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A2 Biology OCR

Unit F215: Control, genomes and environment

Module 4.1 Plant responses

Answers

1

(a) (apical / terminal) bud is source of auxin;
auxin inhibits growth of side shoot / ora;
remove bud and auxin concentration drops;
(this allows) cell division / elongation to take place;
ecf – marking points 2 and 3 if growth regulator or hormone used instead of auxin max 3

(b) *award two marks if correct answer (80%) is given*

award one mark for calculation if answer is not correct

(90 – 50 = 40) 40 / 50 × 100;
80%;; 2

(c) no growth until day, 8 / 10;
auxin moves out of paste / AW;
inhibits growth;
growth occurs after, 8 / 10, days;
because auxin, levels fall / 'used up'; 3

[8]

2

(a) (i) due to mutation; **A** *named mutation*
has changed, gene/allele/base sequence/DNA;
random;
irradiation/other named mutagen;
genetically engineered;
altered, mRNA/enzyme/protein;
selective breeding; max 2

(ii) light <u>intensity</u>;
carbon dioxide;
water/humidity;
temperature;
mineral content of soil/potting compost; **R** *nutrients*
pH;
lighting regime; max 2

(b) *wild type*
no significant/very little, difference;
those with water taller/ora;
18 day result an anomaly;
ref to figures from table; *need two figures at same age with correct units*

dwarf
those with gibberellin taller;
difference greater as they get older;
still shorter than wild type;
ref to figures from table; *need two figures at same age with correct units*

only penalise lack of units once

calculation of % difference between treatments for either wild type or dwarf; max 5

(c) dwarf unable to produce (active) GA/ora;
dwarf lacks enzyme for (active) GA formation/ora;
details of why dwarf lacks enzyme; **A** *has, recessive/mutant allele* max 2

[11]

3

light / daylength;
gravity;
water / humidity;
touch;
chemicals; **R** carbon dioxide
temperature; **A** heat 3 max

[3]

4

(i) depends on plant growth regulators ; **A** plant growth substances / plant hormones
named plant growth regulator ;
produced in a variety of tissues ;
may have effect at a distance ;
move, cell to cell / by diffusion / by active transport / via vascular tissue via a named vascular tissue / via plasmodesmata ;
different effects in different tissues ;
different effects when acting together ; 2 max

(ii) coordinate, growth / development / activities, of different parts ;
respond to internal changes ;
respond to, external / environmental / e.g. environmental, change ;
AVP ; e.g. comparison with animals 2 max

[4]

5

(a) (i) *penalise lack of units once in answer*

increase in, elongation / length, with auxin concentration up to, 1.4 / 1.8, µmol dm^{-3};

peak / maximum, at 1.4 µmol dm^{-3};
decrease between 1.4 and 1.8 µmol dm^{-3};
data quote with any 2 points;
linear / directly proportional, before <u>1.2</u> or linear inversely proportional after <u>1.5</u>;
R length decreases max 3

(ii) *mark first three factors*
temperature;
age of stems;
light, <u>intensity</u> / wavelength;
concentration of dissolved, ions / salts;
(concentration of) other named growth substance;
AVP;;;

e.g. pH, genotype (of plant), concentration of named metabolite (e.g. glucose / amino acids), O_2 concentration, CO_2 concentration

R 'amount of' max 3

(b) <u>cell</u>, enlargement / elongation; **R** stem
enzyme synthesis;
vacuolation;
increase in plasticity of cell walls;
(cell) wall softened by, H^+ / lowered pH;
high concentration of auxin causes inhibition of growth;
AVP; e.g. cell division, mitosis, replication, cytokinesis, increase in number of cells
R ref to uptake of nutrients max 2

(c) *assume answer is about plant growth substances unless stated otherwise*
treat refs to target, cells / tissue(s) and external stimuli as neutral

growth substances produced by, dividing cells / meristems;
ora hormones produced by, islets of Langerhans / alpha cells / beta cells / <u>endocrine</u> gland / pancreas
growth substances move, in phloem / in xylem / from cell to cell;
ora hormones / named hormone(s), move in blood
growth substances usually produce a permanent change in the plant;
ora hormones produce reversible change in blood sugar
(GS) not homeostatic / no negative feedback; *ora* for hormones
R positive feedback **A** description of negative feedback
(GS) not protein / not polypeptide; *ora* insulin / glucagon, are proteins
AVP; max 2

[10]