# Cell Membranes and Transport

## Question Paper 2

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|---|---|
| **Level** | International A Level |
| **Subject** | Biology |
| **Exam Board** | CIE |
| **Topic** | Cell Membranes and Transport |
| **Sub Topic** | |
| **Booklet** | Multiple Choice |
| **Paper Type** | Question Paper 2 |

**Time Allowed :** **29 minutes**

**Score :** **/ 24**

**Percentage :** **/100**

**Grade Boundaries:**

| A* | A | B | C | D | E | U |
|---|---|---|---|---|---|---|
| >85% | '77.5% | 70% | 62.5% | 57.5% | 45% | <45% |

1 What is the width of the cell surface membrane?

**A** 0.5 – 1.0 nm **B** 5 – 10 nm **C** 50 – 100 nm **D** 0.5 – 1 μm

2 Some functions of molecules found in cell surface membranes are listed.

1 cell recognition
2 ion transport
3 maintaining fluidity
4 mechanical stability

Which are functions of cholesterol?

**A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

3 The enzyme lactase is found in the membranes of epithelial cells lining the small intestine.

The enzyme is formed by a single polypeptide that folds to give three regions.

- an active site with the free amino group outside the cell
- a short section inside the membrane
- a short section inside the cell

What type of amino acid would be found in each of the three regions?

| | outside cell | inside the membrane | inside the cell |
|---|---|---|---|
| **A** | hydrophilic | hydrophobic | hydrophilic |
| **B** | hydrophilic | hydrophobic | hydrophobic |
| **C** | hydrophobic | hydrophilic | hydrophobic |
| **D** | hydrophobic | hydrophobic | hydrophilic |

4 Membrane proteins are called 'peripheral' if they are temporarily attached to the membrane or 'integral' if they are permanently attached to the membrane.

Integral proteins are described as 'intrinsic' if they extend across the whole bilayer and 'extrinsic' if they are found only in one side of the bilayer.

How would you describe a channel protein?

**A** integral extrinsic

**B** integral intrinsic

**C** peripheral extrinsic

**D** peripheral intrinsic

5 Molecules 1, 2 and 3 are found in cell surface membranes.

1 glycolipids

2 glycoproteins

3 phospholipids

Which contribute to cell recognition?

**A** 2 only

**B** 1 and 2 only

**C** 1 and 3 only

**D** 2 and 3 only

6 Which is correct for components of a cell surface membrane?

| | increases membrane fluidity | allows recognition of cell |
|---|---|---|
| **A** | cholesterol | glycoproteins |
| **B** | glycolipids | phospholipids |
| **C** | glycoproteins | glycolipids |
| **D** | phospholipids | cholesterol |

7 Which statement about the fluid mosaic model of membrane structure is correct?

**A** The less unsaturated the fatty acid chains of the phospholipids, the more fluid the membrane.

**B** The more unsaturated the fatty acid chains of the phospholipids, the more fluid the membrane.

**C** The higher the temperature, the less fluid the membrane.

**D** The lower the temperature, the more fluid the membrane.

8 Which statement concerning the role of cholesterol in the cell surface membrane is correct?

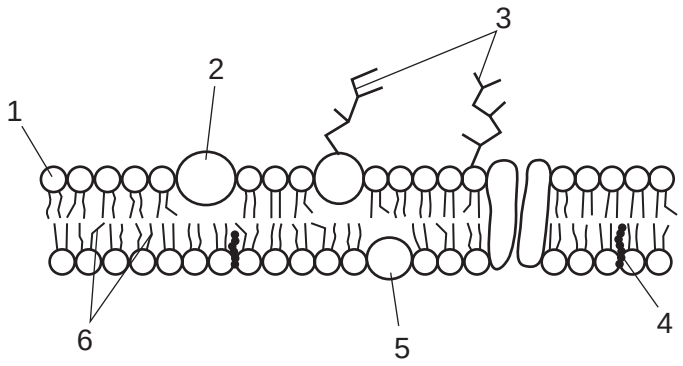
**A** It can act as a barrier to the entry into the cell of non-polar molecules.

