



R2103

MAINTAINING PLANT HEALTH

Level 2

Monday 18 June 2018

13:30 – 14:20

Written Examination

Candidate Number:

Candidate Name:

Centre Number/Name:

IMPORTANT – Please read carefully before commencing:

- i) The duration of this paper is **50** minutes;
- ii) **ALL** questions should be attempted;
- iii) **EACH** question carries **10 marks**;
- iv) Write your answers legibly in the lined space provided. It is **NOT** necessary that all lined space is used in answering the questions;
- v) Use **METRIC** measurements only;
- vi) Use black or blue ink only. Pencil can be used for drawing purposes only;
- vii) Where plant names are required, they should include genus, species and where appropriate, cultivar;
- viii) Where a question requires a specific number of answers; only the first answers given that meet the question requirement will be accepted, regardless of the number of answers offered;
- ix) Please note, when the word '**distinct**' is used within a question, it means that the items have different characteristics or features.

ANSWER ALL QUESTIONS

MARKS

Q1 a) Explain what is meant by the term 'cultural control' of plant health problems.

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b) Describe **ONE** cultural control for **EACH** of the diseases listed below:

- i) potato blight;
- ii) tobacco mosaic virus;
- iii) rose black spot;
- iv) apple and pear canker.

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i).....

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ii).....

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iii).....

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iv).....

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Total Mark

Please see over/.....

Q2 a) Describe **TWO** modes of action for contact chemicals on distinct **NAMED** pests, by completing the table below.

Type of chemical	Named pest	Mode of action
contact		
contact		

3

3

b) Describe **ONE** mode of action for systemic chemicals on a **NAMED** pest, by completing the table below.

Type of chemical	Named pest	Mode of action
systemic		

3

c) Name **ONE** chemical used to control garden pests.

1

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Total Mark

Please turn over/.....

MARKS
6

Q3 a) Describe the life-cycle of the slug with the use of a labelled diagram.

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b) Describe how slug populations can be controlled using a microscopic biological control.

4

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Total Mark

Please see over/.....

MARKS

Q5 a) State what is meant by the term 'plant disorder'.

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b) Name **FOUR** plant disorders and state **ONE** symptom of each, by completing the table below.

Disorder	One symptom
1.	
2.	
3.	
4.	

2

2

2

2

Total Mark

Please see over/.....

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Sharing the best in Gardening

R2103

MAINTAINING PLANT HEALTH

Level 2

Monday 18 June 2018

Candidates Registered	721		Total Candidates Passed	449	75%
Candidates Entered	599	83%	Passed with Commendation	95	16%
Candidates Absent/Withdrawn	111	15%	Passed	354	59%
Candidates Deferred	11	2%	Failed	150	25%

Senior Examiner's Comments:

- 1** Candidates should be able to demonstrate a good range of plant knowledge and be able to give accurately named plant examples where appropriate. Common names and generic names are often too vague and cannot be rewarded in the positive manner that genus, species and where appropriate, variety/cultivar can. This is particularly important when answering questions relating to particular (named) plant(s). Marks can only be awarded for these narratives where the example(s) are correctly and fully identified.
- 2** Candidates must be able to display accurate knowledge of the technical terms and concepts detailed in the syllabus, in the context of horticulture and also be aware that wider interpretation will not be rewarded. The examination should be regarded as a possible introduction to higher level studies, which will only be open to those who are in possession of a clear understanding of the horticultural terms and concepts which are current.
- 3** The introductory rubric given on the first page of each question paper should be read carefully by candidates. At each examination there are a significant number of candidates who ignore or misread the instructions given and consequently may not perform as well as they could have done.

- 4** Candidates should pace themselves during each paper. The most successful candidates allow sufficient time to read the question thoroughly before answering it and also take time to read through their answers. They should take care to write as legibly as possible, so that the examiner is in no doubt about what is intended.
- 5** Candidates need to interpret key words within questions, particularly those such as 'state', 'list' and 'describe'. Questions requiring descriptions or explanations obviously require a more detailed answer than those requiring a list.
- 6** It is important to ensure that responses to questions are to the point. Candidates should bear in mind that small sketches might be used to convey information more succinctly than words.
- 7** Successful candidates ensure that their answers are focused and to the point. It is disappointing when they cannot be rewarded for their efforts because the answer is irrelevant to the particular question. Candidates should take note of the mark allocation for specific sections and allocate their time and efforts accordingly.
- 8** Diagrams can enhance an answer and where appropriate can replace detailed descriptions. They should be large, clear and well annotated, ensuring that labels are properly attached to the features they describe. Diagrams should preferably be in pencil. Colour may be used successfully but only where it is relevant to the answer.
- 9** In each examination it is clear that some candidates are ill prepared to answer papers of the type set. It is essential that candidates have the opportunity to practice questions. Ideally some papers should be answered in a time constrained situation. Appropriate feedback must, in any case be provided.

Q1 a) Explain what is meant by the term 'cultural control' of plant health problems.

2

b) Describe **ONE** cultural control for **EACH** of the diseases listed below:

- | | | |
|------|-------------------------------|----------|
| i) | <i>potato blight;</i> | 2 |
| i) | <i>tobacco mosaic virus;</i> | 2 |
| ii) | <i>rose black spot;</i> | 2 |
| iii) | <i>apple and pear canker.</i> | 2 |

Q1a) The majority of candidates were able to state that 'cultural control' is the use of the best horticultural practices to maintain plants in the best possible condition of health and were awarded full marks. Candidates provided a number of suitable examples including: ensuring the soil is free from weeds to reduce competition with garden plants, providing appropriate soil conditions for crops e.g. correct watering regimes and correct soil pH.

