



**CHEMISTRY ONLINE**  
— **TUITION** —

Phone: +442081445350

[www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)

Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)

# **BIOLOGY**

## **CELLS**

Level & Board	AQA (A-LEVEL)
TOPIC:	TRANSPORT ACROSS CELL MEMBRANE
PAPER TYPE:	QUESTION PAPER-2
TOTAL QUESTIONS	6
TOTAL MARKS	54

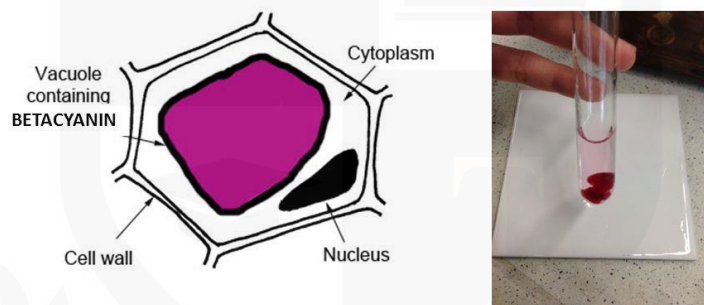
**ChemistryOnlineTuition Ltd reserves the right to take legal action against any individual/ company/organization involved in copyright abuse.**

## Transport across Cell Membrane 2

1.

Beetroot cells have a red pigment in them. A student looked into how temperature affected the beetroot ability to retain red pigment. He placed beetroot discs that had been cut into water-filled tubes. He kept the temperature of each tube varied. He gauged the amount of light that was getting through each tube water after 25 minutes.

### Beetroot pigments



(a) Each tube held the same amount of water, according to the student.

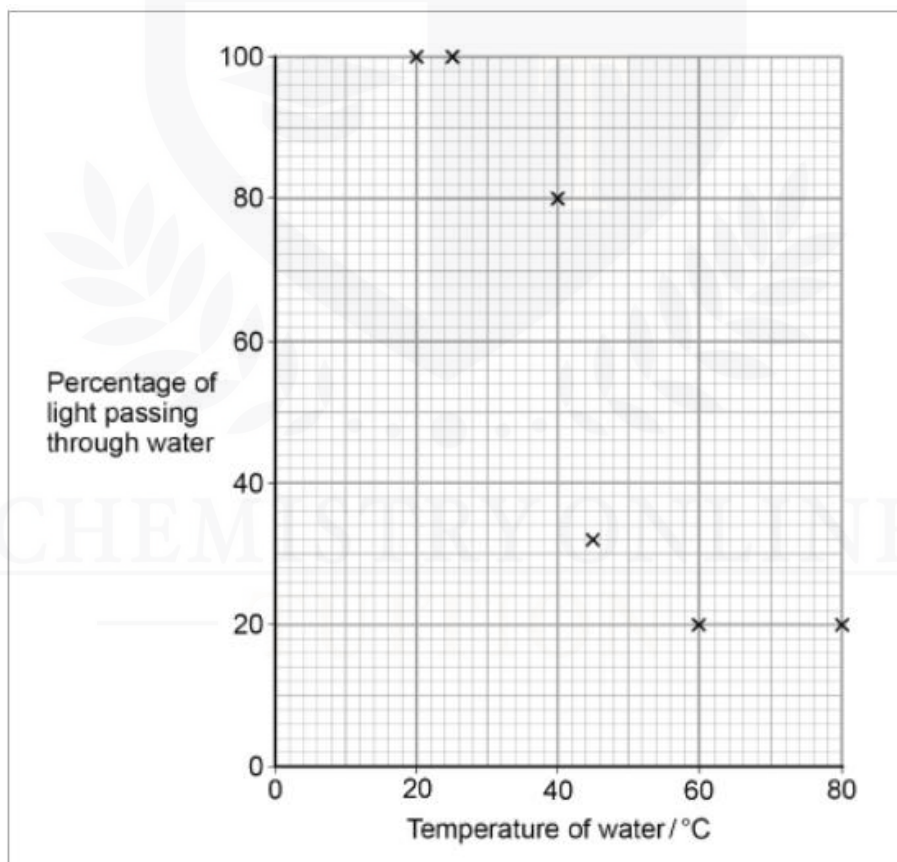
Describe the significance of his control over this experimental variable. (2)

CHEMISTRY ONLINE  
— TUITION —

I am Sorry !!!!!

