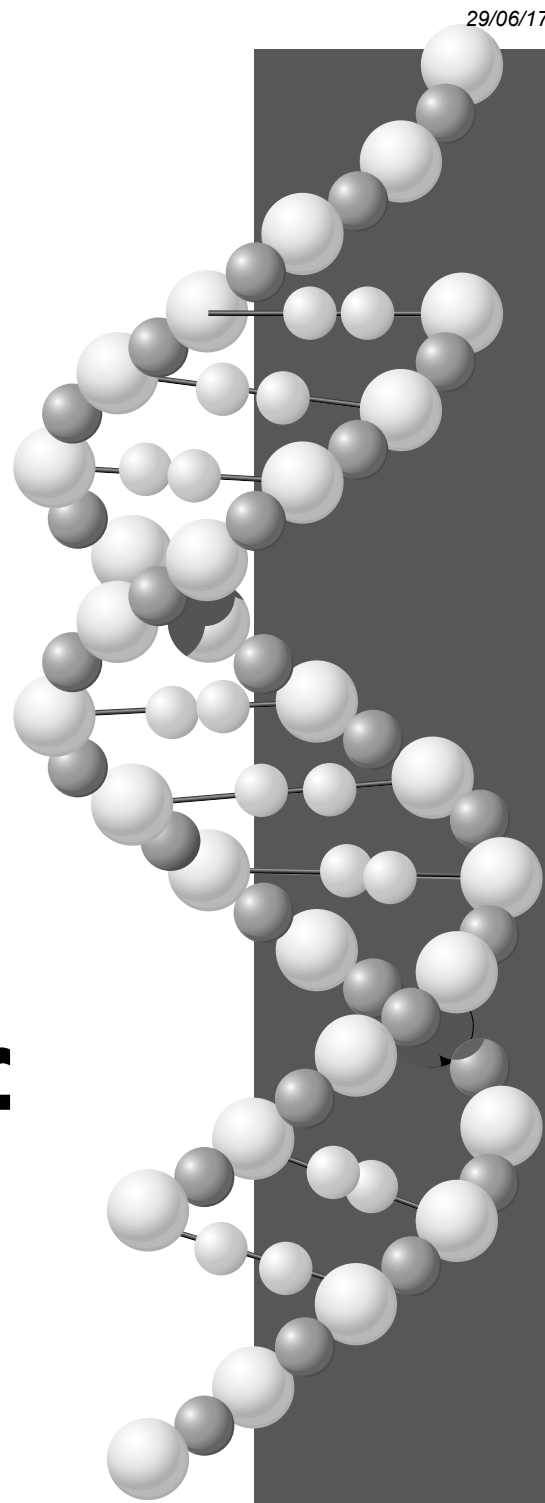
Mr.Tan Wei Xiang

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Section I

Principles of Biology



O Level Biology

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Unit 1.1

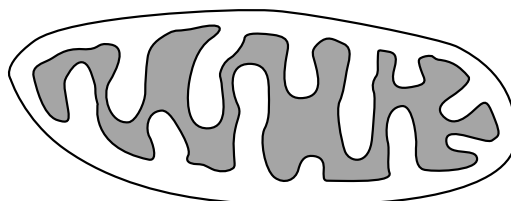
O Level Biology

Q A

Cell Structure and Organisation

Multiple Choice Questions

- 1** The figure below shows a cell structure found in a plant cell.
What is the main function of this cell structure?



- A To serve as a storage molecule
B To contain cell sap
C To make new proteins
D To produce energy

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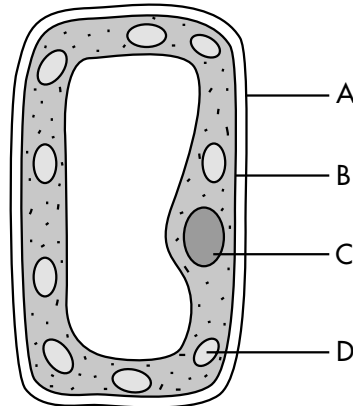
- 2** Which of these options correctly describes the features of a typical animal cell?

Legend: ✓-present ✗-absent

	cell wall	nucleus	cell surface membrane	chloroplast
A	✓	✗	✓	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✗	✗	✓

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3 Which cell structure can help to trap light energy?



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4 Which combination of structures are present in both animal cells and plant cells?

