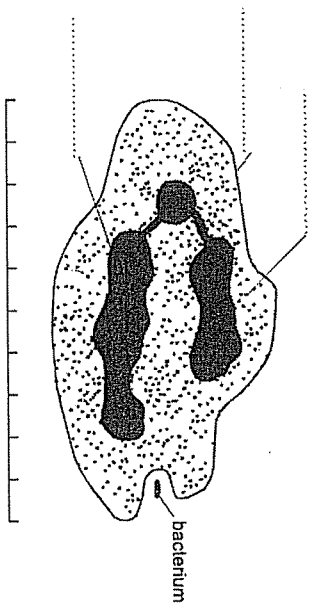


Cells and cell structure and dissolved substances

1. The drawing shows a white blood cell ingesting a bacterium.



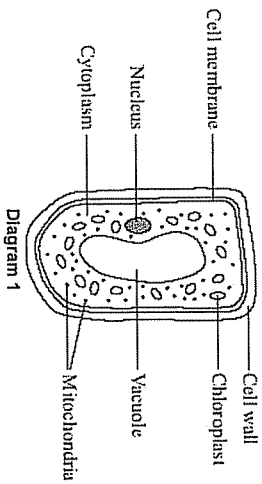
- (i) Use words from the list to label the parts of the white blood cell.  
cell membrane    cell wall    cytoplasm    nucleus    vacuole

- (ii) The scale shows that the white blood cell is 10 micrometres long.  
How long is the bacterium? Show your working.

..... micrometres

(Total 5 marks)

2. Diagram 1 shows a cell from a leaf.



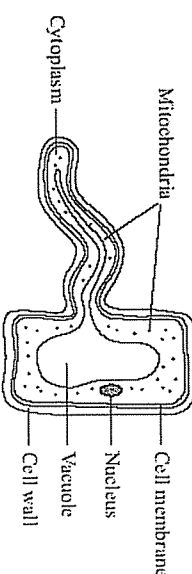
- (a) How is the leaf cell specialised to carry out photosynthesis?

Tick (✓) one box.

- It has a permanent vacuole.
- It has many chloroplasts.
- It has cytoplasm.
- It has many mitochondria.

(1)

- (b) Diagram 2 shows another type of plant cell.

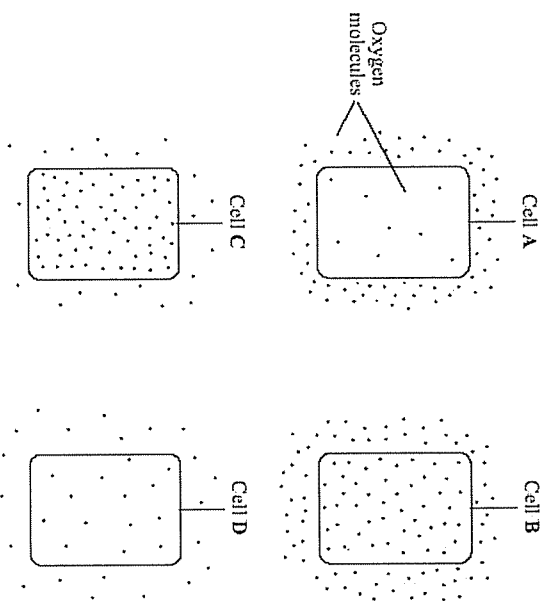


Give two ways in which this cell is different from an animal cell.

- 1 .....  
2 .....

(Total 3 marks)

3. (a) The diagrams show cells containing and surrounded by oxygen molecules. Oxygen can move into cells or out of cells.



Into which cell, A, B, C or D, will oxygen move the fastest?

Write your answer, A, B, C or D, in the box.

(1)

- (b) Draw a ring around the correct word to complete each sentence.

