

Question 6 (Answer: **D**)

- 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 (Answer: **C**)

- 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 (Answer: **A**)

- 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 (Answer: **A**)

- 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 (Answer: **A**)

- 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.

1(a)(i)	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) ;
1(a)(ii)	<u>kinetic</u> (energy) ;
1(b)(i)	aerobic respiration ;
1(b)(ii)	arrow drawn from inside to outside of epithelial cell ;
1(c)	<i>type:</i> active transport ; <i>explanation:</i> (particles move from) low(er) concentration to high(er) concentration ; uses energy ;
1(d)	<i>any two from:</i> starch is insoluble ; starch is (too) large ; starch has already been broken down / AW ;
1(e)	<i>any six from:</i> 1 <i>idea of</i> before immersion cells are turgid / <i>idea of</i> after immersion cells are flaccid or plasmolysed ; 2 <i>idea of</i> before immersion cell membrane or cytoplasm pushes against cell wall / <i>idea of</i> after immersion cell membrane or cytoplasm pulls away from cell wall ; 3 <i>idea of</i> before immersion increased turgor <u>pressure</u> / <i>idea of</i> after immersion decreased turgor <u>pressure</u> ; 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 ; 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 ;