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BIOLOGY-0610/31, 32, 33
TOPIC-CHEMICALS OF CELL

1 Fig. 1.1 shows an animal cell.

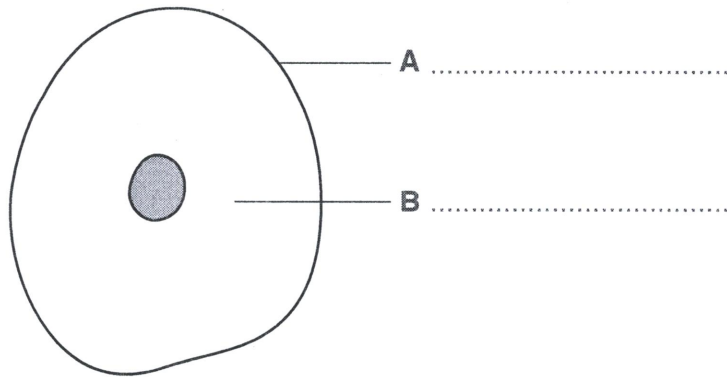


Fig. 1.1

(a) (i) Name the features labelled **A** and **B**.

Write your answers on Fig. 1.1.

[2]

(ii) The nucleus of living cells contains genetic material.

Name the **chemical** that this genetic material is made from.

.....[1]

(b) The cell in Fig. 1.1 carries out aerobic respiration.

Name **one** chemical that diffuses into an animal cell and one chemical that diffuses out of a cell during aerobic respiration.

chemical that diffuses in

chemical that diffuses out

[2]

(c) The process of active transport occurs in some cells.

Outline **one** way in which diffusion is different to active transport.

.....

.....[1]

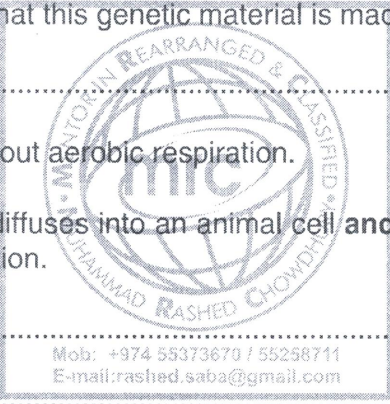


Fig. 1.2 shows a cell from the palisade mesophyll layer of a leaf.

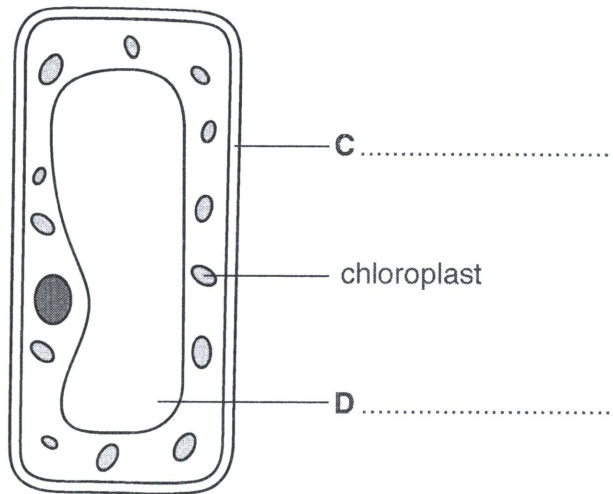


Fig. 1.2

(d) (i) Name the features labelled **C** and **D**.

Write your answers on Fig. 1.2.

[2]

(ii) Name the process carried out by the chloroplasts and explain why all animal life depends on this process.

name of process

explanation

.....

.....

.....

.....

.....

.....

.....

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.....

.....

[5]

[Total: 13]

- (b) The ratio of the surface area to the volume of a cell affects the rate of diffusion of a substance into the cell.

The results of an investigation on diffusion into a cube-shaped cell are shown in Table 9.1.

- (i) Complete Table 9.1. One of the rows has been done for you.