(b) Give an example of a technique the student could have used to keep an eye on the water temperature in each tube. (1)

The graph shows the student results.



(c) On the graph above, draw a suitable curve. (1)

**(d)** The beetroot's cells release red pigment, which lowers the percentage of light that reaches the water between 25 and 60 degrees Celsius.

Explain how the water's rising temperature led to the red pigment release.

**(2)**

**2.**

In mammals, a developing embryo communicates with its mother through uterine lining cells during the early phases of pregnancy. The uterine lining cells contain a significant amount of glycogen at this point.

**(a)** Provide two possible modifications to the uterine lining cells, cell-surface membranes that would enable the quick passage of nutrients. **(2)**

**1.**

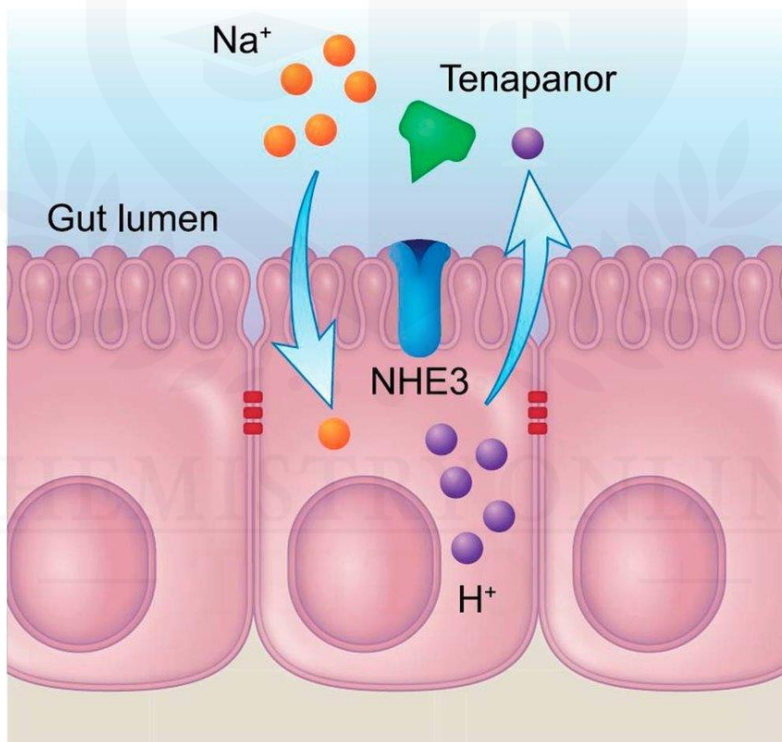
I am Sorry !!!!!

2.

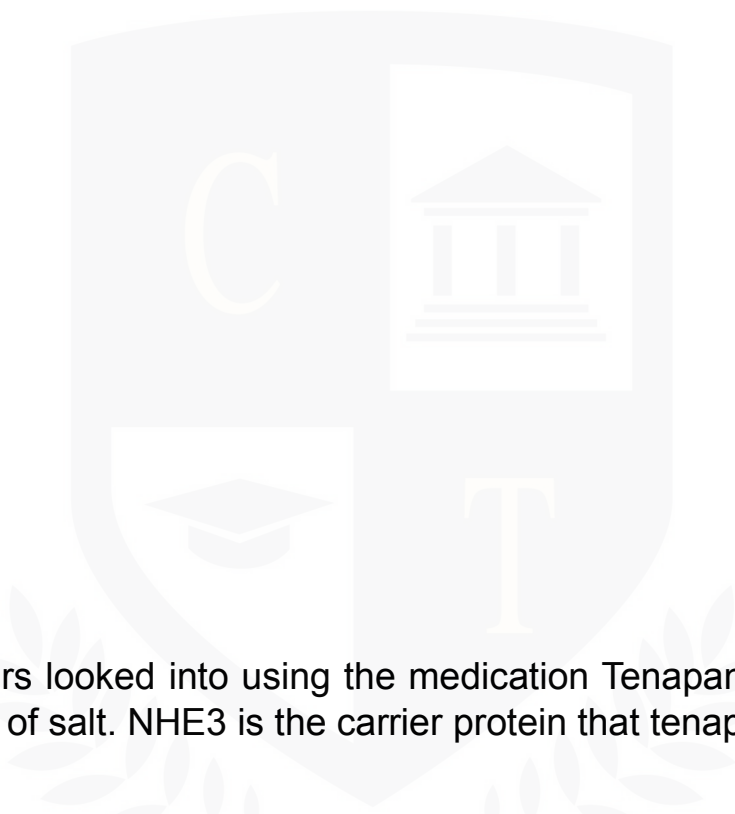
3.

