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**kickstart
tutors**

Student number

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Name _____

Date _____

Attempt/Time taken _____

GCSE BIOLOGY

Topic Paper: 3.1 Transport in cells
Part 1

Time allowed: 35 minutes

Materials

For this paper you must have:

- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

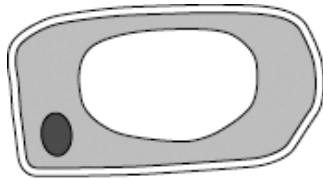
- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
 - is clear, logical, sensibly structured
 - fully meets the requirements of the question
 - shows that each separate point or step supports the overall answer.



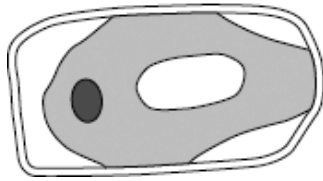
31 Marks



Q1. The diagram shows the same plant cell:
after 1 hour in distilled water
after 1 hour in strong sugar solution.



After 1 hour in distilled water



After 1 hour in strong sugar solution

(a) Describe **two** ways in which the cell in the strong sugar solution is different from the cell in distilled water.

- 1
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- 2
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(2)

(b) Explain how the differences between the cell in the strong sugar solution and the cell in distilled water were caused.

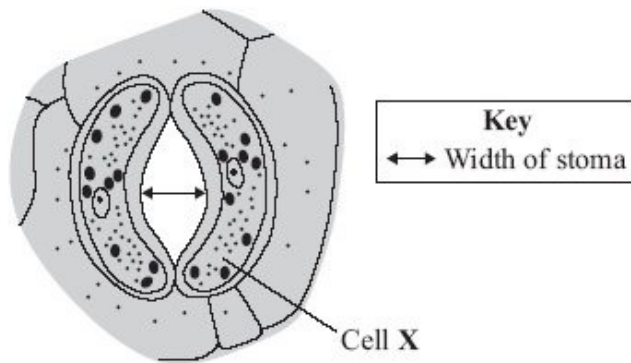
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(2)

(Total 4 marks)

Q2. Plant leaves have many stomata.

The diagram shows a stoma.



(a) Name cell X

(1)

(b) The table shows the mean widths of the stomata at different times of the day for two different species of plant.
 Species **A** normally grows in hot, dry deserts.
 Species **B** grows in the UK.

	Time of day In hours	Mean width of stomata as a percentage of their maximum width	
		Species A	Species B
	0	95	5
Dark	2	86	5
	4	52	6
Light	6	6	40
	8	4	92
	10	2	98
	12	1	100
	14	0	100
	16	1	96
	18	5	54
Dark	20	86	6
	22	93	5
	24	95	5



The data in the table show that species **A** is better adapted than species **B** to living in hot, dry deserts.

Explain how.

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(4)

(Total 5 marks)

Q3. (a) Some scientists investigated the rates of absorption of different sugars by the small intestine.

In one experiment they used a piece of normal intestine.
In a second experiment they used a piece of intestine poisoned by cyanide. Cyanide is poisonous because it prevents respiration.

The results are shown in the table.

Sugar	Relative rates of absorption	
	Normal intestine	Intestine poisoned by cyanide
Glucose	1.00	0.33
Galactose	1.10	0.53
Xylose	0.30	0.31
Arabinose	0.29	0.29

(i) Name **two** sugars from the table which can be absorbed by active transport.

1

2

(1)



(ii) Use evidence from the table to explain why you chose these sugars.

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(3)

(b) All of the sugars named in the table can be absorbed by diffusion.

Explain how information from the table provides evidence for this.

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(2)

(Total 6 marks)



Q4. Drinking after exercise to replace the water lost in sweat is called rehydration. Scientists at a Spanish university investigated rehydration after exercise.

24 students took part in the investigation.

All the students ran on a treadmill in a temperature of 40 °C until they were exhausted.

12 of the students were each given half a litre of beer to drink.

The other 12 students were each given half a litre of tap water to drink.

Both groups of students were then allowed to drink as much tap water as they wanted.

The scientists measured how quickly each student rehydrated.

The students who had been given beer rehydrated 'slightly better' than the ones given only water.

A newspaper reported the investigation.

The headline was



The newspaper headline was **not** justified.

Explain why.

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(Total 3 marks)



Q5. Diffusion and active transport take place in healthy kidneys.

(a) Explain what is meant by:

(i) diffusion

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(2)

(ii) active transport

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(2)

(b) Describe, as fully as you can, how urine is produced by the kidneys.

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(5)
(Total 9 marks)



Q6. Read the following information about how the small intestine absorbs sugars.

The blood absorbs glucose and some other sugars, like xylose, from the small intestine.

Glucose molecules are the same size as xylose molecules, but glucose is absorbed more quickly than xylose.

Experiments with pieces of intestine show that the uptake of oxygen by the intestine is 50 % higher in the presence of glucose than in the absence of glucose. Xylose does not have this effect on the uptake of oxygen.

The cells lining the small intestine have many mitochondria.

Explain how this information provides evidence that glucose is absorbed by the small intestine using *active transport*.

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(4)
(Total 4 marks)