Name: ( )	Class: Sec _____	Date: _____

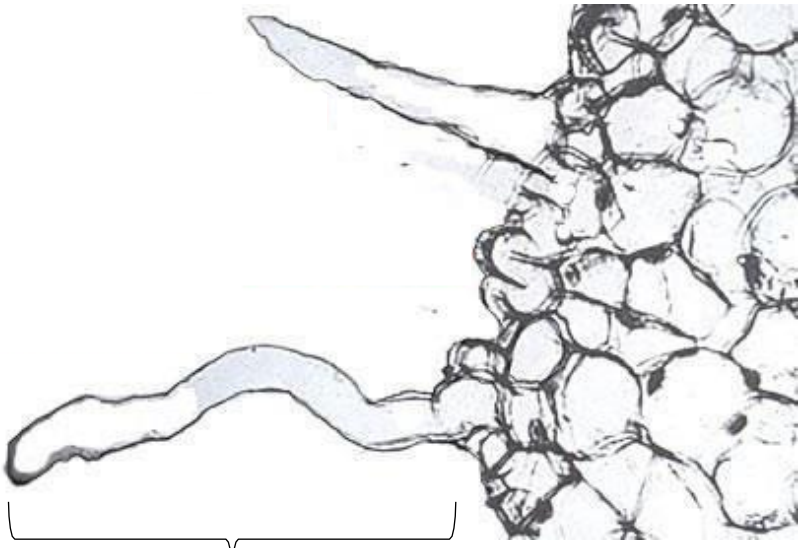
PASIR RIS CREST SECONDARY SCHOOL
SCIENCE(BIOLOGY)
HOLIDAY HOMEWORK

Topics: Cells, Movement of Substances, Biological Molecules and Enzymes

MCQ (5 marks)
Write your answers in the spaces provided.

1.	2.	3.	4.	5.

1 The diagram shows a photomicrograph of a root of a plant.
(can refer to textbook Page 23)



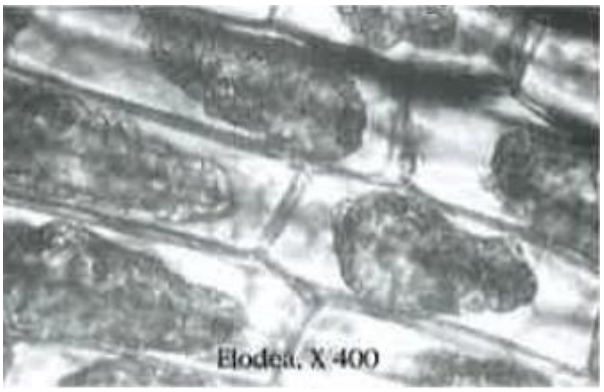
What is the function of structure Z?

A allows for faster absorption of water and mineral salts
B provides more space for storage of substances
C transport of water and mineral salts in the plant
D traps light to carry out photosynthesis

2 Which of the following statements is NOT true of a human red blood cell?
(*can refer to textbook page 23)*

A A human red blood cell has a biconcave shape.
B A human red blood cell contains haemoglobin.
C A human red blood cell contains a nucleus.
D A human red blood cell transports oxygen.

3 The diagram below shows the plant cells found in Elodea, a fully submerged water plant.



What is the appearance of the cells shown in Figure 1.2?
(can *refer to textbook page 36, 37)*

A Burst.

B Crenated.

C Plasmolysed.

D Turgid.

