Mark schemes

Q1.

(a) tropism

1

(b) auxin

1

(c) nitrate ions

1

water

1

(d) **Level 3**: The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.

5–6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.

3–4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

Indicative content

- one pot of seedlings placed in box with slit

- one pot of seedlings in dark
- one pot of seedlings in full light

- measure heights of shoots
- remeasure heights of shoots
- record a feature of appearance of seedlings
- detail of how bent shoots were measured eg use thread or straighten them out
- calculate mean height increase for each group
- compare results (for each group of seedlings)

- control variable(s)
  - same temperature
  - same volume of water
  - same soil type
  - same age of seedlings
  - same species / type of plant
  - same time left for

For **Level 3**, a method comparing the growth of plants in light from one direction with plants in full light / darkness along with a control variable is required

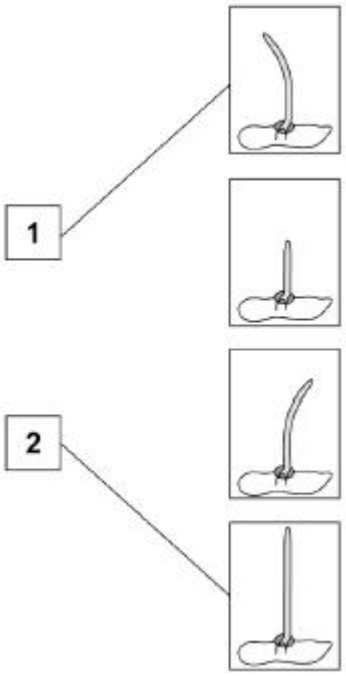
[10]

Q2.

(a) tropism

1

(b)



*do **not** accept more than one line from a box on the left*

2

(c) to show the response in experiment **1** is caused by (1-sided) light

*allow to compare (with experiment **1**)*

allow to show the difference between (1-sided) light and no light

or

as a control

*do **not** accept control variable*

1

(d) shine light from all sides on the third seedling

1

(e) keep each seedling at the same temperature

1

(f) any **one** from:

- gravity
- water

  allow moisture
- chemicals / minerals / ions

  allow a named chemical such as nitrate

  ignore nutrients

  ignore light

1

(g) because of variation (in results)
or
to identify / eliminate anomalies
allow example such as some may not grow
1

to calculate a mean
allow to calculate an average
or
a mean value would be more representative / typical
ignore to improve accuracy / precision / validity
1

[9]