



CHEMISTRY ONLINE
— TUITION —

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BIOLOGY

CELLS

Level & Board	AQA (A-LEVEL)
TOPIC:	TRANSPORT ACROSS CELL MEMBRANES
PAPER TYPE:	SOLUTION -3
TOTAL QUESTIONS	5
TOTAL MARKS	38

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Transport Across Cell Membranes - 3

1.

(a)

Treatment 1: No grease means that there is normal CO₂ uptake.

Treatment 2: Having grease on the lower surface prevents the stomata from uptaking CO₂

Treatment 3: Grease all over means there is no CO₂ uptake.

(b) The rate of intake of CO₂ is constant until the light is turned off at which point the mean CO₂ uptake decreased from 4.5 to 0.

(c) In short supply of water, the closed stomata help in maintaining the water level in the plant thereby avoiding the evaporation and loss of water content. For photosynthesis: These openings are small and are managed during the daytime to ensure less water loss.

OR

Since water loss takes place in the stomata, closing the stomata prevents water loss.

(d) CO₂ uptake takes place on the upper surface of the leaf.

(e) There was no use of CO₂ in photosynthesis so there is now a diffusion gradient for CO₂ out of the leaf due to respiration.

2.

(a) Tissue fluid is formed by the overall outward pressure of 3.2kPa forces small molecules out of the capillaries.

(b) The force of hydrostatic pressure means that as blood moves along the capillary, fluid moves out through its pores and into the interstitial space. This movement means that the pressure exerted by the blood will become lower, as the blood moves along the capillary, from the arterial to the venous end.

OR

Loss of water

(c) If someone's blood pressure is too high, the pressure will not have dropped enough by the end of the capillary bed to allow fluid to return to the blood. Instead, it stays in the tissues and makes them swollen and puffy.

OR

- There is a high blood pressure
- High hydrostatic pressure
- Increases pressure at the arterial end so, more tissue fluid is formed

(d) Water potential at the venule end of the capillary is lower than that of the tissue fluid. This is due to the loss of fluid from the capillary and an increasing concentration of proteins and cells that don't leave the capillary.

OR

- Water has left the capillary
- Proteins are too large to leave the capillary
- Higher concentration of proteins so water potential is more negative

3.

(a)

- Add a few drops of ethanol to the food solution.
- Shake the test tube and leave for one minute.
- Pour the ethanol into a test tube of water.
- If the solution turns cloudy, the food contains lipids.

(b) Glycerol.

(c) Ester.

(d) Y is the unsaturated fatty acid because it contains double bond between adjacent carbon atoms in the hydrocarbon chain.

4.

(a)

- Divide mass of each lipid by total mass of all lipids in that type of cell
- Multiply answer by 100

(b) One advantage of the different percentage of cholesterol in red blood cells compared to cells lining the ileum is in their function and structure. Red blood cells contain a high percentage of cholesterol to improve their stability and durability.

OR

Red blood cells free in blood/not supported by other cells so cholesterol helps to maintain shape.

(c) The cell-surface membrane of *E. coli*, a bacterium, maintains a constant shape despite the lack of cholesterol. This is due to its cell wall structure, which is made up of a cohesive rigid layer of peptidoglycan.

OR

The *E. coli* cell doesn't change shape as it has a rigid cell wall made of murein.

5.

(a) Calculations made from raw data / raw data would have recorded initial and final masses.

(b)

$$= 0.15/1.0$$

$$= 0.15 \times 30 = 4.5$$

$$30 - 4.5 = 25.5$$

You take 4.5cm^3 of the original 1.0 mol dm^{-3} solutions of sucrose

Add it to 25.5 cm^3 of water

Makes 30 cm^3 of a 15 mol dm^{-3} solution of sucrose.

(c)

- Water potential of solution is less than that of the potato tissue
- Tissue loses water by osmosis.

- Plot a graph with concentration on the x-axis and percentage change in mass on the y-axis
- Find concentration where curve crosses the x-axis / where percentage change is zero
- Use another resource to find water potential of sucrose concentration where curve crosses x-axis



I am Sorry !!!!!



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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
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