Table 9.1

length of side of cube /mm	time taken for substance to diffuse to centre of cell /s	surface area of cube /mm ² (total of 6 sides)	volume of cube /mm ³	surface area to volume ratio
1	20	6	1	6:1
2	41			
3	76			

[2]

- (ii) Suggest how surface area to volume ratio affects the efficiency of diffusion.

.....

.....

.....[1]

- (c) Explain **one** way that the lungs of a mammal are adapted to increase the rate of diffusion of oxygen from the alveoli to the blood.

.....

.....

.....

.....[2]

[Total: 8]

3 (a) Define *diffusion*.

.....

.....

.....

..... [2]

(b) Fig. 3.1 shows an apparatus that was used to investigate the effect of concentration of a chemical on the rate of diffusion.

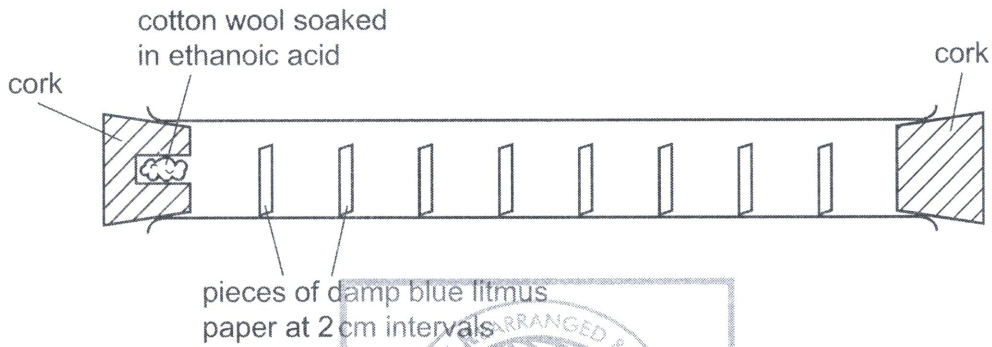
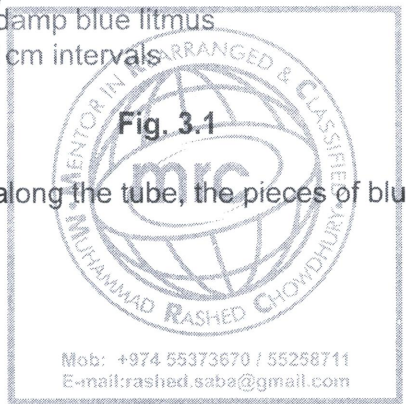


Fig. 3.1

As ethanoic acid diffused along the tube, the pieces of blue litmus paper turned red.



Two different samples of ethanoic acid, **A** and **B**, were used in this apparatus. The two samples had different concentrations. The results are shown in Fig. 3.2.

