Plant Nutrition

Mark Scheme 7

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Plant Nutrition
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 7

Time Allowed: **42 minutes**

Score: **/35**

Percentage: **/100**

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 ;
gland ; **[2]**

(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]