A centrioles and cytoplasm

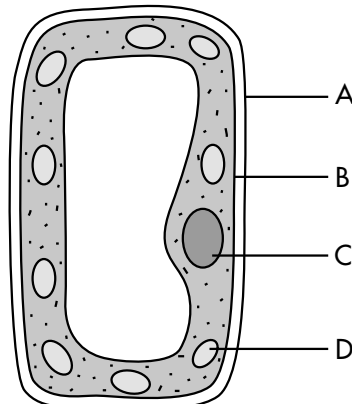
B nucleus and Golgi apparatus

C chloroplast and nucleus

D cytoplasm and sap vacuole

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5 The plant cell shown below was stained with iodine. Which cell structure will be stained blue-black?



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6 Some cellular structures are bound by a single membrane while others are bound by a double membrane. Which one of the following options is correct?

	single membrane		double membrane	
A	sap vacuole	chloroplast	mitochondrion	nucleus
B	Golgi apparatus	plasma membrane	chloroplast	mitochondrion
C	chloroplast	mitochondrion	sap vacuole	plasma membrane
D	nucleus	Golgi apparatus	chloroplast	mitochondrion

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7 The characteristics of four organelles are shown below.

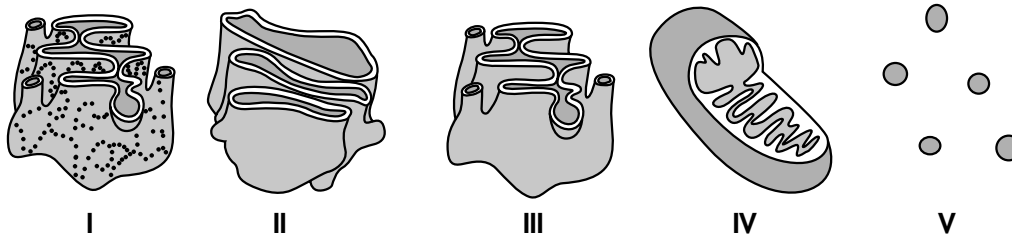
- I contains chromosomes
- II contains light trapping pigments
- III contains respiratory enzymes
- IV contains cell sap

Which of the following options correctly matches the organelles with their characteristics?

	I	II	III	IV
A	nucleus	chloroplast	mitochondrion	sap vacuole
B	chloroplast	mitochondrion	nucleus	sap vacuole
C	mitochondrion	nucleus	chloroplast	sap vacuole
D	mitochondrion	chloroplast	nucleus	chloroplast

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8 The following diagram shows five cell structures.

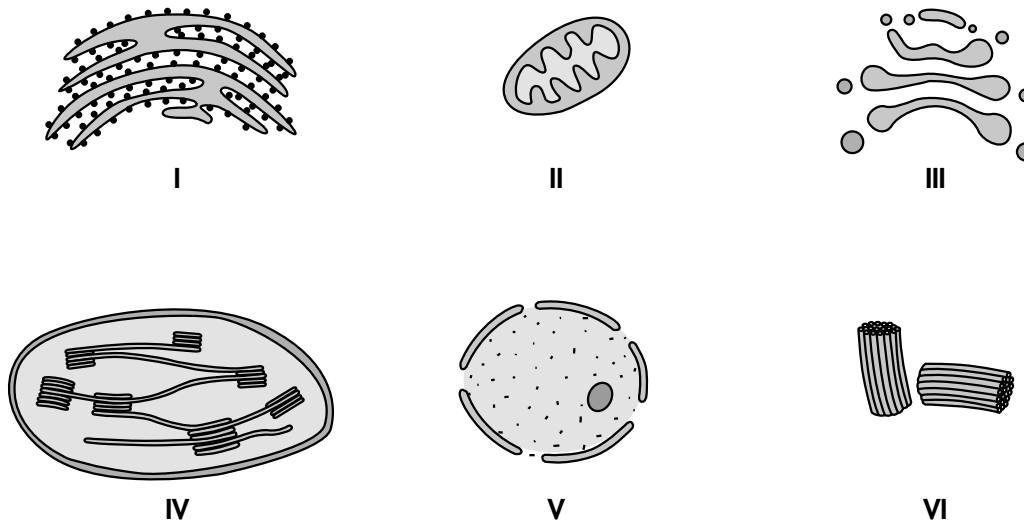


Which cell structures would be present in large quantities in a cell that is actively synthesising extracellular proteins?

- A** I and III only
- B** I, II and V
- C** I, II III and IV
- D** I, II, III and V

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9 Use the following diagram to answer Question 9 and Question 10. Six cell organelles are shown below.



What is the correct distribution of these organelles in plant and animal cells?

	Plant cells only	Animal cells only	Plant and animal cells
A	I, III	VI	II, IV, V
B	II, III	I	IV, V, VI
C	IV	VI	I, II, III, V
D	IV, VI	I, III	II, V

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10 Which organelle is correctly matched with its specific function?

