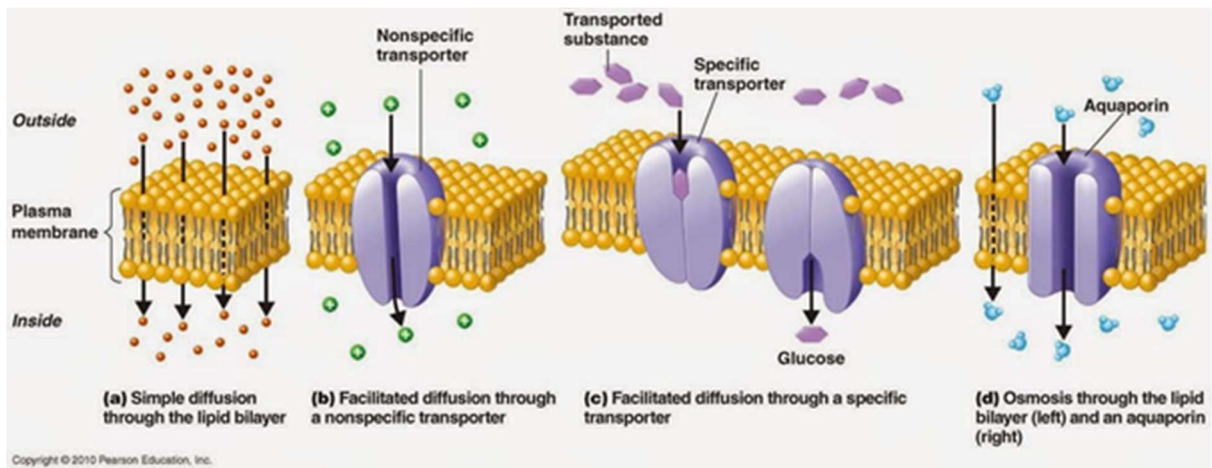
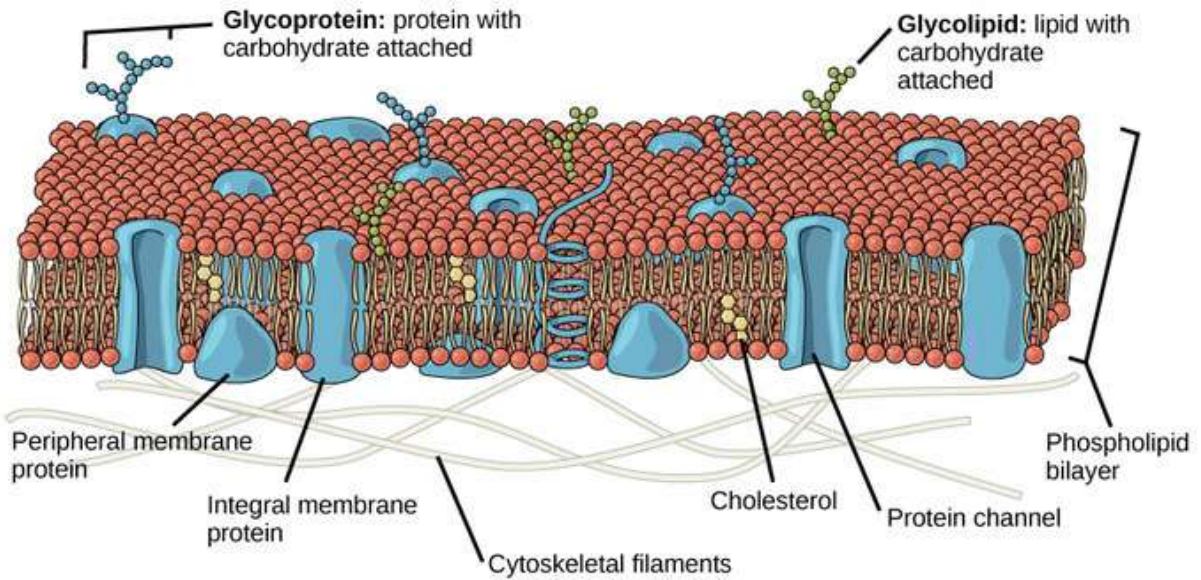
