

INTRODUCTION TO CARBS



ABBREIATION	MEANING	NOTES
C		
A		
R		
B		
S		

INTRODUCTION TO CARBS



COMMAND WORD	AO	MEANING	EXAM TECHNIQUE
Give / Name / State / Define / Identify		Produce an answer from recall or from given information	
Describe		Give an account of	
Compare and Contrast		Identify similarities and differences	
Explain		Give reasons for	
Calculate		Work out the value of something	
Deduce		Work out the answer from the information provided	
Evaluate		Judge from available evidence	
Justify (a conclusion)		Support a case with evidence	
Suggest		Present a possible case	



0 7 . 1

NMO is a disease that leads to damage to nerve cells in the spinal cord. A person with NMO produces anti-AQP4 antibody that attacks only these nerve cells.

Explain why the anti-AQP4 antibody only damages these cells.

[4 marks]



0 7 . 1

NMO is a disease that leads to damage to nerve cells in the spinal cord. A person with NMO produces anti-AQP4 antibody that attacks only these nerve cells.

Explain why the anti-AQP4 antibody only damages these cells.

[4 marks]

1. (Anti-AQP4) antibody has a (specific) tertiary structure;
2. Has binding site / variable region that only binds to / complementary to one antigen;
3. Antigen to this antibody (only) found on these nerve cells;
4. So, antibody (only) binds to / forms antigen- antibody complex with these nerve cells (causing damage);

Reject "active site" (only penalise once if it occurs throughout)
3. / 4. Accept 'receptor' for antigen

INTRODUCTION TO CARBS



0 5 . 1 Contrast the processes of facilitated diffusion and active transport.

[3 marks]

0 5 . 2 Calculate the ratio of the mean **rate** of uptake of chloride ions in the first hour to the **rate** of uptake of chloride ions in the second hour for group **B** plants.

[2 marks]

Ratio = _____ :1

Students investigated the uptake of chloride ions in barley plants. They divided the plants into two groups and placed their roots in solutions containing radioactive chloride ions.

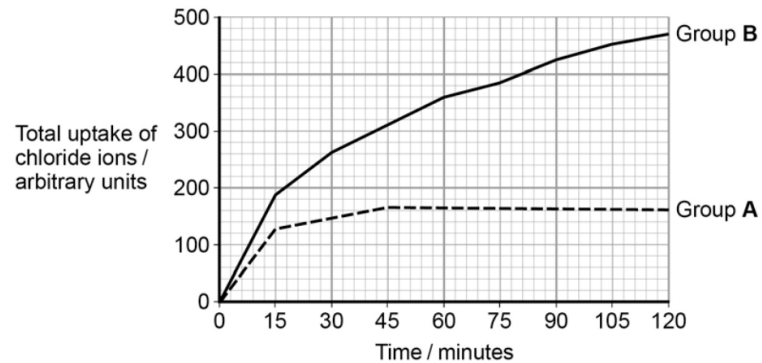
- Group **A** plants had a substance that inhibited respiration added to the solution.
- Group **B** plants did not have the substance added to the solution.

The students calculated the total amount of chloride ions absorbed by the plants every 15 minutes. Their results are shown in **Figure 4**.

0 5 . 3 Explain the results shown in **Figure 4**.

[4 marks]

Figure 4





0 5 . **1** Contrast the processes of facilitated diffusion and active transport.

[3 marks]

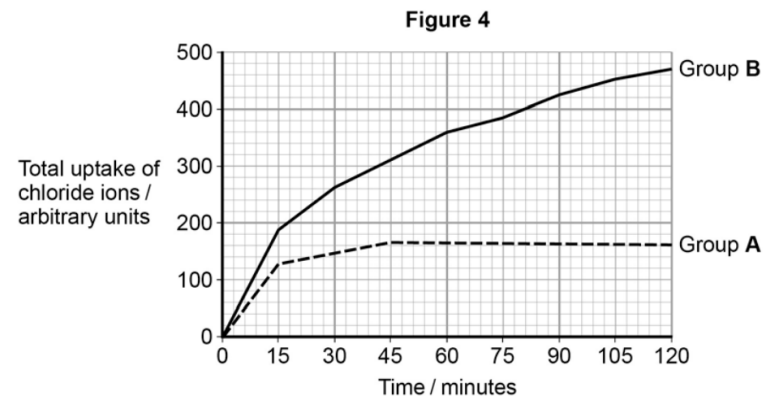
1. Facilitated diffusion involves channel or carrier proteins whereas active transport only involves carrier proteins;
2. Facilitated diffusion does not use ATP / is passive whereas active transport uses ATP;
3. Facilitated diffusion takes place down a concentration gradient whereas active transport can occur against a concentration gradient;

Since 'contrast', both sides of the differences needed

Students investigated the uptake of chloride ions in barley plants. They divided the plants into two groups and placed their roots in solutions containing radioactive chloride ions.

