

(Plant hormones (auxins, gibberellins, ethene, uses in agriculture))

Q1.a)(2018)

to prevent water affecting the
direction of root growth

Q1.b)(2018)

gravity acts evenly on all sides

Q1.c)(2018)

(mean) includes the
(anomalous) result for seedling
4

Q1.d)(2018)

calculate (mean) from just
seedlings 1, 2, 3 and 5
or
repeat the investigation **and**
recalculate (a new mean)

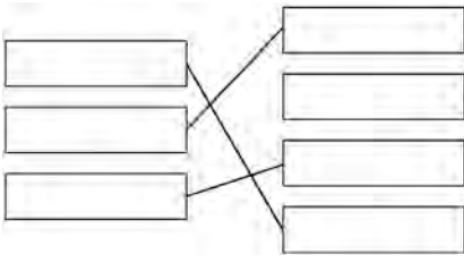
Q1.e)(2018)

uneven distribution of hormone
in (root / seedling of) A

even distribution of hormone in
B

(so) top grows fast(er) (than
bottom) in (root / seedling of) A
(and equal growth in B)

Q1.f)(2018)



Q2.a)(2019)

named example of tropism – eg
geotropism / gravitropism

correct corresponding stimulus –
eg gravity

Q2.b)(2019)

- several seedlings in each batch
or one pot of seedlings in each batch
- measure heights of shoots
- leave some in dark with light from one side / direction in box with hole
- control(s) with all-round light or rotating on clinostat or in dark
- control variable(s) eg same temperature / water / soil type
- after suitable time (at least several hours)
- record appearance of seedlings re. light direction
- re-measure heights of shoots
- detail of how bent shoots were measured – eg use thread or straighten them out
- calculate mean height increase for each group
- use ruler / protractor to estimate angle of bending

Q2.c)(2019)

leaves / plant receive(s) /
absorb(s) more light

(so) more photosynthesis

(so plant) produces more
glucose

Q3.(2020)

to increase fruit size

to promote flower production

Q4.a)(2020)

any **two** from:

- keep temperature the same
(for all dishes)
- use equal numbers of seedlings (in each dish)
- use seedlings of the same (initial) height
- use more seedlings in each dish
- give all dishes the same volume of water
- use seed(ling)s of the same species
- measure light intensity

Q4.b)(2020)

any **one** from:

- use a piece(s) of thread / string **and** measure length of thread (with ruler)
- straighten seedling / shoot **and** measure (with ruler)
- measure with a flexible ruler **or** a tape measure

Q4.c)(2020)

(side nearest the lamp) receives more light (on side P)

(therefore) unequal distribution of auxin

(auxin causes) more growth on side away from the lamp

Q5.(2020)

ethene is released from
bananas

Q6.a)(2022)

any **two** from:

- (same volume of) water
- (same) temperature
- (same) species / type of plant
- (same) age of shoot

Q6.b)(2022)

B shows response (in **A**) is due
to light (as **B** has no light)

C shows response (in **A**) is due
to one-sided light (as **C** has light
from all sides)

Q6.c)(2022)

growth / elongation occurs (just)
behind / below / at the tip

bending occurs (just) behind /
below / at the tip

or

more growth on the side away
from the light

Q6.d)(2022)

phototropism / phototropic

Q7.a)(2022)

in **F** there is more auxin in the side furthest from the light

in **G** there is the same mass of auxin in each side

in **F** auxin can move through the shoot but in **G** the glass prevents this

Q7.b)(2022)

all four (blocks) have (approximately) the same mass of auxin

Q8.a)(2024)

to prevent (direction of) light affecting the results

or

to prevent (direction of) light affecting growth (of roots)

Q8.b)(2024)

to prevent water affecting the direction of root growth

to provide enough water for root growth

Q8.c)(2024)

to compare (with apparatus **A**)

(so) it shows that gravity caused the results in apparatus **A**

or

(because) gravity acted equally in all directions (in apparatus **B**)

or

to cancel out the (one-sided) effect of gravity

Q8.d)(2024)

root drawn bending downwards

root drawn longer than at start

ink marks spread out in bent region

Q8.e)(2024)

(in B) horizontal

Q8.f)(2024)

uneven distribution of auxin

(so) upper side grows faster / more (than lower)

Q9.a)(2024)

any **two** from:

- weed killers
- rooting (powders)
- (promoting) growth in tissue culture

Q9.b)(2024)

any **two** from:

- promote / start / initiate /
force flowering
- more fruit
- bigger fruits