

1

Tobacco mosaic virus (TMV) is a disease affecting plants.

The diagram below shows a leaf infected with TMV.



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(a) All tools should be washed in disinfectant after using them on plants infected with TMV.

Suggest why.

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(1)

(b) Scientists produced a single plant that contained a TMV-resistant gene.

Suggest how scientists can use this plant to produce **many** plants with the TMV-resistant gene.

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(1)

(c) Some plants produce fruits which contain glucose.

Describe how you would test for the presence of glucose in fruit.

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(2)

(d) TMV can cause plants to produce less chlorophyll.

This causes leaf discoloration.

Explain why plants with TMV have stunted growth.

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(4)

(Total 8 marks)

Mark schemes

1

- (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]