	Organelle	Function
A	I	Secrete proteins out of the cell
B	IV	Carries out photosynthesis
C	V	Control the formation of spindle fibres
D	VI	Chemical modification of proteins

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- 11** Some wild plants contain toxins to deter herbivores from consuming them. In a particular species of plants, the toxin produced by the plant was toxic to the same plant when applied to the roots. To understand why the plant was not normally killed by its own toxin, a further investigation found that the toxin was contained in the largest cell structure. After the toxin was heated, it was no longer effective. The following statements were made about the toxin.

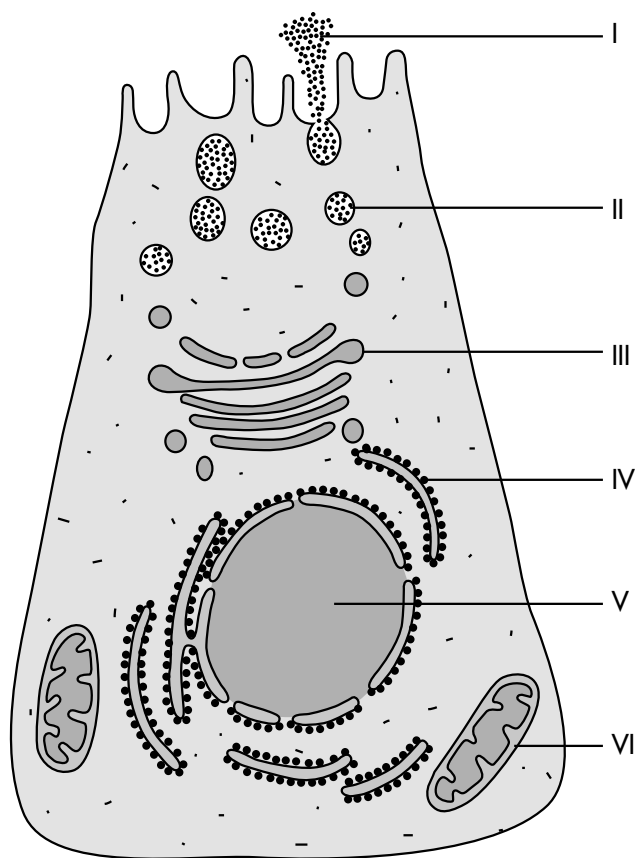
- I The toxin was stored in the chloroplast
- II The toxin may be an enzyme
- III The toxin was stored in the sap vacuole
- IV The toxin was unable to diffuse out from the place in which it is stored
- V The toxin may be lipid soluble

Which statements can be concluded from the observations?

- A I, III and V
- B II, III and IV
- C I, II and III
- D I, II, III and IV

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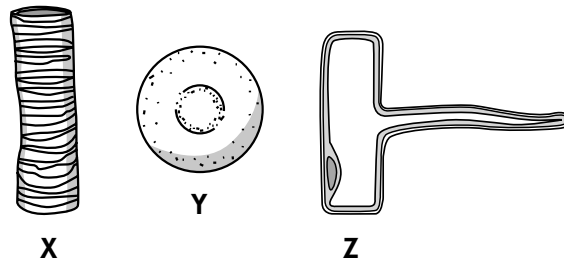
- 12** The diagram represents an electron micrograph of a secretory cell, which was incubated with radioactively labelled amino acids. Which option shows the correct sequence in which radioactivity will appear in the cell?



	Earliest → Latest
A	V → IV → II → I
B	V → IV → III → II
C	IV → III → II → I
D	VI → IV → III → II

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13 Three cells are shown below.



What is the correct identity of the three cells?

	X	Y	Z
A	muscle cell	red blood cell	root hair cell
B	xylem vessel	red blood cell	root hair cell
C	red blood cell	root hair cell	muscle cell
D	red blood cell	root hair cell	guard cell

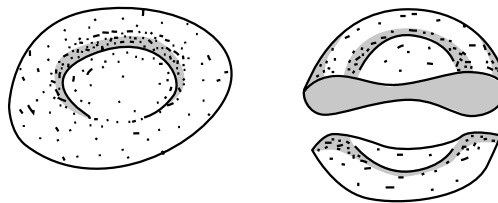
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14 Which of the following statements are false?

- A The root hair cell increases the surface area for absorbing water and mineral salts.
- B The xylem vessels are non-living as they do not contain any cytoplasm.
- C The red blood cell is unspecialised as it does not possess a nucleus.
- D The muscle cells are well adapted for movement in animals as they can undergo contraction.

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15 The figure shows the surface view and cross sectional view of a red blood cell.



