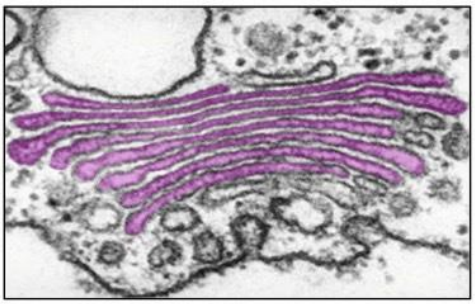
Name: ( )	Class: Sec _____	Date: _____

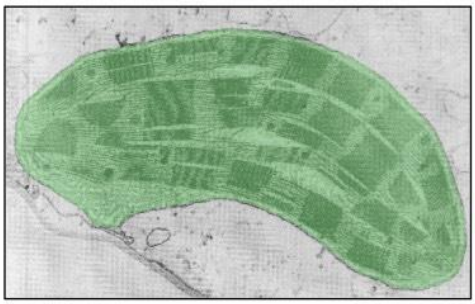
PASIR RIS CREST SECONDARY SCHOOL
BIOLOGY
HOLIDAY HOMEWORK

Topic: Cells, Movement of Substances, Nutrients and Enzymes

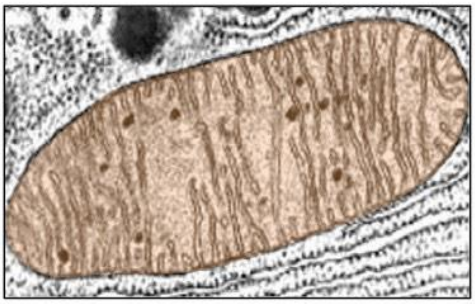
1 The diagram below shows several cellular structures as seen under an electron microscope.



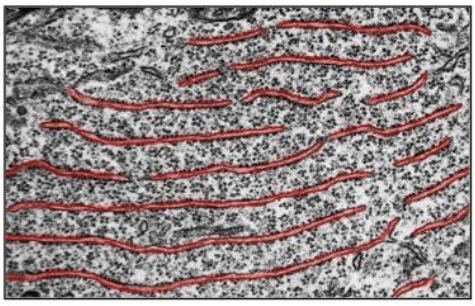
A



B



C



D

(a) Complete the following table by identifying the cellular structure shown in the diagram above and state its function.

Structure	Name	Function
A		
B		
C		
D		

[4]

2 The diagram below shows an electron micrograph of a cell from a leaf.

In the space provided below, draw a labelled diagram of the cell shown above.

Title: ……

[4]

3 Describe how the following cell / tissues are structurally adapted to carry out their function.

(a) Red blood cell

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…… [4]

(b) Root hair cell

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…… [2]

(c) Muscle tissue

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…… [4]

4 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 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) Calculate the percentage change in mass of the potato piece when it was placed in 0.70 mol per dm^3 sugar solution.

Show your working clearly.

Percentage change in mass: …….. [1]

(b) On a separate piece of graph paper, plot the percentage change in mass of the potato piece against the concentration of sugar solution.

Use the checklist below to aid you in the drawing of your graph. [4]

	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)	

(c) (i) Based on your graph in (b), state the concentration of sugar present in the cytoplasm of potato cells.

……... [1]

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

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…… [2]

(d) Suggest why sugar molecules are unable to pass through the cell membrane.

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…… [2]

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 salivary amylase is unable to catalyse the breakdown of starch in the stomach.

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…… [4]

(d) A student conducted an experiment to observe the effects of amylase on the digestion of starch.

Describe how the student can determine if all the starch in a solution has been digested by amylase.

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…… [2]