- Group **A** plants had a substance that inhibited respiration added to the solution.
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The students calculated the total amount of chloride ions absorbed by the plants every 15 minutes. Their results are shown in **Figure 4**.



0 5 . **2** Calculate the ratio of the mean **rate** of uptake of chloride ions in the first hour to the **rate** of uptake of chloride ions in the second hour for group **B** plants.

[2 marks]

3.3:1;

Correct answer = 2 marks

If incorrect, allow 1 mark for 470–360/60 for rate in second hour

Ratio = _____ :1

0 5 . **3** Explain the results shown in **Figure 4**.

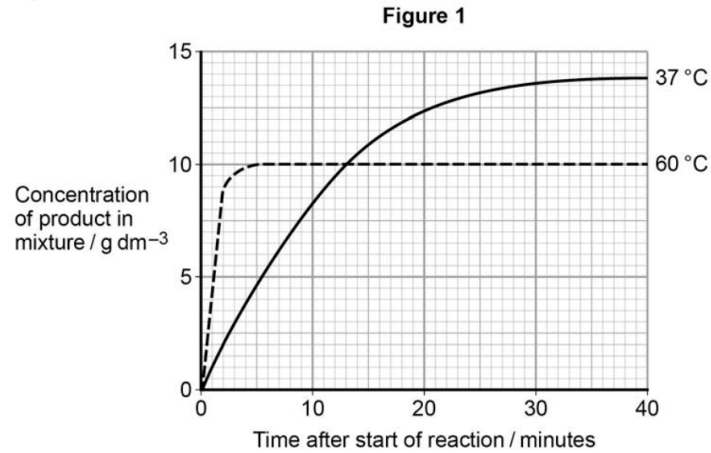
[4 marks]

1. Group A – initial uptake slower because by diffusion (only);
2. Group A – levels off because same concentrations inside cells and outside cells / reached equilibrium;
3. Group B – uptake faster because by diffusion plus active transport;
4. Group B fails to level off because uptake against gradient/no equilibrium to be reached;
5. Group B – rate slows because few/fewer chloride ions in external solution/respiratory substrate used up;



- 1 A technician investigated the effect of temperature on the rate of an enzyme-controlled reaction. At each temperature, he started the reaction using the same concentration of substrate.

Figure 1 shows his results.



- 0 1 . 3 Explain the difference in the initial rate of reaction at 60 °C and 37 °C.

[2 marks]

- 0 1 . 4 Explain the difference in the rates of reaction at 60 °C and 37 °C between 20 and 40 minutes.

[4 marks]

- 0 1 . 1 Give **two** other factors the technician would have controlled.

[1 mark]

- 1
- 2

- 0 1 . 2 Draw a tangent on each curve to find the initial rates of reaction. Use these values to calculate the ratio of the initial rates of reaction at 60 °C : 37 °C. Show your working.

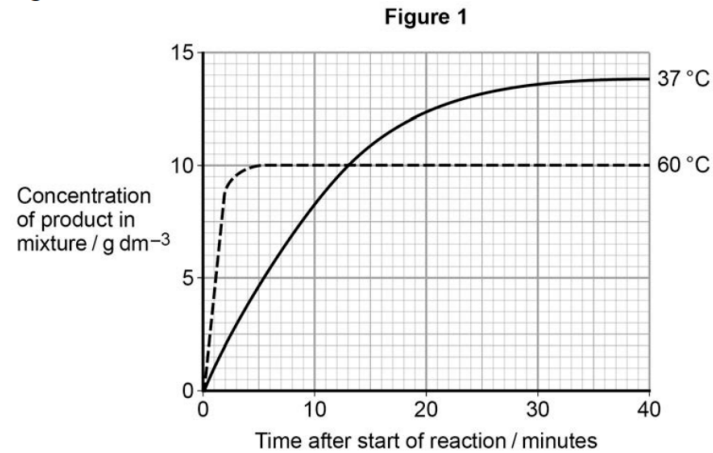
[2 marks]

Ratio = _____ :1



- 1 A technician investigated the effect of temperature on the rate of an enzyme-controlled reaction. At each temperature, he started the reaction using the same concentration of substrate.