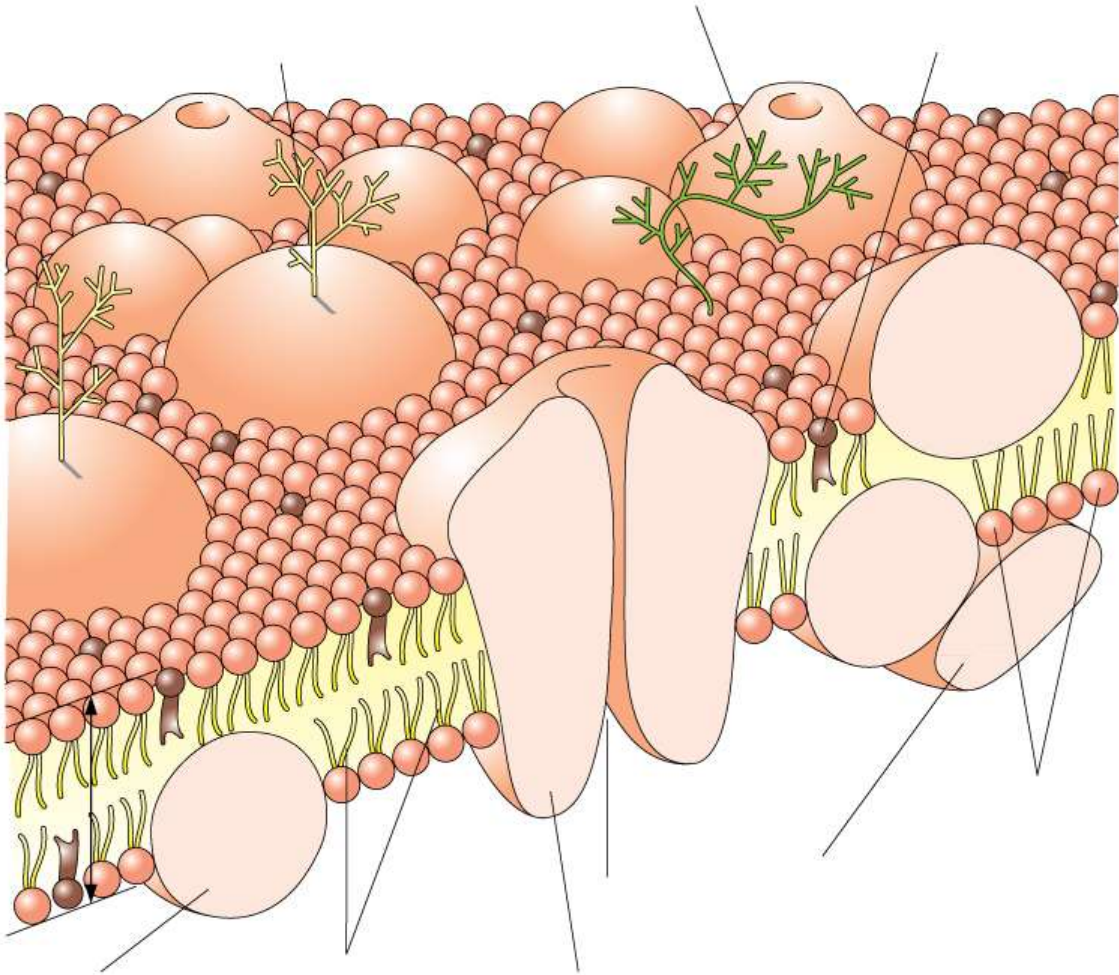