4 What is the basic unit of an enzyme?
(*can refer to textbook page 59, 68)*

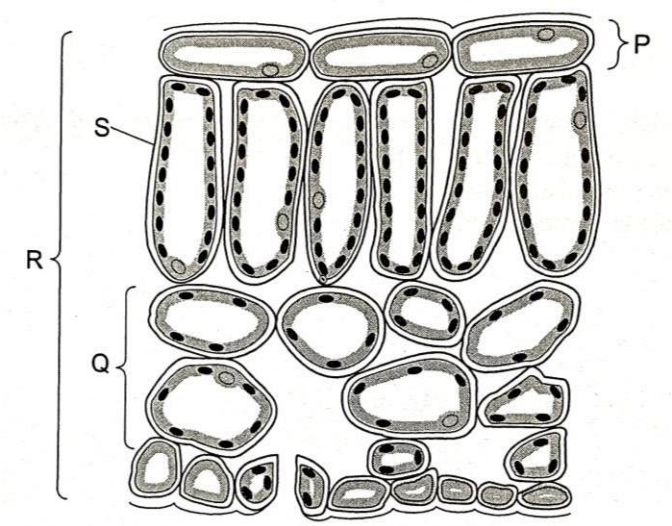
A amino acids

B fatty acids

C glucose

D glycerol

5 The diagram shows a section through a leaf.

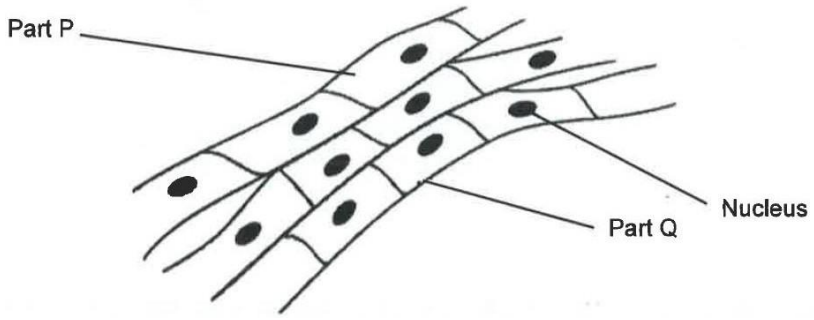


Which is a cell, tissue and organ respectively?
(can refer to textbook pages 24, 25)

	cell	tissue	organ
A	P	Q	R
B	P	S	Q
C	S	Q	R
D	S	P	Q

Structured Questions

1 The diagram below shows some muscle cells in the human body.



(a) Label the structures labeled P and Q.

P: …… Q: …… [1]

(b) State two structures that are present in plant cells and not in muscle cells.

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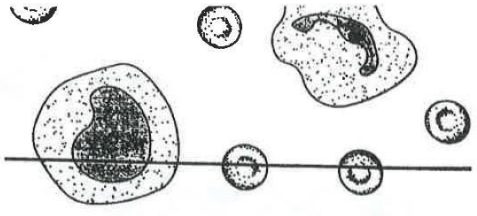
…….. [2]

2 The diagram below shows a sample of blood taken from a patient and observed under a light microscope.



(a) How many red blood cells are touching the line shown in the diagram.

…….. [1]

(b) Based on observable features in the diagram, describe and explain one way in which a red blood cell is adapted for its function.

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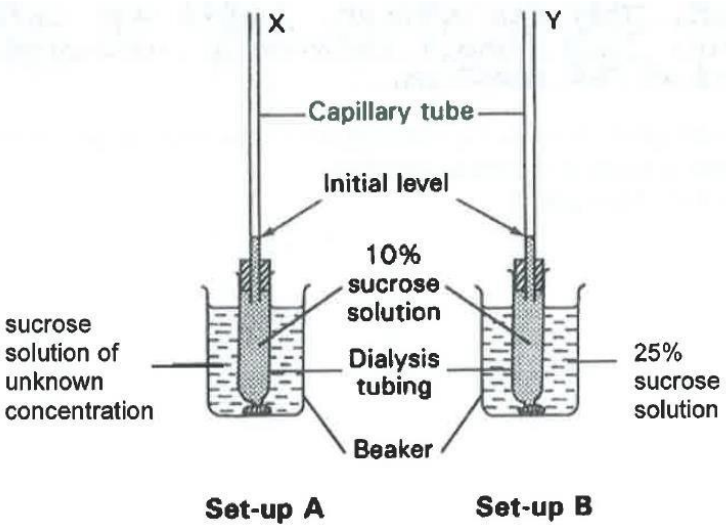
……..

…….. [2]

3 The diagram below shows an experimental set-up in an investigation into the effects of osmosis.



(a) Predict what will happen to the level of sucrose solution in capillary tube Y after an hour.

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…….. [1]

(b) Explain your answer in (a).

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……..

…….. [2]

(c) The level of sucrose solution in capillary tube X remained the same.

Suggest and explain the concentration of sucrose solution in the dialysis tubing in set-up A.

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…….. [3]

4 Ah Seng wanted to make a saltwater pond in his gardens. In it he added both water plants and fishes. The saltwater pond was made up of 65% saltwater solution.

(a) After one day, he noticed that the water plants have wilted.