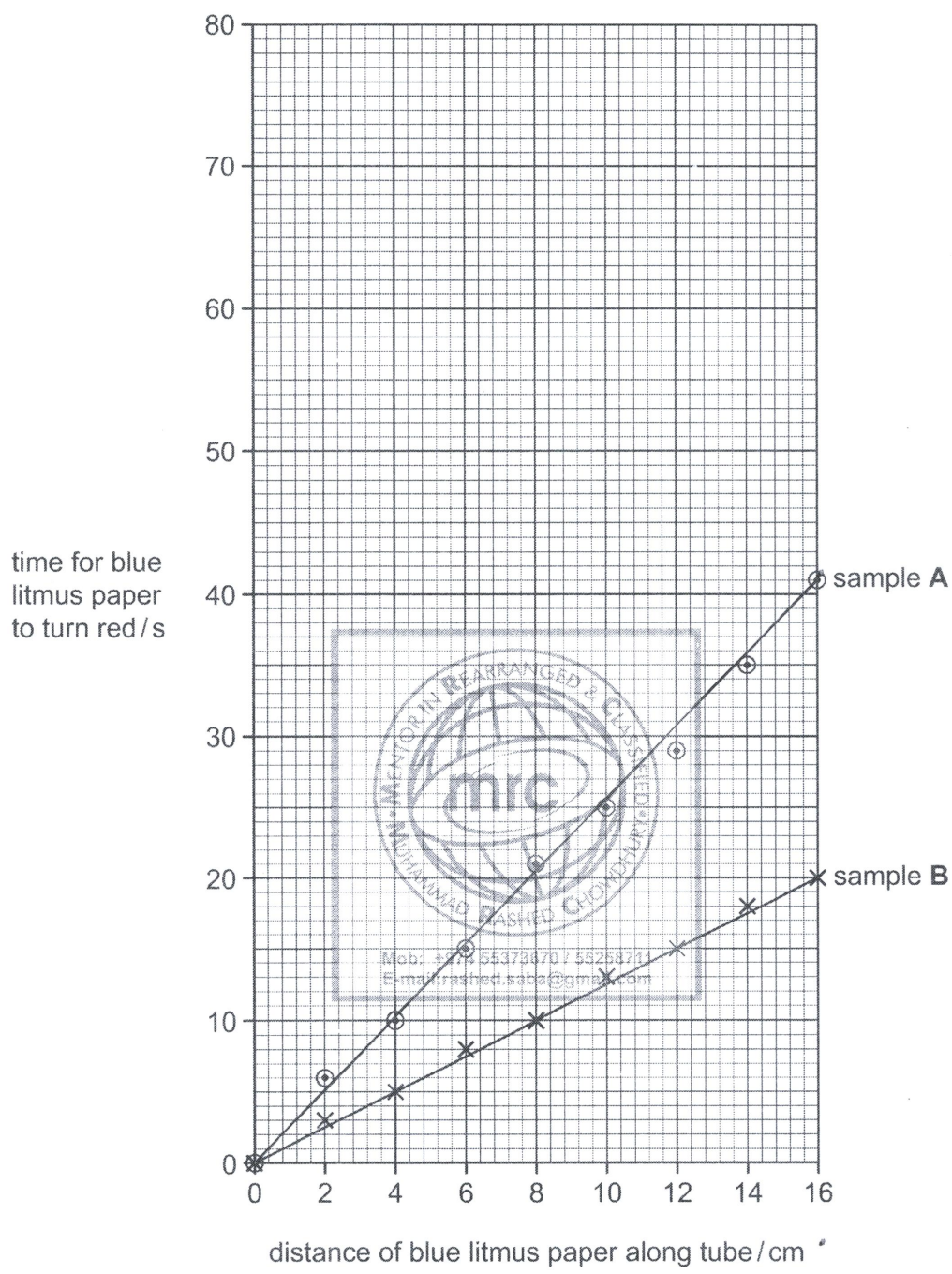


Fig. 3.2

Table 3.1 shows the results for a third sample, **C**, of ethanoic acid.

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Table 3.1

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distance of blue litmus paper along tube / cm	time for blue litmus paper to turn red / s
2	9
4	18
6	28
8	35
10	45
12	55
14	63
16	72

(i) Complete Fig. 3.2 by plotting the results shown in Table 3.1.

Plot the results shown in Table 3.1 on the grid, Fig. 3.2, on page 6. [3]

(ii) State which sample of ethanoic acid, A, B or C, took the longest time to travel 8 cm along the tube.

..... [1]

(iii) State and explain which sample of ethanoic acid was the most concentrated.

.....

.....

.....

..... [2]

(c) Substances can enter and leave cells by either diffusion or by osmosis.

State two ways in which osmosis differs from diffusion.

1

.....

2

..... [2]

[Total: 10]

(c) Materials can enter the cells shown in Fig. 4.1 by diffusion and osmosis.

(i) Define *diffusion*.

.....
.....
.....[2]

(ii) Describe how osmosis differs from diffusion.