**B** It helps the entry and exit of ions through the fatty acids.

**C** It maintains the fluidity of the membrane at low temperatures.

**D** It makes the membrane more permeable to very small water-soluble substances.

9 The diagram represents the fluid mosaic model of membrane structure.




Which two components contribute to the fluidity of the membrane?

**A** 1 and 3 **B** 2 and 4 **C** 3 and 5 **D** 4 and 6

10 Which role of the cell surface membrane is **not** a result of the properties of the phospholipids?

**A** to allow cytokinesis to occur in mitotic cell division

**B** to allow entry and exit of the water-soluble gases, oxygen and carbon dioxide

**C** to allow phagocytosis of a bacterium into cells

**D** to allow surface membranes to stabilise by binding with water molecules

11 An increase in which component would make the cell surface membrane more fluid?

**A** cholesterol

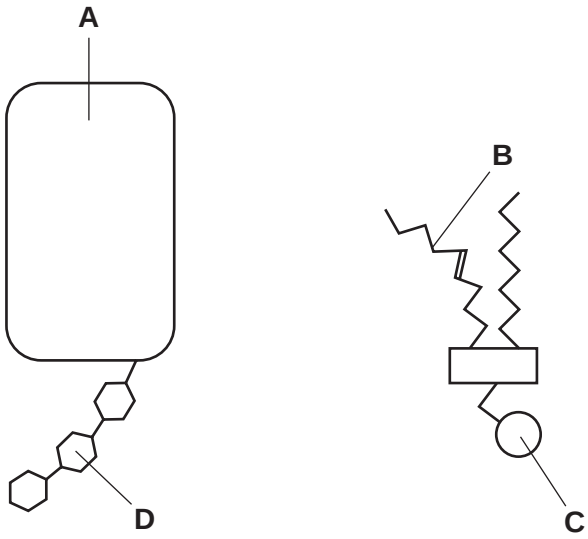
**B** glycolipids

**C** glycoproteins

**D** proteins

12 The diagrams show two molecules found in cell surface membranes.

Which part affects the fluidity of the membrane?




13 Single-celled animals that live in fresh water have a vacuole that contracts regularly to remove excess water. Single-celled plants that live in fresh water do not have a similar vacuole.

Which statement explains why only these animals need this vacuole?

**A** Plant cell cytoplasm and animal cell cytoplasm both have a lower water potential than fresh water.

**B** Plant cell sap has the same water potential as fresh water, animal cytoplasm has a lower water potential than fresh water.

**C** Plant cell walls are impermeable to water, animal cell surface membranes are permeable to water.

**D** Plant cell walls restrict the entry of water, animal cell membranes allow the free entry of water.

14 Which molecules, found in the cell surface membrane, have the properties listed?

| | act as receptor sites for hormones | form hydrogen bonds with water | recognise antibodies |
|---|---|---|---|
| **A** | cholesterol and proteins | phospholipids and cholesterol | proteins and glycolipids |
| **B** | glycolipids and glycoproteins | glycolipids and glycoproteins | glycolipids and glycoproteins |
| **C** | phospholipids and cholesterol | proteins and glycolipids | cholesterol and proteins |
| **D** | proteins and glycolipids | cholesterol and proteins | phospholipids and cholesterol |

**15** Which molecules, found in cell surface membranes, contribute to cell recognition?

1 glycolipids

2 glycoproteins

3 phospholipids

**A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

16 The epithelial cells of people with cystic fibrosis have a defect in the structure of the cell surface membrane. The ability of the cell to transport chloride ions out of the cell is affected.

Which membrane component is involved?

