

- 1 (a) (voluntary)
 ref. to going into room ;
 ref. to switching on light ;
 ref. to grabbing door handle ;
- (involuntary)
 pupils changed size ;
 heart beat speeded up ;
 ref. to sneezing ; [max. 4]
- (b) (i) muscle ; [2]
gland ;
- (ii) motor / efferent (neurone) ; [1]
- (c) (i) phototropism ; (ignore refs. to positive or negative) [1]
- (ii) paint auxin on one side of shoot (or description of other suitable treatment) ;
 place shoot in a dark place AW ;
 leave + for stated period of time (e.g. 1 to 3 days) / until the shoot
 to grows vertically / changes direction AW ;
 ref. to control without auxin ;
 ref. to repeats used ; [max. 4]
- (iii) auxin accumulates on or moves to + shaded side of shoot / auxin is broken down by light ;
 difference in concentrations on shaded side and light side ;
 cells with higher concentration of auxin absorb more water ;
 causes unequal growth ; [max. 3]
- (d) i. ref. to large concentrations used ;
 ii. plants / leaves / stems + are stimulated to grow rapidly ;
 iii. growth gets out of control ;
 iv. root growth inhibited by high concentrations of auxin ;
 v. so plants die ; (linked to ii, iii or iv) ;
 vi. ref. to only broad leaved plants affected AW ; [max. 2]
- [max. 17]**

- 2 (a) (i) maintaining cell turgidity ;
preventing wilting ;
transport of named materials (minerals / amino acids / sugars) ;
medium for enzyme action ;
raw material for photosynthesis ; [max. 3]
- (ii) salt concentration in soil is higher than in roots AW ;
ref. to water potential is greater in root cells than in soil / w.p gradient
goes from cells to soil AW;
so water is drawn out of roots + by osmosis ;
cells become flaccid ;
plant wilts ;
plant lacks water ; [max. 3]
- (b) (i) active transport ; [1]
- (ii) growth would be slower ;
because some of the plant's energy would be used in active transport ; [2]
- (iii) (ACCEPT OTHER NUTRIENTS AND FUNCTIONS)
magnesium ;
ref. to the formation of chlorophyll ;
nitrate ;
ref. to growth / formation of amino acids or protein ; [4]
- (c) the removal of a gene from one species ;
and its insertion into another species ;
(in article) genes are modified, not transferred AW ;
Ⓐ other valid arguments [3]
- (d) ref. to leaching of minerals AW ;
ref. to eutrophication + of rivers / lakes ;
ref. to soil erosion ;
creation of water shortage ;
ref. to soil + becomes infertile / lacks minerals ; [max. 2]
- [max. 18]**