Figure 1 shows his results.



0 1 . 3

Explain the difference in the initial rate of reaction at 60 °C and 37 °C.

[2 marks]

At 60 °C:

1. More kinetic energy;
2. More E-S complexes formed;

Allow converse for 37 °C

IA A P1 15 Q1.4

0 1 . 4

Explain the difference in the rates of reaction at 60 °C and 37 °C between 20 and 40 minutes.

[4 marks]

Different times:

1. Higher temperature / 60 °C causes denaturation of all of enzyme;
2. Reaction stops (sooner) because shape of active site changed;

Different concentrations of product (at 60 °C)

3. Substrate still available (when enzyme denatured);

4. But not converted to product;

Accept converse for 37 °C

2. Reject if active site on substrate

0 1 . 1

Give **two** other factors the technician would have controlled.

[1 mark]

- 1 Any two of the following;
Concentration of enzyme
- 2 Volume of substrate solution
pH

Allow same concentration of substrate

IA A P1 15 Q1.2

0 1 . 2

Draw a tangent on each curve to find the initial rates of reaction. Use these values to calculate the ratio of the initial rates of reaction at 60 °C : 37 °C. Show your working.

[2 marks]

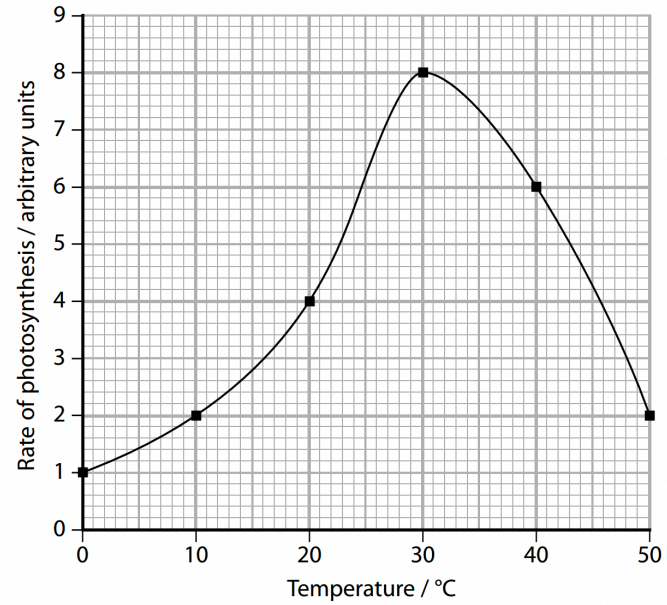
Ratio between 4:1 and 5:1;;

Initial rates incorrect but correctly used = 1 mark

Ratio = _____ :1



- 1 The reactions involved in photosynthesis are affected by environmental factors.
The graph shows the effect of temperature on the rate of photosynthesis in wheat.

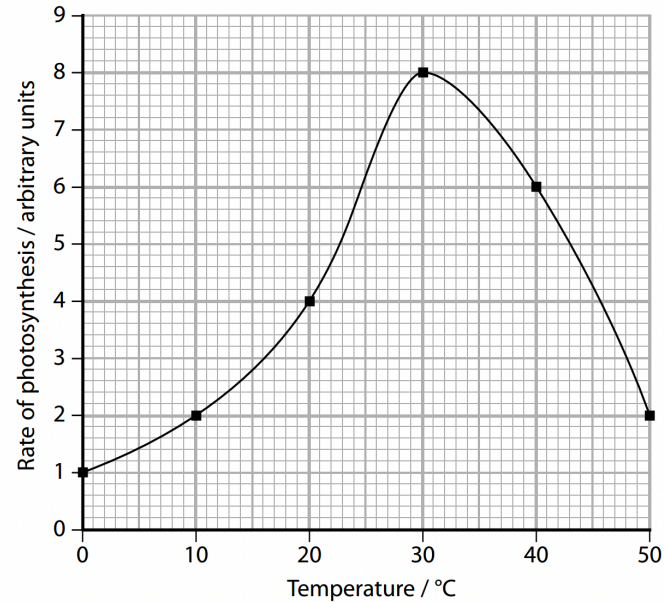


- (b) Explain the effect of temperature on the rate of photosynthesis in wheat.