.....
.....
.....
.....[2]

[Total : 11]



5 This question is about the movement of substances into and out of cells.

N-V-3

(a) Draw one straight line from each box on the left to join it with the box containing the correct description on the right.

how substances pass into and out of cells

description

active transport

the movement of water through a partially permeable membrane

the exchange of one kind of particle for another through a partially permeable membrane

diffusion



the net movement of particles from a region of their higher concentration to a region of their lower concentration down a concentration gradient

osmosis

the movement of particles through a cell membrane from a region of lower concentration to a region of higher concentration using energy

[3]

(b) (i) The contents of a meal must be digested before they can be absorbed.

State the two types of digestion.

1

2

[1]

(ii) The body uses enzymes to digest food.

Define the term *enzyme*.

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

[2]

(iii) Give **one** example of a digestive enzyme and the substrate it acts on.

enzyme

substrate

[1]

(iv) Suggest why the human digestive system must make many different enzymes.

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

[2]

[Total: 9]



0 7(a) Proteins are digested in the stomach and small intestine.

(i) Which type of enzyme breaks down proteins?

..... [1]

(ii) State how the conditions necessary for the digestion of proteins in the stomach are different from those in the small intestine.

.....
..... [1]

(b) When carbohydrates have been digested, excess glucose is stored.

(i) Where is it stored?

..... [1]

(ii) What is it stored as?

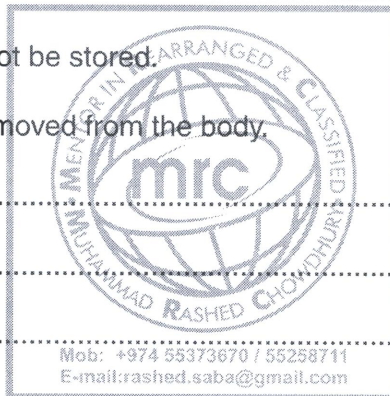
..... [1]

(c) Excess amino acids cannot be stored.

Describe how they are removed from the body.

.....
.....
.....
.....
.....
.....
..... [4]

[Total : 8]



8 (a) Define *diffusion*.

.....

.....

.....[2]

(b) Fig. 8.1 shows an apparatus that was set up to investigate diffusion.

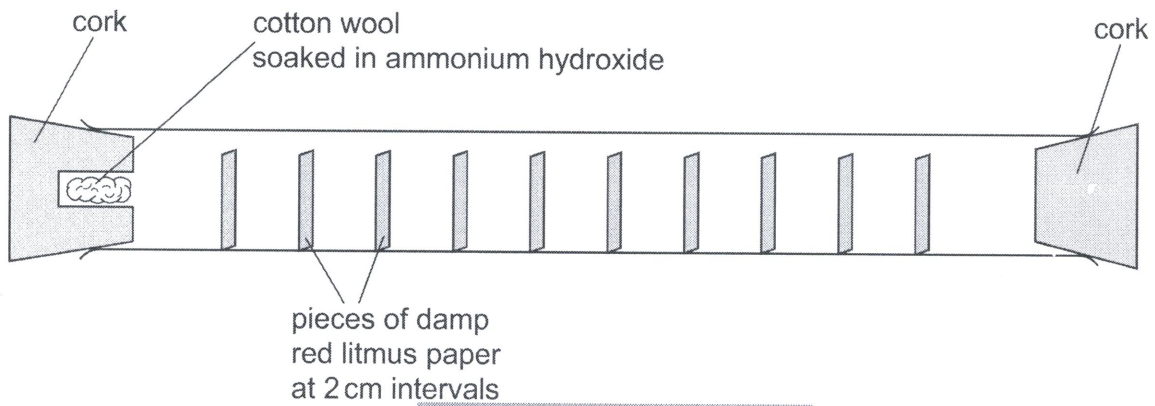


Fig. 8.1

Question 8 continues on page 14.

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Fig. 8.2 shows the results for two samples of ammonium hydroxide that were investigated.

