

Mark schemes

1.	(a) stinging hairs / can sting	1
	(so) this harms herbivores / stops animals eating them	1
	(so) less of the plant is removed / damaged	1
	(b) clove (oil)	1
	it has the largest areas with no bacteria growing <i>allow largest inhibition zone or description of largest inhibition zone</i>	1
	(c) antibiotics were not tested	1
		[6]
2.	(a) A	1
	(b) D	1
	(c) use the same type of plant or give equal amount of water to each plant <i>ignore size of pot</i>	1
	(d) (advantage) more minerals	1
	(disadvantage) cost / not free	1
		[5]
3.	(a) compare them to (pictures in) a gardening manual / website	1
	send to laboratory (for testing)	1
	(b) (nitrate) stunted growth	1
	(magnesium) yellowing of leaves <i>allow chlorosis</i>	1

(c) (fertiliser **S**)

has most nitrogen for good growth

*if no other marks awarded allow 1 mark for (fertiliser **s**) has more minerals than compost*

1

(and) has high(est) potassium content for stronger roots

1

(it is also) cheaper than fertiliser **T**

1

(however) has less phosphate than fertiliser **T** (although more than compost) so flowers / fruit perhaps less important for the gardener

1

[8]

4.

(a) protein

1

(b) (i) (more) magnesium gives more growth / more leaves / more duckweed
if converse must be clear that less magnesium gives less growth

1

(ii) **A** gave highest number of leaves / plants **or** more than others
it equals 'A'
*use of numbers must compare **A** with at least one other*

or

A gave most growth / most duckweed **or** more than others
allow faster / fastest / better / best growth
allow more growth with nitrate / less growth without nitrate
do not allow 'no' growth without nitrate

(c) (i) mark (c) as a whole

sensible method:

e.g. mass / weighing

ignore dry or fresh

allow other sensible method involving measuring eg length of roots
– ignore 'size' of roots or measure roots unqualified

1

(ii) corresponding explanation:

ignore accuracy

e.g. includes roots / includes whole plant

or

leaves vary in size

or

(length / mass / surface area given in c(i)) is a continuous variable

1

[5]

5.

(a) to kill virus

or

to prevent virus spreading

1

(b) take (stem) cells from meristem

or

tissue culture

allow take cuttings

1

(c) use Benedict's solution

1

glucoses turns solution blue to orange

1

(d) **Level 2 (3–4 marks):**

A detailed and coherent explanation is provided. The student makes logical links between clearly identified, relevant points that explain why plants with TMV have stunted growth.

Level 1 (1–2 marks):

Simple statements are made, but not precisely. The logic is unclear.

0 marks:

No relevant content.

Indicative content

- less photosynthesis because of lack of chlorophyll
- therefore less glucose made
- so
- less energy released for growth
- because glucose is needed for respiration
- and / or
- therefore less amino acids / proteins / cellulose for growth
- because glucose is needed for making amino acids / proteins / cellulose

4

[8]

6.

(a) phloem

1

(b) translocation

1

(c) either:

less (sugars for) respiration

1

(so) less energy released

1

or

less amino acids made (1)

(so) less protein produced **or** less protein synthesis (1)

or

less cellulose made (1)

(so) weaker cell walls (1)

(d) (aphids) can fly to another plant **or** part of the plant

ignore to fly unqualified

1

to get (more) food

allow to find a mate

allow idea of less competition for food

allow to escape predators

*do **not** accept escape prey*

1

(e) (oil) prevents aphids from attaching to leaf **or** causes aphids to slide off leaf

ignore 'the leaf is slippery'

or

idea that oil may harm / kill the aphid

allow oil may be unpleasant to the aphid

1

(f) (plant / stem has) thorns

allow spines / spikes / prickles

ignore stings

*do **not** accept thorns protect (the plant) from predators*

1

(g) C

if any other letter given then no marks for the question

1

(fungi / spores) blown by / in direction of the wind

allow black spot / disease is blown by / in direction of the wind

or

it's the closest plant (to A)

*do **not** accept reference to bacteria / viruses / pollen being blown*

1

(h) any **one** from:

- spread rose bushes out more

allow isolate the infected plant

allow idea of barrier around infected plant

ignore separate unless qualified

- remove any infected parts of the plant

allow remove infected plant / A

- use a fungicide

ignore pesticide

*do **not** accept insecticides / herbicide*

1

[11]