Explain his observations.

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…….. [3]

(b) Draw the appearance of a cell of the wilted plant as seen under a light microscope. Label all parts of the cell.

[4]

5 A student cut six pieces of potato into cubes and weighed each piece. He then placed each piece of potato into different concentrations of sugar solutions for one hour. Sugar molecules are unable to pass through the partially permeable cell membrane.

At the end of one hour, he reweighed each piece of potato and calculated the change in mass for each piece of potato. His results are shown in Table 5.1.

Table 5.1

concentration of sugar solution / mol per dm^3	mass of potato		Percentage change in mass / %
	start	finish	
0.20	8.42	9.18	+9.0
0.30	8.15	8.68	+6.5
0.40	8.30	8.48	+2.2
0.50	8.62	8.31	-3.6
0.60	8.38	7.83	-6.6
0.70	8.22	7.53	

(a) Explain why the mass of some potato pieces increased.

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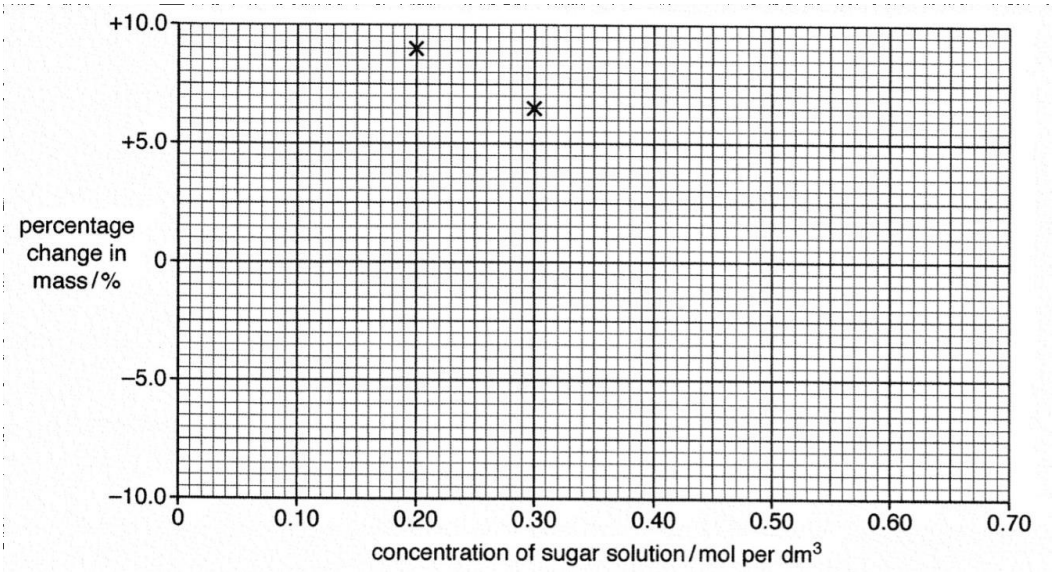
……... [2]

(b) Calculate the percentage change in mass of the potato piece that was placed in 0.70 mol dm^{-3} sucrose solution.

percentage change in mass: ……. [2]

(c) On the grid below, two points have been plotted for you.

On the same grid,
(i) plot the other four points, and
(ii) draw a line of best fit.



(d) (i) Based on the graph above, deduce the concentration of sugar present in the cytoplasm of the potato cell.

…… [1]

(ii) Explain your answer in (d)(i).

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…… [2]

	Checklist for graph drawing	Tick
1	Did you use an appropriate scale? (so your graph occupies 2/3 of space)	
2	Have you labeled the axis correctly? *(X is independent variable)*	
3	Have you labelled your axis?	
4	Did you include the units?	
5	Did you plot points using an 'x' using a pencil?	
6	Did you draw a line of best fit?	
7	Did you ensure that you did not extrapolate your line/curve?	
8	Did you circle anomalous results (if any)	

6 (a) Define the term *enzyme*.

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……

…… [3]

(b) The following equation describes the breakdown of starch into maltose.

$$\text{starch} \xrightarrow{\text{amylase}} \text{maltose}$$

State which molecule is the

(i) substrate: ……

(ii) product: ……..

(iii) enzyme: …….. [3]

(c) Using the lock-and-key hypothesis, explain why enzymes are specific in their action.

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…… [3]