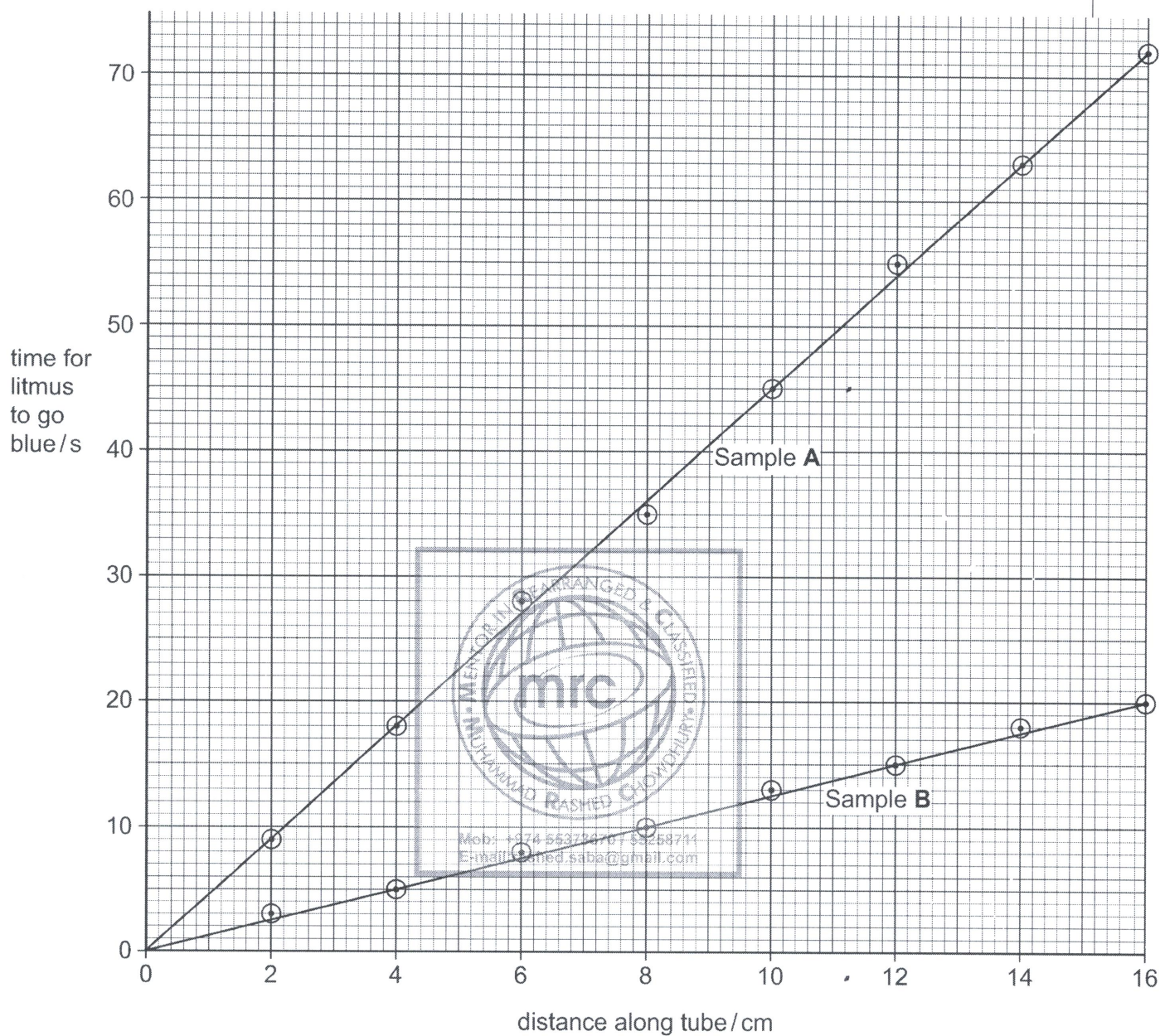


Fig. 8.2

Table 8.1 gives data for a third sample, **C**, of ammonium hydroxide that was investigated.