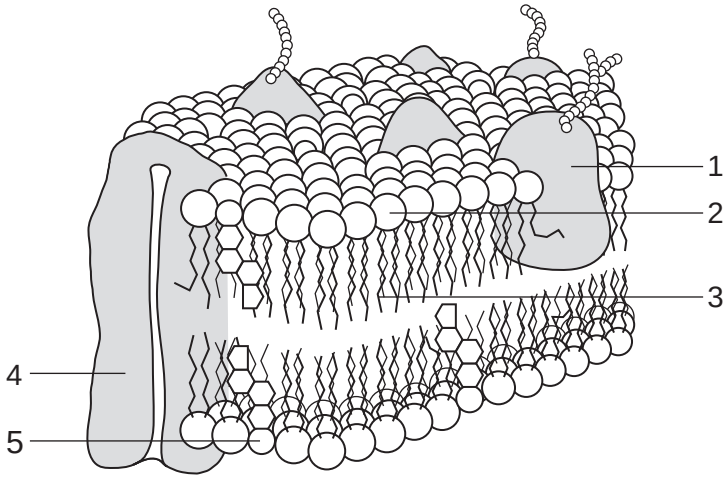
**A** cholesterol

**B** glycolipid

**C** phospholipid

**D** protein

17 The diagram shows part of the cell surface membrane.

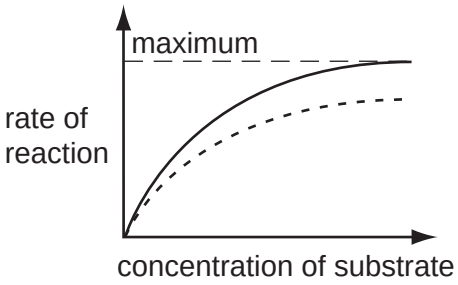



Which components help to maintain the fluidity of the membrane?

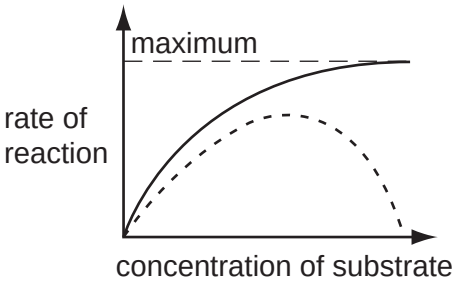
**A** 1 an **B** 1 and 4 **C** 2 and 4 **D** 3 and 5