(i) Oxygen is taken into cells by the process of diffusion  
osmosis  
respiration

(1)

(ii) Cells need oxygen for breathing  
photosynthesis  
respiration

(1)

(iii) The parts of cells that use up the most oxygen are the membranes  
mitochondria  
nuclei

(1)

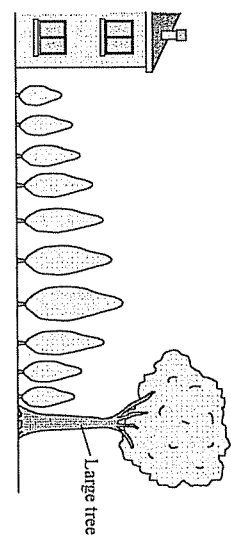
(iv) Some cells produce oxygen in the process of diffusion  
photosynthesis  
respiration

(1)

(Total 5 marks)

Photosynthesis

1. The diagram shows bushes in a hedge growing near to a house. The bushes were the same species and the same age.



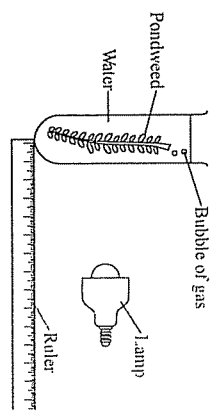
- (a) (i) The student said, "I have noticed that the short bushes grow next to the house. I think that the more light the bushes get, the faster they will grow."

Draw lines to match each of the student's statements to the correct term.  
Draw only two lines.

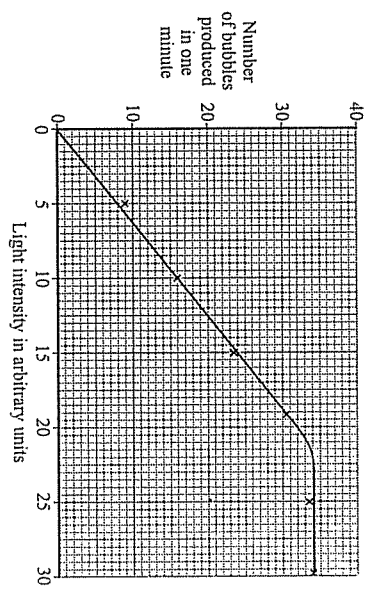
Statement	Term
The short bushes grow next to the house.	A conclusion
Plants will grow faster if they get more light.	A prediction
An observation	

- (ii) Complete the word equation for photosynthesis.  
..... + water (+ light energy) → ..... + oxygen

- (b) The student decided to investigate the effect of light intensity on the rate of photosynthesis. She used the apparatus shown in the diagram. She measured the rate of photosynthesis by counting the number of gas bubbles given off each minute.



- (i) Suggest how the student varied the intensity of the light received by the pondweed. (1)
- (ii) The student's results are shown on the graph. (1)



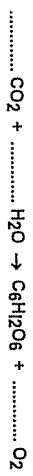
- Describe the pattern shown on the graph. (1)
- (iii) This is what the student wrote for her conclusion. "Increasing the light intensity increases the rate of photosynthesis of the pondweed." Why was her conclusion incomplete? (2)

(Total 8 marks)

7 Progress check

Unit B2, B2.3.1

2. (a) Balance the following equation for photosynthesis.



(1)

(b) Give two conditions necessary for photosynthesis apart from a suitable temperature range and the availability of water and carbon dioxide.

1. ....

2. ....

(2)

(a) Plants have leaves which contain guard cells and palisade cells. Explain how each of these kinds of cell assists photosynthesis.

Guard cells .....

.....

.....

.....

Palisade cells .....

.....

.....

.....

(2)

(d) Glucose is a product of photosynthesis. Give three uses which green plants make of glucose.

1. ....

2. ....

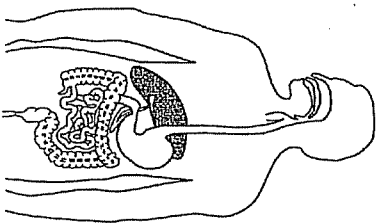
3. ....