Table 8.1

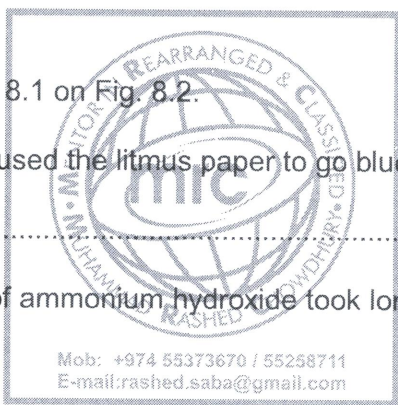
distance of red litmus paper along tube / cm	time for red litmus paper to go blue / s
2	6
4	10
6	15
8	21
10	25
12	29
14	35
16	41

(i) Plot the data in Table 8.1 on Fig. 8.2. [3]

(ii) Suggest what has caused the litmus paper to go blue.
.....[1]

(iii) State which sample of ammonium hydroxide took longest to travel 10 cm along the tube.
.....[1]

(iv) What can you suggest about the concentration of sample **C**? Explain your answer.
.....
.....
.....[2]



(c) Fig. 8.3 shows an alveolus and an associated blood capillary.

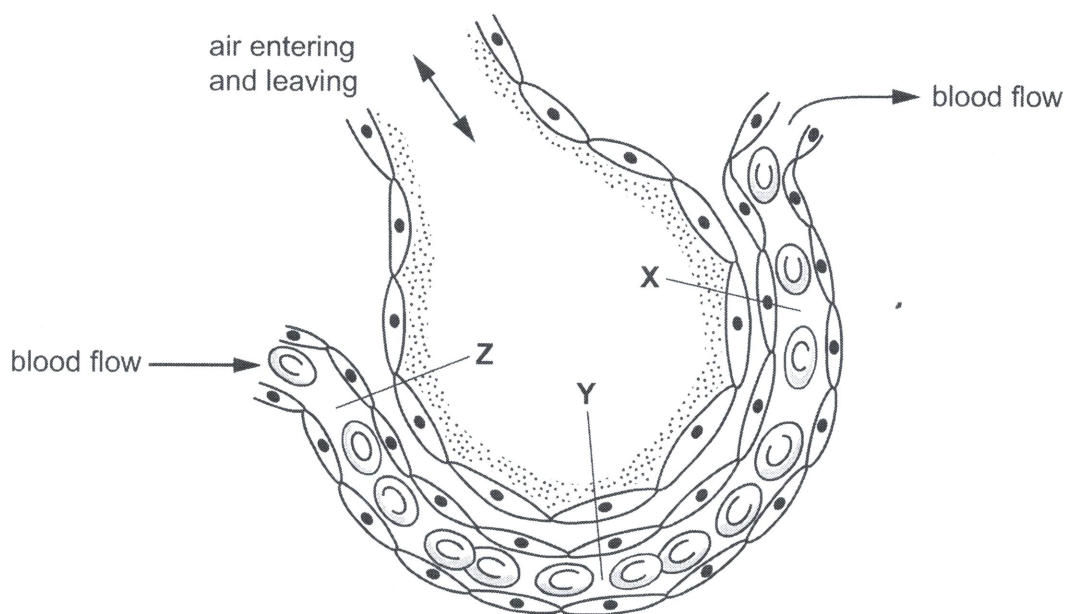


Fig. 8.3

- (i) Suggest at which point, X, Y or Z, the rate of diffusion of carbon dioxide will be highest.

.....
.....[1]

- (ii) The bronchi and bronchioles are lined with ciliated epithelium tissue and a thin layer of mucus. Describe the role of the cilia and mucus.

.....
.....
.....[2]

[Total: 12]

9 (a) (i) Define *osmosis*.

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

[3]

(ii) Osmosis is considered by many scientists to be a form of diffusion.