(a) Gut lining cells take up sodium ions from salt (sodium chloride). Some of these cells have NHE3 carrier protein in their membranes.

In return for one proton (hydrogen ion) leaving the cell, NHE3 actively transports one sodium ion inside.



Explain how NHE3 accomplishes this using your understanding of transport across cell membranes. (3)



**(b)** Researchers looked into using the medication Tenapanor to lessen the gut absorption of salt. NHE3 is the carrier protein that tenapanor inhibits.

Two rat groups, A and B, were given a diet with a high salt content by the scientists.

- The rats in Group A were not given Tenapanor ( $0 \text{ mg kg}^{-1}$ ).
- The rats in Group B were given  $3 \text{ mg kg}^{-1}$  Tenapanor

The rats gut contents were removed by the scientists an hour after treatment, and they weighed the rats right away.

I am Sorry !!!!!

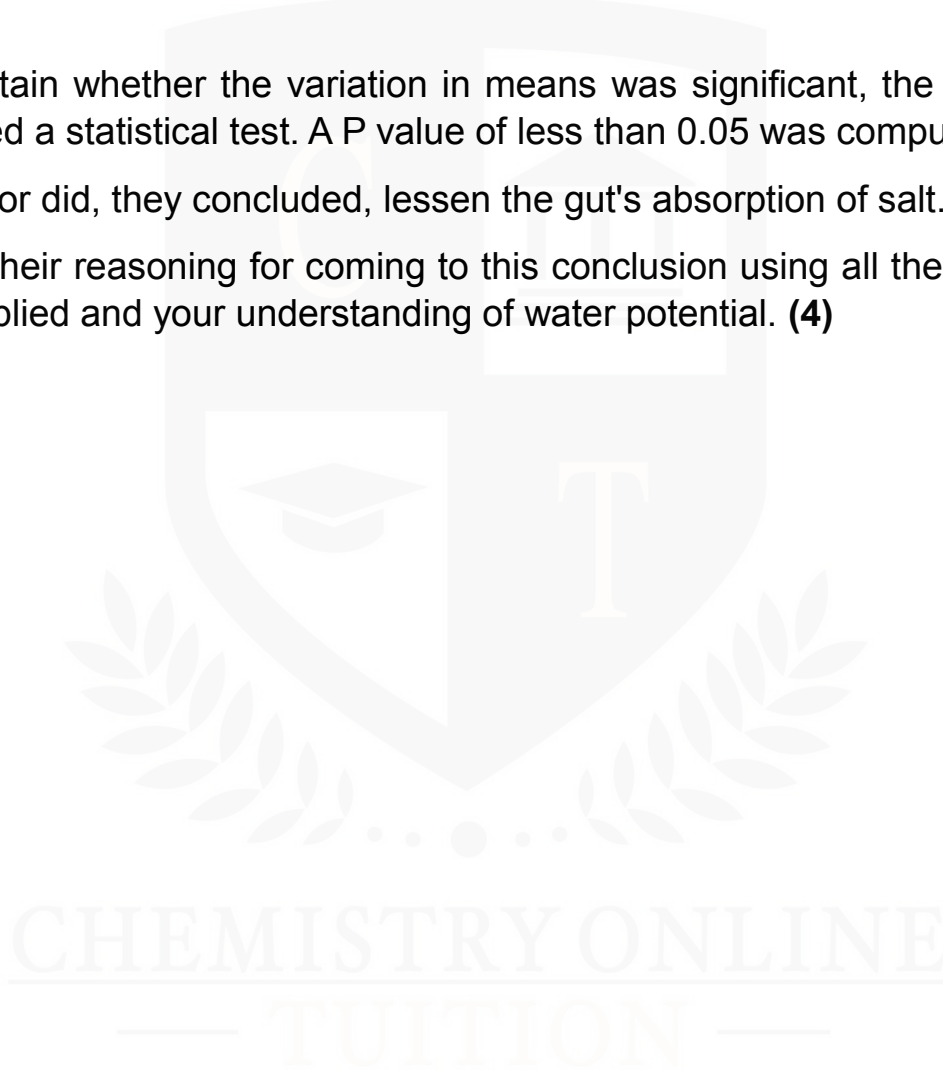
The table displays their outcomes.