(2)

(Total 10 marks) (3)

Enzymes

1. The diagram shows the digestive system.



(a) Complete the following sentences about digestive enzymes.

(i) Amylase works in the ..... where it is involved in the digestion of ..... to .....

(3)

(ii) Lipase works in the ..... where it is involved in the digestion of ..... to .....

(3)

(b) Which gland produces:

(i) amylase: .....

(1)

(ii) lipase? .....

(1)

(Total 8 marks)

2. Enzymes have many uses in the home and in industry.

(a) Which type of organism is used to produce these enzymes?

Tick (✓) one box.

Mammals

Microorganisms

Plants

(1)

(b) Babies may have difficulty digesting proteins in their food. Baby food manufacturers use enzymes to 'pre-digest' the protein in baby food to overcome this difficulty.

Use words from the box to complete the sentences.

amino acids	amylases	proteases	sugars
-------------	----------	-----------	--------

(i) Proteins are 'pre-digested' using enzymes called .....

(1)

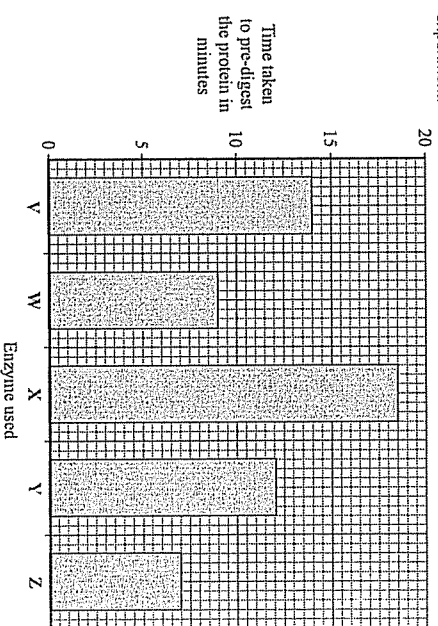
(ii) This pre-digestion produces .....

(1)

(2)  
(Total 8 marks)

(c) A baby food manufacturer uses enzyme V to pre-digest protein. He tries four new enzymes, W, X, Y and Z, to see if he can reduce the time taken to pre-digest the protein.

The graph shows the time taken for the enzymes to completely pre-digest the protein. The manufacturer uses the same concentration of enzyme and the same mass of protein in each experiment.



(i) How long did it take enzyme V to pre-digest the protein?  minutes

(1)

(ii) Which enzyme would you advise the baby food manufacturer to use? Draw a ring around your answer:

enzyme V   enzyme W   enzyme X   enzyme Y   enzyme Z

Give a reason for your answer.

.....  
.....

(2)

(iii) Give two factors which should be controlled in the baby food manufacturer's investigations.

Tick (✓) two boxes.

Oxygen concentration

Temperature

Light intensity

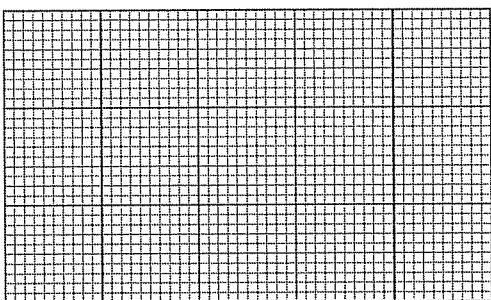
pH

(2)  
(Total 8 marks)

Anaerobic respiration

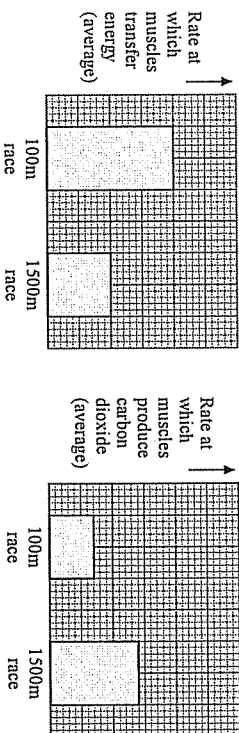
1. (a) The table shows an athlete's breathing rate after the end of a race. Use the information shown in the table to draw a line graph.

