Past-paper walk-through

Active transport ▪ 3.3

eXercise

Questions in this set

- 0610/21 N25 Q6 ▪ 1 mark
- 0610/21 N25 Q18 ▪ 1 mark
- 0610/21 J25 Q4 ▪ 1 mark
- 0610/23 J25 Q19 ▪ 1 mark
- 0610/22 M25 Q6 ▪ 1 mark
- 0610/42 M25 Q1 ▪ 16 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- // separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = "or words to that effect" – the wording need not match.

Question 6

0610/21 N25 ▪ Q6 ▪ 1 mark

6 Which row shows correct statements about active transport?

	direction of movement	requires a partially permeable membrane
A	down a concentration gradient	no
B	down a concentration gradient	yes
C	against a concentration gradient	no
D	against a concentration gradient	yes

Solution 6

Answer: **D**

Why

- Active transport moves substances *against* the concentration gradient, from low to high.
- It uses carrier proteins embedded in a partially permeable membrane.
- So it needs the membrane, and it works up the gradient rather than down it.

Question 18

0610/21 N25 ▪ Q18 ▪ 1 mark

18 Which process requires energy from respiration?

A diffusion

B osmosis

C protein synthesis

D transpiration

Solution 18

Answer: **C**

Why

- Protein synthesis builds new molecules, so it needs energy.
- That energy comes from respiration, as ATP.
- Diffusion, osmosis and transpiration are all passive and need no energy from the organism.

Question 4

0610/21 J25 ▪ Q4 ▪ 1 mark

4 A student made the following statements about the movement of ions by active transport.

1 It is the net movement of particles from a low concentration to a high concentration.

2 It is the net movement of particles from a high concentration to a low concentration.

3 It requires the use of energy from respiration.

4 It can only take place in living cells.

Which statements are correct?

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

Solution 4

Answer: **A**

Why

- Active transport moves substances *against* the concentration gradient, from low to high.
- That needs energy from respiration and a protein carrier in the membrane.
- Diffusion and osmosis go the other way and need no energy.

Question 19

0610/23 J25 ▪ Q19 ▪ 1 mark

19 Which process in plants uses energy from respiration?

A cell division

B osmosis

C photosynthesis

D transpiration

Solution 19

Answer: **A**

Why

- Cell division needs energy to build new material and to move the chromosomes.
- That energy comes from respiration.
- Osmosis and transpiration are passive, and photosynthesis *stores* energy rather than using it from respiration.

Question 6

0610/22 M25 ▪ Q6 ▪ 1 mark

6 Three processes are listed.

1 Molecules or ions are moved across membranes.

2 Molecules or ions are moved by protein carriers.

3 Ions are taken up by root hairs.

Which processes can involve active transport?

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

Solution 6

Answer: **A**

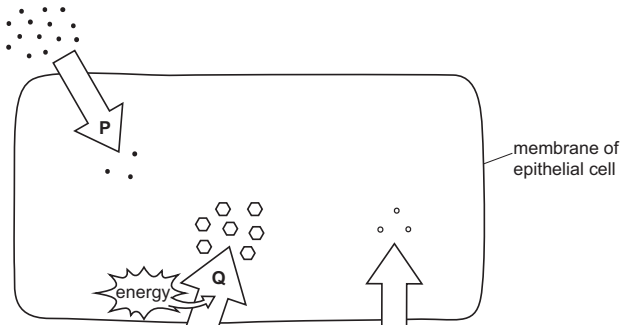
Why

- Active transport moves substances across membranes, so process 1 applies.
- It uses protein carriers in the membrane, so process 2 applies.
- Root hairs take up ions against a gradient by active transport, so process 3 applies too.

Question 1

0610/42 M25 ▪ Q1 ▪ 16 marks

1 Fig. 1.1 shows the movement of particles through an epithelial cell in the small intestine.



Question 1

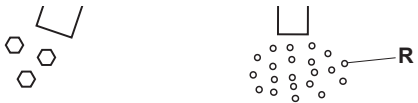


Fig. 1.1

(a) In Fig. 1.1, arrow **P** represents the diffusion of oxygen molecules.

(i) Describe what is meant by the term diffusion.

Question 1

(ii) State the type of energy needed for diffusion.