(3)



- 1 The reactions involved in photosynthesis are affected by environmental factors.
The graph shows the effect of temperature on the rate of photosynthesis in wheat.



- (b) Explain the effect of temperature on the rate of photosynthesis in wheat.

(3)

An explanation that makes reference to three of the following:

1. increasing temperature increases {movement of both enzyme and substrate molecules / kinetic energy of molecules} (1)
2. therefore molecules collide {more often / with more force} causing the rate to increase (1)
3. resulting in {enzyme denaturation / change in bonding in the enzyme} above 30 °C (1)
4. which causes active site shape to change and causing the rate to decrease (1)



Cholesterol increases the stability of plasma membranes. Cholesterol does this by making membranes less flexible.

| *E. coli* has no cholesterol in its cell-surface membrane. Despite this, the cell maintains a constant shape. Explain why.

[2 marks]



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E. coli has no cholesterol in its cell-surface membrane. Despite this, the cell maintains a constant shape. Explain why.

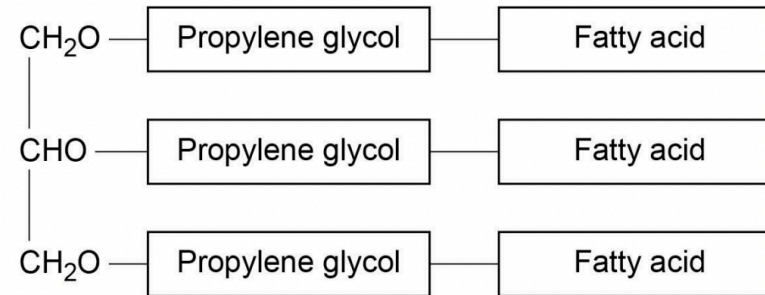
[2 marks]

1. Cell unable to change shape;
2. (Because) cell has a cell wall;
3. (Wall is) rigid/made of peptidoglycan/murein;



Figure 1 shows the structure of a fat substitute.

Figure 1



This fat substitute **cannot** be digested in the gut by lipase.

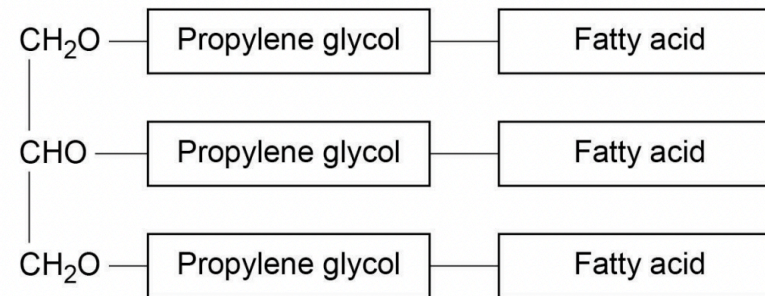
Suggest why.

[2 marks]



Figure 1 shows the structure of a fat substitute.

Figure 1



This fat substitute **cannot** be digested in the gut by lipase.

Suggest why.

[2 marks]

1. (Fat substitute) is a different/wrong shape/not complementary;
OR
Bond between glycerol/fatty acid and propylene glycol different (to that between glycerol and fatty acid)/no ester bond;
2. Unable to fit/bind to (active site of) lipase/no ES complex formed;

If wrong bond name given (e.g. peptide/glycosidic), then penalise once



Human breast milk is produced and secreted by gland cells. These gland cells have adaptations that include many mitochondria and many Golgi vesicles. The milk contains a high concentration of protein.

Explain the role of these cell adaptations in the production and secretion of breast milk.

[2 marks]



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Explain the role of these cell adaptations in the production and secretion of breast milk.

[2 marks]

1. (Many mitochondria) release energy / ATP for movement of vesicles / synthesis of protein / active transport;
2. (Many Golgi) vesicles transport protein / glycoprotein / milk to cell membrane / out of cell;

Must include function of organelle and use in context of milk production.

Ignore reference to lipid / triglyceride

1. Reject reference to mitochondria undergoing anaerobic respiration

1. Reject "produce energy".

1. Reject "energy for respiration"

2. Accept exocytosis as transport and release

2. Ignore references to proteinsynthesis