Which is not a structural adaptation of the red blood cell?

- A It has a bi-concave shape to increase its surface area for diffusion of oxygen.
- B Without a nucleus, it can increase the amount of haemoglobin packed in the cell.
- C It contains haemoglobin, which can bind irreversibly with oxygen to form oxyhaemoglobin.
- D It is flexible to allow the red blood cells to squeeze through the narrow blood capillaries.

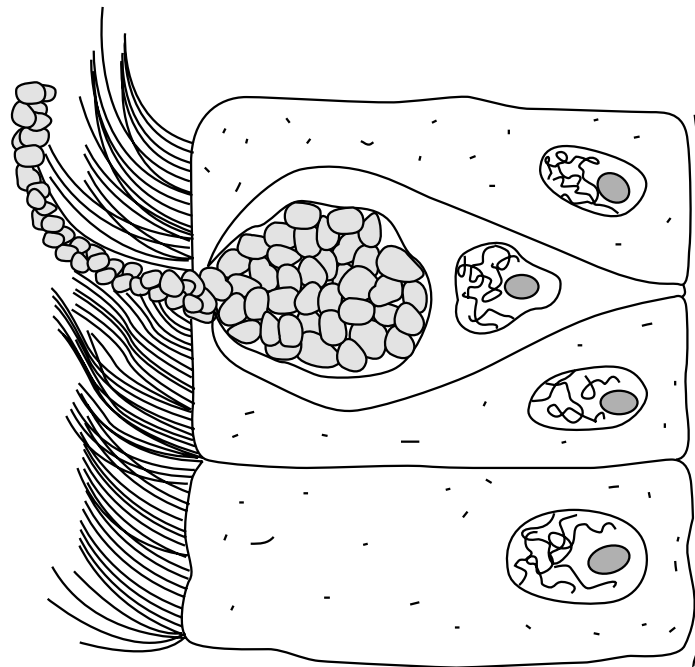
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16 Which organ is correctly paired with its organ system?

- A lungs and respiratory system
- B brain and excretory system
- C heart and respiratory system
- D eyes and reproductive system

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17 The diagram shows some ciliated cells from the respiratory tract in human beings.

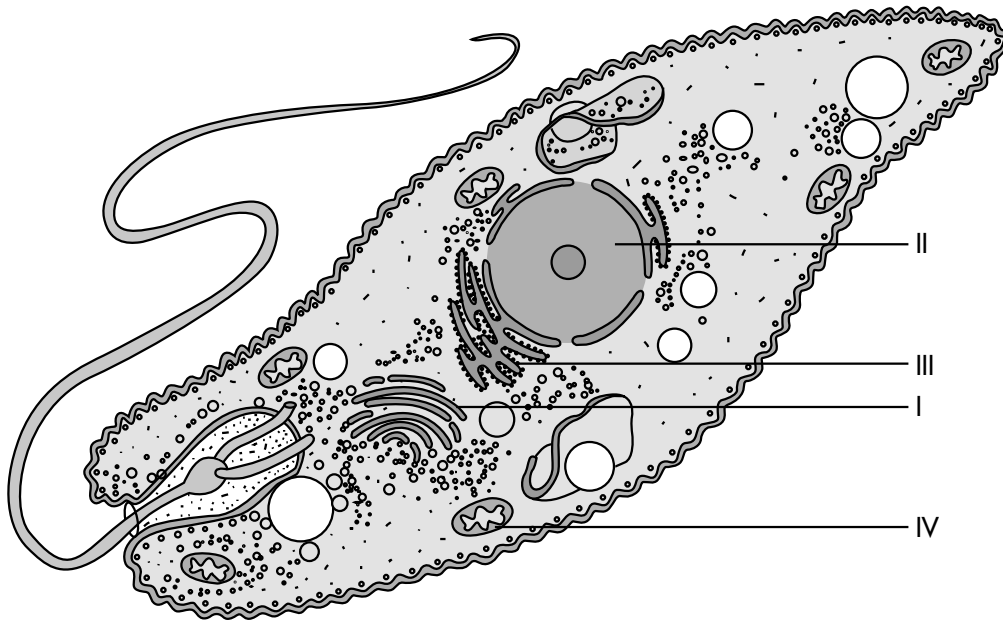


What is the function of the cilia?

- A protect the epithelial cells from the inhaled air.
- B increase surface area for the absorption of oxygen.
- C produce sweeping movements to remove excess mucus.
- D provide structural support and stabilise the respiratory tract.

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18 A unicellular organism is shown in the diagram.



Several statements were made about the labelled parts.