Question 1

(b) Carbon dioxide molecules also move by diffusion.

(i) State the name of the process in human cells that produces carbon dioxide.

Question 1

(ii) On Fig. 1.1, draw an arrow to show the direction of diffusion of carbon dioxide molecules.

[1]

(c) In Fig. 1.1, arrow **Q** represents another type of particle movement.

Identify the type of particle movement represented by arrow **Q**.

Explain your answer.

Question 1

Question 1

[3]

(d) In Fig. 1.1, particle **R** moves from the lumen of the small intestine into the epithelial cell.

Suggest why particle **R cannot** be starch.

Question 1

(e) Fig. 1.2 is a photomicrograph of red onion cells.

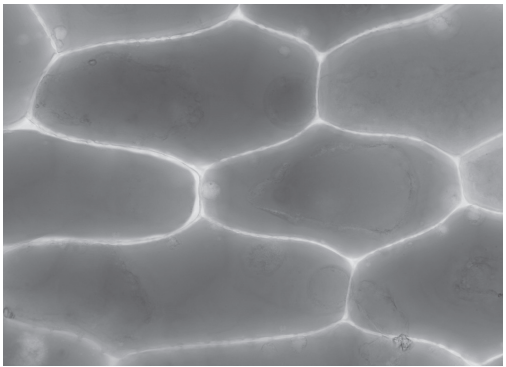


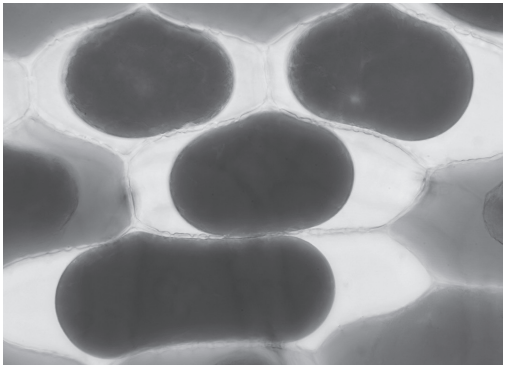
Fig. 1.2

Question 1

Fig. 1.2

Question 1

Fig. 1.3 is a photomicrograph of the same red onion cells after being immersed in a salt solution.



Question 1

Question 1

Fig. 1.3

Using Fig. 1.2 and Fig. 1.3, describe **and** explain the difference in appearance of the cells before and after immersion in salt solution.

Question 1

[Total: 16]

Solution 1

(a)(i)

Mark scheme

- net movement / AW, of particles ;
- from a region of higher concentration to a region of their lower concentration
- (as a result of their random movement) ;
- 2

Solution 1

(a)(ii)

Mark scheme

- kinetic (energy) ;
- 1

Solution 1

(b)(i)

Mark scheme

- aerobic respiration ;
- 1

(b)(ii)

Mark scheme

- arrow drawn from inside to outside of epithelial cell ;
- 1

Solution 1

(c)

Mark scheme

- type:
- active transport ;
- explanation:
- (particles move from) low(er) concentration to high(er) concentration ;
- uses energy ;
- 3

Solution 1

(d) Mark scheme

- any two from:
- starch is insoluble ;
- starch is (too) large ;
- starch has already been broken down / AW ;
- 2
- 0610/42
- February/March 2025
- Guidance

Solution 1

(e) Mark scheme

- any six from:
- 1
- idea of before immersion cells are turgid / idea of after immersion cells
- are flaccid or plasmolysed ;
- 2
- idea of before immersion cell membrane or cytoplasm pushes against
- cell wall / idea of after immersion cell membrane or cytoplasm pulls
- away from cell wall ;

Solution 1

- 3
- idea of before immersion increased turgor pressure / idea of after
- immersion decreased turgor pressure ;
- 4
- ref to osmosis ;
- 5
- salt solution is concentrated or has a lower water potential / cytoplasm is
- dilute or has a higher water potential ;
- 6
- water moves from high water potential to low water potential ;

Solution 1

- 7
- through a partially permeable membrane ;
- 8
- cytoplasm / vacuole / cell contents, is darker (after immersion) / ora ;
- 9
- cytoplasm / vacuole / cell contents, are more concentrated (after
- immersion) / ora ;
- 6
- 0610/42
- February/March 2025

Solution 1

- Guidance