Transport across the Cell HW Booklet

Name: _____



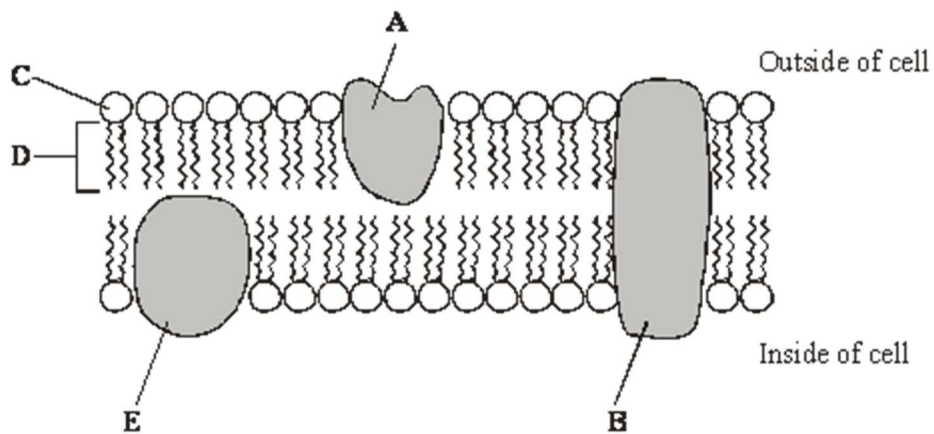
Task 1: Label the diagram



Explain why this model of the membrane structure is known as the fluid-mosaic model.

What are the functions of the components of cell-surface membranes?

Q1. The diagram shows part of a cell surface membrane.



(a) Complete the table by writing the letter from the diagram which refers to each part of the membrane.

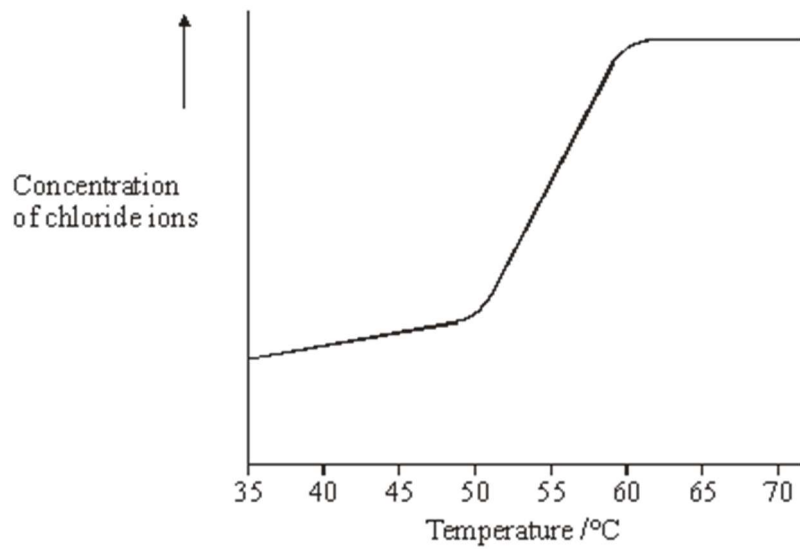
Part of membrane	Letter
Channel protein	
Contains only the elements carbon and hydrogen	

(2)

(b) Explain why the structure of a membrane is described as *fluid-mosaic*.

(2)

- (c) When pieces of carrot are placed in water, chloride ions are released from the cell vacuoles. Identical pieces of carrot were placed in water at different temperatures. The concentration of chloride ions in the water was measured after a set period of time. The graph shows the results.



Describe and explain the shape of the curve.

(3)
(Total 7 marks)