Concentration of Tenapanor / mg kg <sup>-1</sup>	Mean mass of contents of the gut / g
0	2.0
3	4.1

To ascertain whether the variation in means was significant, the scientists performed a statistical test. A P value of less than 0.05 was computed.

Tenapanor did, they concluded, lessen the gut's absorption of salt.

Explain their reasoning for coming to this conclusion using all the data that was supplied and your understanding of water potential. **(4)**



**(c)** Elevated concentration of salt in the blood plasma that enters capillaries can be caused by high dietary salt absorption. Tissue fluid accumulation may result from this.

Describe how. **(2)**

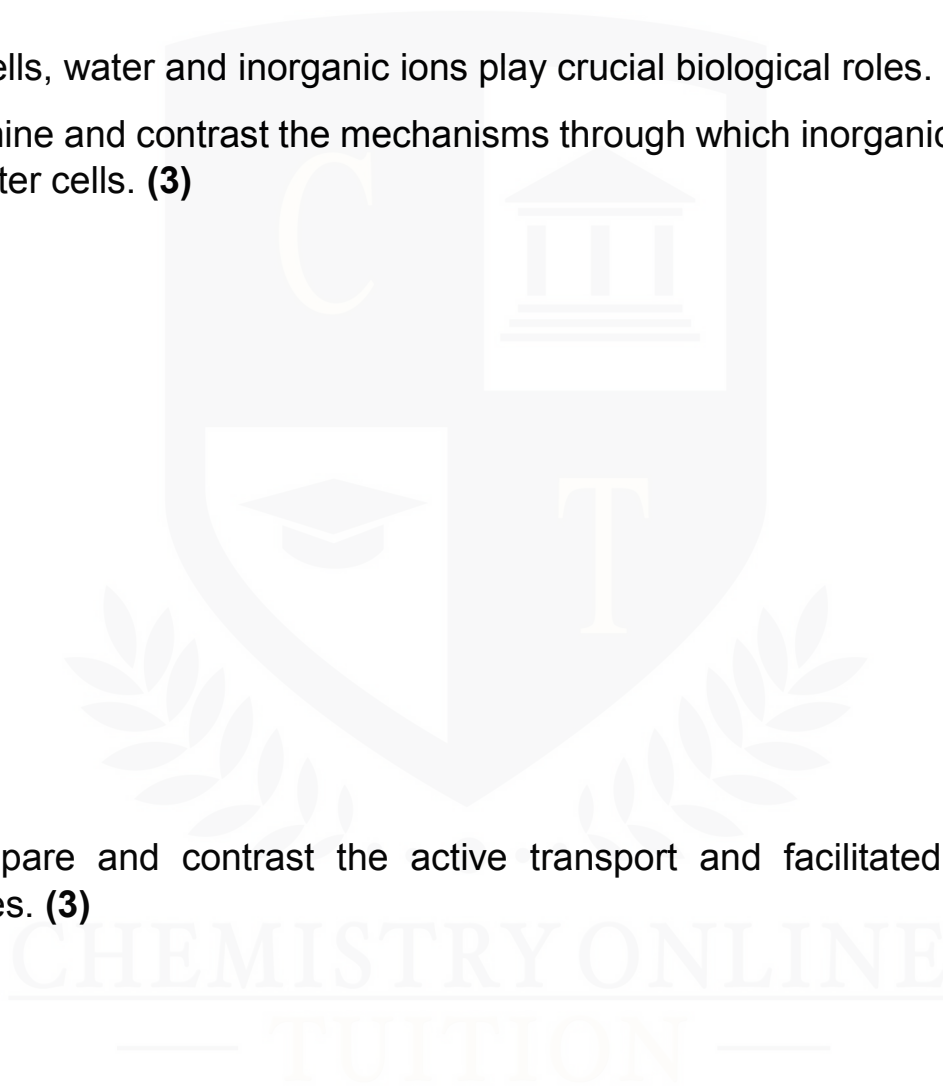
**4.**

Within cells, water and inorganic ions play crucial biological roles.