18 Which graph represents the action of a non-competitive inhibitor?

**A**




**B**

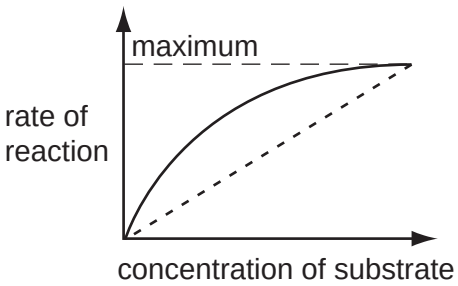



key

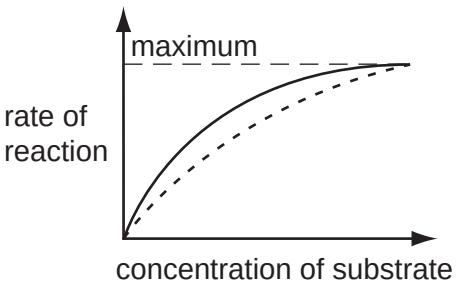
—— without inhibitor

- - - with inhibitor

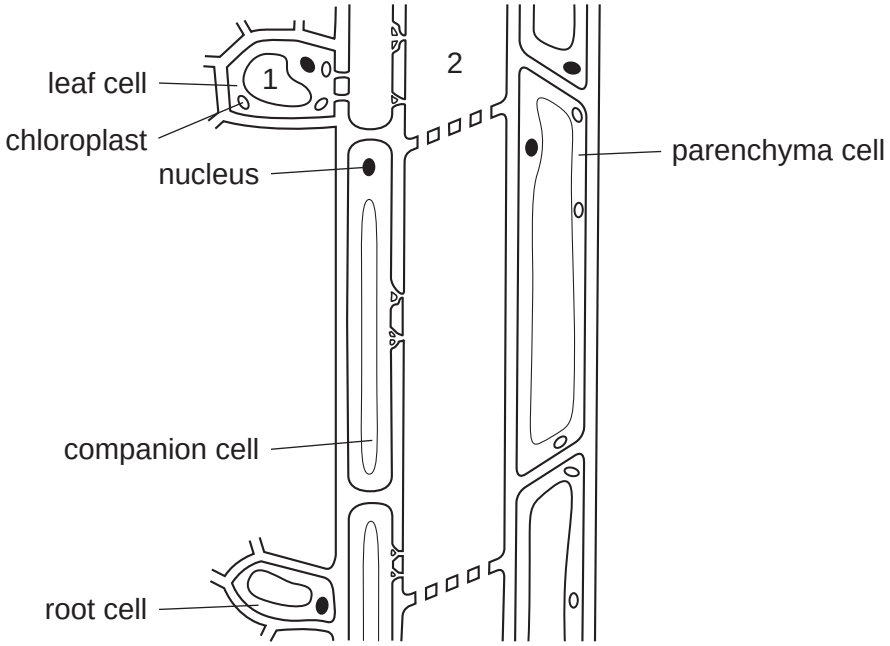
**C**




**D**



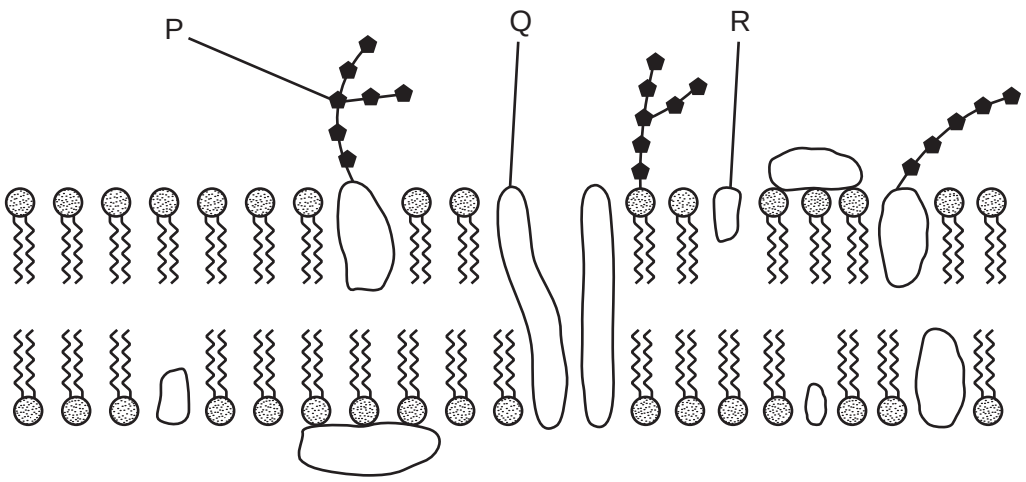
19 The diagram represents the phloem pathway, with adjacent cells, from leaf to root in a plant.




Which process is occurring between 1 to 2 and what is the effect on the water potential at 2?

| | process from 1 to 2 | water potential at 2 |
|---|---|---|
| **A** | active transport of sucrose | becomes more negative |
| **B** | active transport of sucrose | becomes less negative |
| **C** | diffusion of sucrose | becomes more negative |
| **D** | diffusion of sucrose | becomes less negative |

20 The diagram shows part of a cell surface membrane.




What is the correct function for each of the structures labelled?

| | regulates membrane fluidity | forms hydrogen bonds with water to stabilise membrane | transports ions and large polar molecules |
|---|---|---|---|
| **A** | R | R | Q |
| **B** | P | Q | R |
| **C** | Q | R | P |
| **D** | R | P | Q |