Task 2: Complete the following questions

Useful website: <https://www.ck12.org/student/>

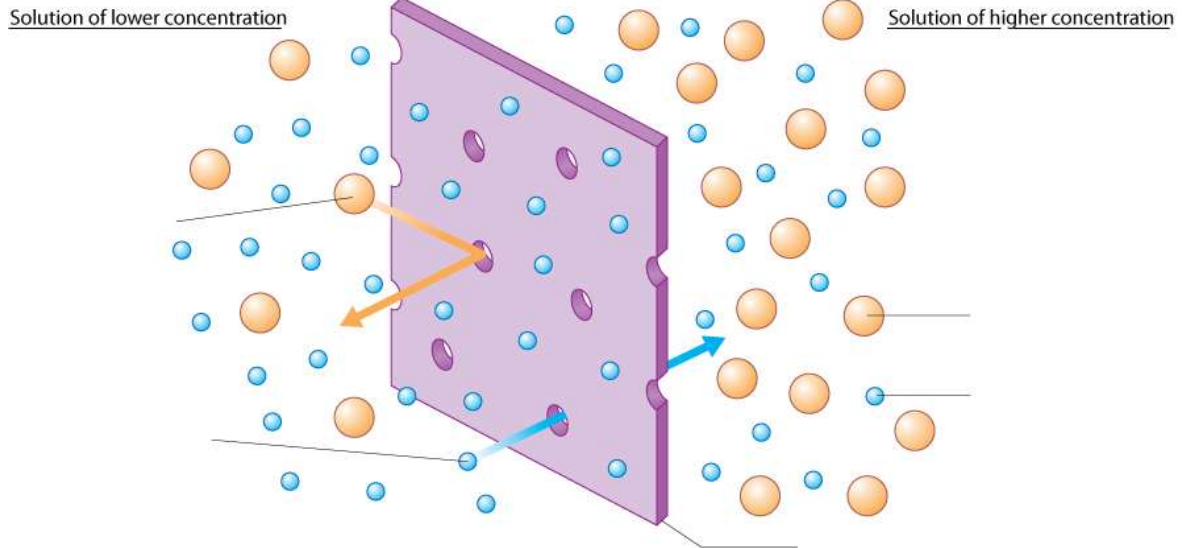
[follow the links to facilitated diffusion]

- 1** Diffusion is the net movement of molecules or ions from an area of higher concentration to an area of lower concentration.
 - a** Explain what 'net movement' means.
 - b** Explain how each of the following factors affects the rate of diffusion.
 1. The concentration gradient.
 2. The area of the exchange surface.
 3. The thickness of the exchange surface.
 4. The size and nature of the diffusing molecules.

- 2** Facilitated diffusion is a special type of diffusion enabling molecules, such as glucose; and amino acids, and charged particles, such as sodium ions, to diffuse into and out of cells.
 - a** Explain how facilitated diffusion differs from simple diffusion.
 - b** In what ways are the two processes similar?
 - c** By means of labelled diagrams, show how large molecules enter cells by facilitated diffusion.

Please label




Task 3: Complete



1. Complete the following passage by filling in the missing words or phrases.
 Osmosis is the diffusion of water from an area of or water potential to an area of or water potential through a partially permeable membrane. Pure water has a water potential of Adding a solute to pure water the water potential. The more solute that is added, the more the solution becomes and the value of the water potential is more Two solutions that have the same water potential are said to be

2. Complete the summary questions

Table 1 Summary of osmosis in an animal cell, for example, a red blood cell

Water potential (ψ) of external solution compared to cell solution	higher (less negative)	equal	lower (more negative)
Net movement of water	enters cell	neither enters nor leaves	leaves cell
State of cell	swells and bursts	no change	shrinks
	contents, including haemoglobin, are released  remains of cell-surface membrane	 normal red blood cell	haemoglobin is more concentrated, giving cell a darker appearance  cell shrunk and shrivelled

Summary questions

- 1 Explain what is meant by a selectively permeable membrane.
- 2 Under standard conditions of pressure and temperature, what is the water potential of pure water?
- 3 \sqrt{x} Four cells have the following water potentials:
 Cell A = -200 kPa
 Cell B = -250 kPa
 Cell C = -100 kPa
 Cell D = -150 kPa.
 Determine the order in which the cells have to be placed for water to pass from one cell to the next if they are arranged in a line.

3. Complete the exam questions

- (a) A plant cell was observed with an optical microscope. Describe how the length of the cell could be estimated.

.....
.....
.....
.....