**(a)** Examine and contrast the mechanisms through which inorganic ions and water enter cells. **(3)**

**5.**

**(a)** Compare and contrast the active transport and facilitated diffusion processes. **(3)**



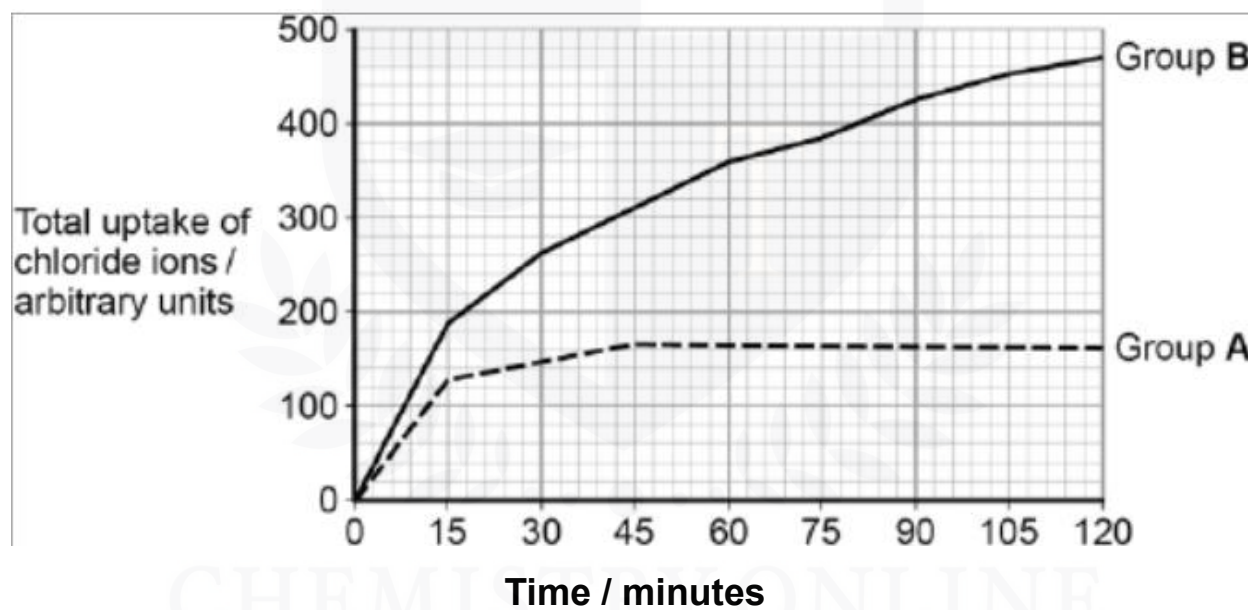
I am Sorry !!!!!



Students looked into how barley plants absorbed chloride ions. Plants were split into two groups, and the roots were submerged in solutions containing radioactive chloride ions.

- Group A plants had a substance that inhibited respiration added to the solution.
- Group B plants did not have the substance added to the solution.

Every fifteen minutes, the students determined how much chloride ions the plants had taken in overall. The figure below displays their findings.



**(b)** Determine the ratio between the group B plants mean rate of chloride ion uptake in the first hour and their rate in the second hour. **(2)**

Ratio = \_\_\_\_\_ :1

(c) Describe the outcomes displayed in the preceding figure. (4)



6.

(a) Write a paper discussing the significance of diffusion in living things. (25)

I am Sorry !!!!!



**DR. ASHAR RANA**  
M.B.B.S / MS. CHEMISTRY



- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, Math's and Biology Tutor

## CONTACT INFORMATION FOR CHEMISTRY ONLINE TUITION

- UK Contact: 02081445350
  - International Phone/WhatsApp: 00442081445350
  - Website: [www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)
  - Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)
- Address: 210-Old Brompton Road, London SW5 OBS, UK