21 Which part of a phospholipid molecule makes up most of the thickness of a cell surface membrane?

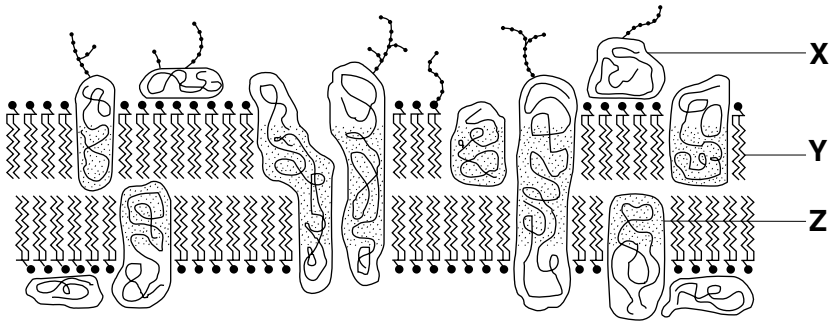
**A** glycerol

**B** hydrocarbon chains

**C** hydrophilic head

**D** phosphate group

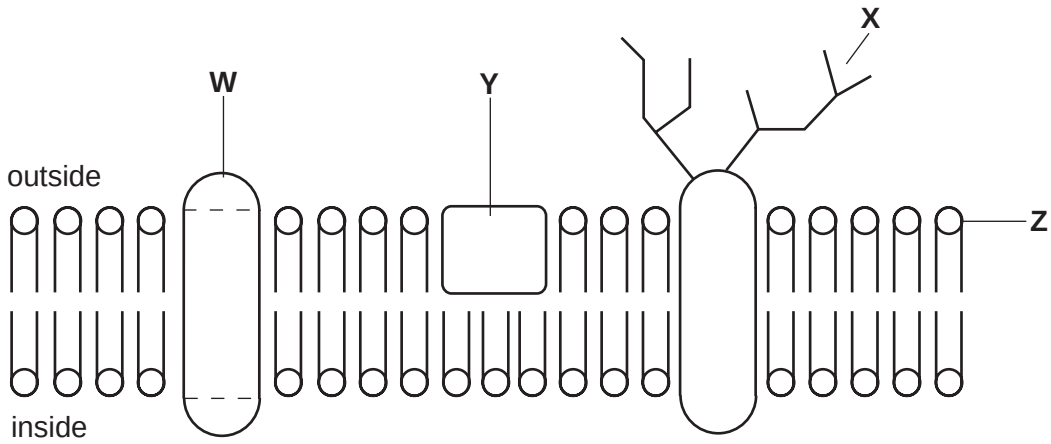
**22** The diagram shows part of a cell surface membrane.




Which labels are correct?

| | glycoprotein | phospholipid | protein |
|---|---|---|---|
| **A** | X | Y | Z |
| **B** | Y | Z | X |
| **C** | Y | X | Z |
| **D** | Z | Y | X |

**23** The diagram shows part of a cell surface membrane.




Four functions of the membrane are listed:

**1** allows fat-soluble molecules through membrane

**2** allows cell recognition

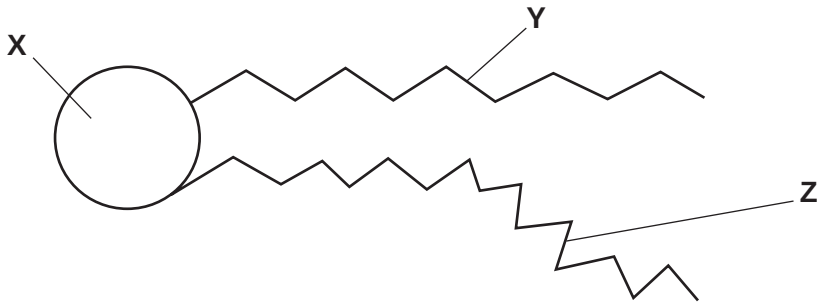
**3** maintains constant shape of membrane

**4** pumps ions through membrane

Which part is correctly paired with its function?

**A** W and 1 **B** X and 2 **C** Y and 3 **D** Z and 4

**24** The diagram shows a molecule that is found in cell surface membranes.




What is present at **X**, **Y**, and **Z**?

| | X | Y | Z |
|---|---|---|---|
| **A** | phosphate | double-bond carbon chain | protein |
| **B** | phosphate | single-bond carbon chain | double-bond carbon chain |
| **C** | protein | glucose | single-bond carbon chain |
| **D** | protein | phosphate | glucose |