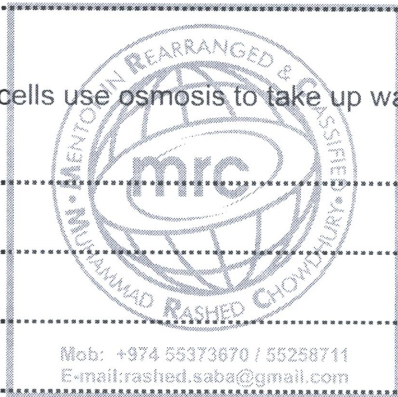
Suggest two ways in which diffusion is different from osmosis.

1.
.....
2.
.....

[2]

(b) (i) Explain how root hair cells use osmosis to take up water.

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



[2]

(ii) The land on which a cereal crop is growing is flooded by sea water.

Suggest the effect sea water could have on the cereal plants.

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

[4]

[Total: 11]

N(9)

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10 (a) Fig. 9.1 shows a root hair cell.

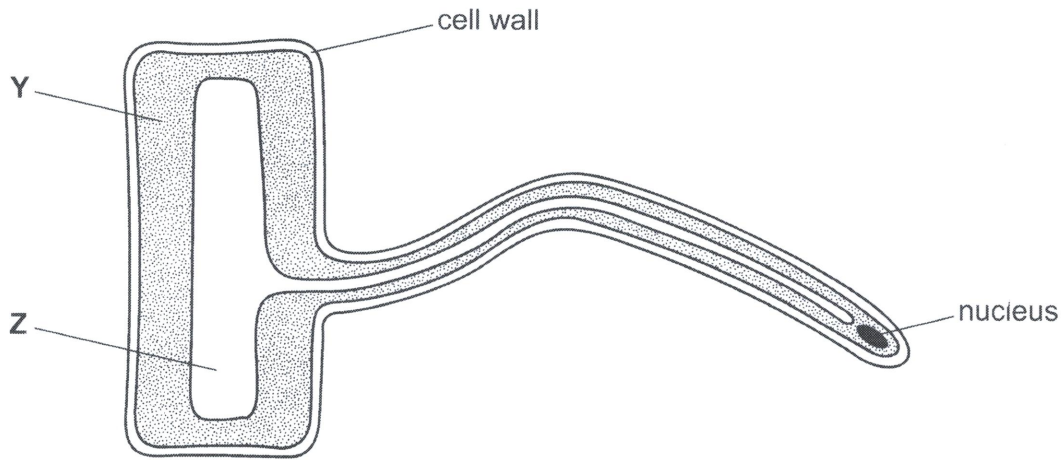


Fig. 9.1

(i) Name the following parts of the cell.

Y

Z [2]

(ii) The function of this cell is to absorb water and mineral ions from the soil.

Describe **one** feature shown in the diagram, that is an adaptation for this function.

.....

..... [1]

(iii) State two features of this plant cell that would **not** be present in a typical animal cell, such as a liver cell.

1.

.....

2.

..... [2]

(b) (i) State what is meant by the term *osmosis*.

.....

.....

.....

..... [3]

1 1 There are many people in the world who are not able to digest lactose, a sugar in milk produced by cows, goats and sheep. These people do not make the enzyme lactase that breaks down lactose in the small intestine.

(a) Describe what is meant by the term *enzyme*.

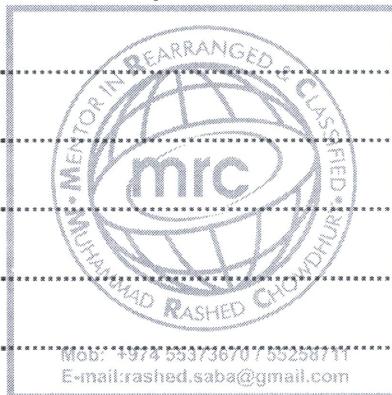
.....
.....
.....
..... [2]

(b) People who cannot digest lactose sometimes drink a liquid containing the enzyme lactase before they eat food containing milk products.

The aim of this treatment is to digest any lactose in the food, but it is not likely to be successful.

Suggest why this treatment is **not** likely to be successful.

.....
.....
.....
.....
.....
.....
.....
..... [3]



[Total: 5]