(2)

- (b) The water potential of a plant cell is -400 kPa. The cell is put in a solution with a water potential of -650 kPa. Describe and explain what will happen to the cell.

.....
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.....
.....
.....
.....

(3)

- (c) A group of students investigated the effect of sucrose concentration on the change in length of cylinders of tissue cut from a young carrot. They measured the initial lengths of the carrot cylinders, then placed one in each of a number of sucrose solutions. After 18 hours, they removed the carrot cylinders and measured their final lengths. Some of the results are shown in the table.

Concentration of sucrose / mol dm^{-3}	Percentage decrease in length of carrot cylinder
0.4	4.2
0.5	8.7
0.6	13.0
0.7	16.8
0.8	18.1
0.9	18.1
1.0	18.1

- (i) The carrot cylinders were left for 18 hours in the sucrose solutions. Explain why they were left for a long time.

.....
.....

(1)

- (ii) Explain how you would use a graph to predict the concentration of sucrose that would result in no change in length of the carrot cylinders.

.....
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.....
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(2)

- (iii) Young carrots store sugars in their tissues but, in older carrots, some of this is converted to starch. How would using cylinders of tissue from older carrots affect the results obtained for a sucrose solution of 0.6 mol dm^{-3} ? Give a reason for your answer.

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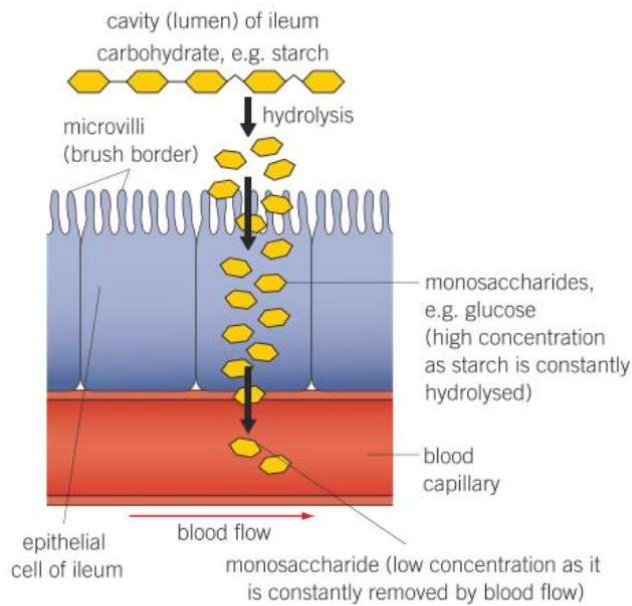
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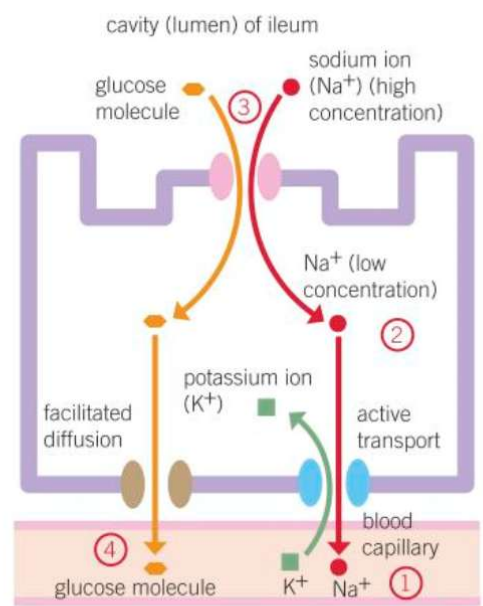
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(2)
(Total 10 marks)

Task 4: Complete



▲ **Figure 2** Absorption of monosaccharides (e.g., glucose) by diffusion in the ileum



▲ **Figure 3** Co-transport of a glucose molecule

Explain why the term 'co-transport' is used to describe the transport of glucose into cells.

In each of the following events in the glucose co-transport system, state whether the movements are active or passive.

- A) Sodium ions move out and into of the epithelial cell
- B) Glucose molecules move into the epithelial cell.