- I Rough ER produces proteins
- II Nucleus contains DNA as the hereditary material
- III Golgi apparatus carries out chemical modification
- IV Mitochondrion helps to synthesise energy

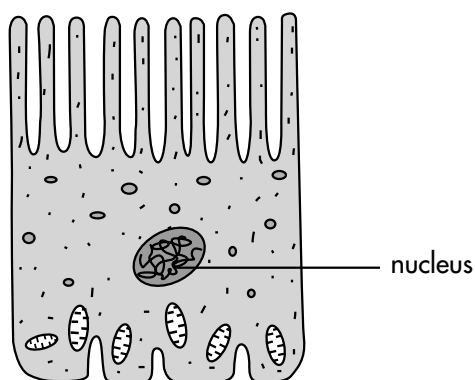
Which statements are correct?

- A I and III
- C I, II and IV

- B II and IV
- D I, II, III and IV

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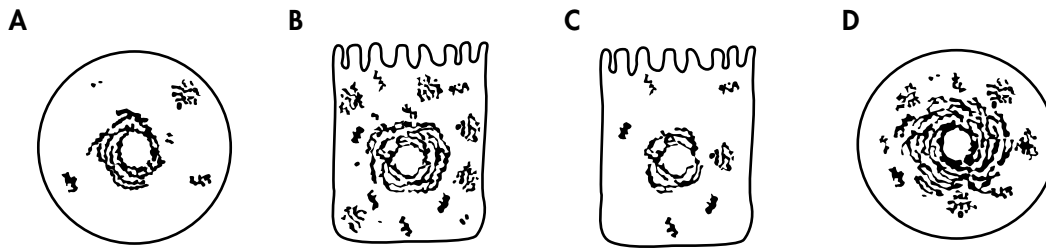
19 A cell was isolated from an organism and viewed under a light microscope. Identify the type of cell and its most likely function.



	Type of cell	Function
A	Animal	Absorption of substances
B	Animal	Storage of substances
C	Plant	Absorption of mineral salts
D	Plant	Respiration

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- 20** Four specialised cells are shown below. Which cell is the best adapted for absorbing substances and synthesising proteins?



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Structured and Free Response Questions

- 1** Figure 1 shows a unicellular organism that was recently discovered.

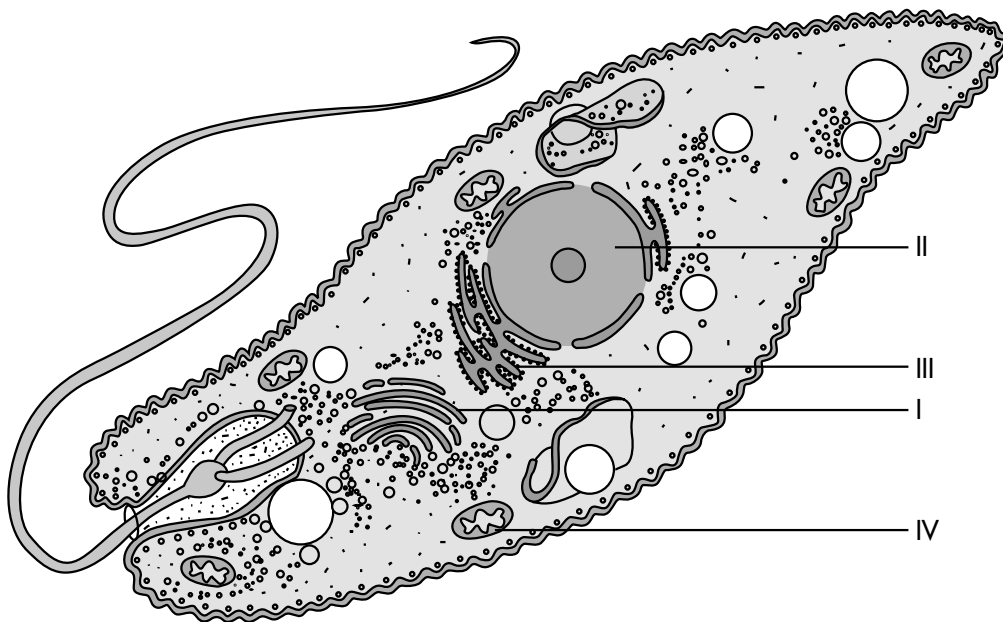


Figure 1

- (a) (i) Identify structures I, II, III and IV. [2 marks]
 (ii) Explain the function of structure IV. [2 marks]
 (iii) With reference to **Figure 1**, explain whether the unicellular organism is a plant cell or an animal cell. [2 marks]

The organism lives in fresh water.

- (b) Explain the effects of putting the organism into salt water. [3 marks]

[Total: 9 marks]