Time after end of race (minutes)	Breathing rate (litres per second)
0	4
1	2
2	1
3	1
4	1
5	1



(3)

- (b) The bar charts show what happens in an athlete's muscles when running in two races of different distances.



- (i) Compare what happens in the athlete's muscles when running in the two races.

(3)

- (ii) Use the information in the box to explain your answer to (i).

aerobic respiration    glucose + oxygen → carbon dioxide + water  
anaerobic respiration    glucose → lactic acid

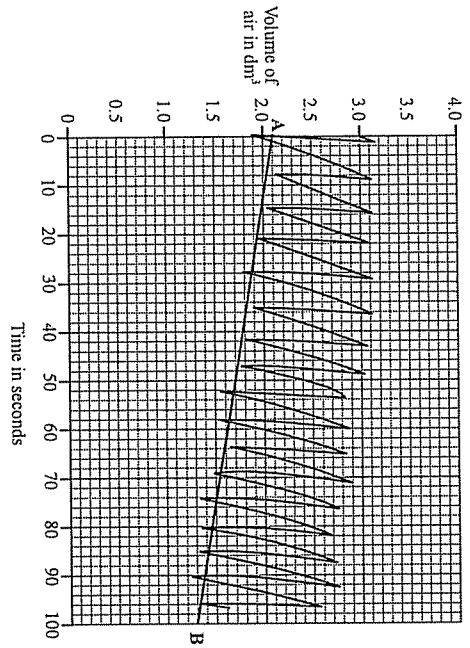
- (c) Explain why the athlete breathes at a faster rate than normal for two minutes after finishing a 100 metres race.

.....  
.....  
.....  
.....

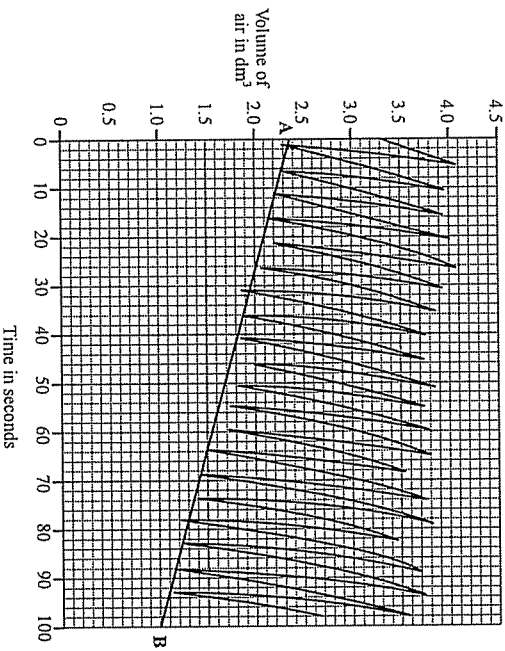
(2)

(Total 10 marks)

2. A student's breathing was monitored before and after vigorous exercise. The student breathed in and out through a special apparatus. The graphs show the changes in the volume of air inside the apparatus. Each time the student breathed in, the line on the graph dropped. Each time the student breathed out, the line went up.



Before exercise



After exercise

- (a) How many times did the student breathe in per minute:  
before exercise: .....  
after exercise? ..... (1)

- (b) On each graph, the line A – B shows how much oxygen was used. The rate of oxygen use before exercise was 0.5 dm<sup>3</sup> per minute. Calculate the rate of oxygen use after exercise.  
.....  
.....

- Rate of oxygen use after exercise = ..... dm<sup>3</sup> per minute (2)

- (c) The breathing rate and the amount of oxygen used were still higher after exercise, even though the student sat down to rest. Why were they still higher?  
.....  
.....  
.....  
.....  
.....  
.....

(Total 7 marks)