Q1b) Candidates described a range of suitable cultural controls for the specific diseases and achieved full marks. Appropriate controls included:

- i) **Potato Blight** can be controlled by planting resistant cultivars from the Sarpo range, remove all rogue potatoes from the previous crop, grow early varieties to avoid the conditions favoured by potato blight and remove all potatoes at harvesting so that none are left in the ground.
- ii) **Tobacco Mosaic Virus** can be controlled by the removal and destruction of infected plants and by ensuring that hands are washed in hot soapy water and tools are sterilised using the disinfectant Virkon S to avoid spreading the virus. Always quarantine new plants which should be purchased from a reputable grower and use virus free seed.
- iii) **Rose Black Spot** can be controlled by removing fallen foliage and destroying it by burning. It can also be controlled by pruning out infected stems and burning them or by planting resistant cultivars e.g. *Rosa* 'Silver Jubilee' or *Rosa* 'New Dawn'.
- iv) **Apple and Pear Canker** can be controlled by planting resistant cultivars e.g. Apple 'Newton Wonder' or Apple 'Bramley's Seedling', cutting the canker out to healthy tissue and burning the arisings, ensuring that tools are sterilised between pruning cuts and liming acidic soils to increase resistance.

Q2 a) Describe **TWO** modes of action for contact chemicals on distinct **NAMED** pests, by completing the table below.

Type of chemical	Named pest	Mode of action
contact		
contact		

3

3

b) Describe **ONE** mode of action for systemic chemicals on a **NAMED** pest, by completing the table below.

Type of chemical	Named pest	Mode of action
systemic		

3

c) Name **ONE** chemical used to control garden pests.

1

Q2a) Full marks were gained by candidates who were able to describe the mode of action of contact chemicals for specific pests. Suitable answers included:

- A contact chemical can affect Peach Potato Aphid by coating the insect to block the spiracles/breathing pores which cause the insect to suffocate and die
- A contact chemical can also affect Glasshouse Whitefly by breaking down the insects' cuticle layer and causing the insect to desiccate

Q2b) Candidates who were able to describe the mode of action of a systemic chemical on a specific pest gained maximum marks. Suitable answers included:

- A systemic chemical can affect Scale Insects by interfering with the insects' nervous system causing paralysis and eventual death.

Q2c) The majority of candidates were able to name a chemical used to control garden pests and were awarded full marks. Acceptable answers included: metaldehyde, deltamethrin and fatty acids.

Q3 a) Describe the life-cycle of the slug with the use of a labelled diagram.

6

b) Describe how slug populations can be controlled using a microscopic biological control.

4

Q3a) Maximum marks were gained by candidates who were able to describe the life-cycle of the slug with the use of a labelled diagram. The best answers included:

- Slugs are hermaphrodite, mate and fertilise each other
- The eggs are white, spherical and each slug can lay up to 300 in batches of 10-15.
- The eggs hatch into immature adults when conditions are moist enough which can be within two weeks
- Time taken to develop into adults is dependent on species
- Several generations are laid in one year and can overlap
- Slugs overwinter as eggs or young slugs

Q3b) Many candidates provided good descriptions of how slug populations can be controlled using biological control. Suitable answers which were awarded full marks included:

- The nematode *Phasmarhabditis hermaphrodita* which is available in a spore form is used
- The nematode is applied as a drench to moist soil
- The soil temperature must be above 5°C
- The nematode invades the slug, infecting it with bacteria
- The nematodes feed on the slug body causing death and also reproduce in it
- A second application may be required if tender seedlings are grown later in the year.

Q4 a) State **ONE** situation where **EACH** of the following types of herbicide could be used. State an active ingredient for each situation, by completing the table below.

- i) selective;
- ii) contact.

	Situation	Active ingredient
Selective		
Contact		

2

2

b) Name **TWO** distinct weeds that could be controlled by a selective weed killer.

c) State **TWO** benefits and **TWO** disadvantages of using chemicals to control weeds.

Q4a) Candidates who were able to provide specific situations for the given types of herbicides including an active ingredient for each, gained full marks. Acceptable answers included:

- i) A selective herbicide can be used on a lawn or playing field e.g. 2, 4-D, MCPA or Dicamba
- ii) A contact herbicide can be used on paths or gravel e.g. Acetic acid, Fatty acids or Diquat

Q4b) The majority of candidates correctly named distinct weeds e.g. *Ranunculus repens* and *Taraxacum officinale* that could be controlled by a selective weed killer and were awarded full marks.

Q4c) Most candidates were able to state both benefits and disadvantages of using chemicals to control weeds and gained full marks. Suitable answers included:

Benefits

- Translocated chemicals can kill the whole plant which prevents regrowth from the root
- Chemicals can be residual which prevents germination of further weeds
- Chemicals are quicker to apply than manual weeding
- Chemicals can target specific weeds

Disadvantages

- Risk of spray drift onto other plants
- Chemicals can contaminate the soil if used inappropriately
- Need appropriate equipment and storage facilities for chemicals
- There is a risk of pollution of water courses when using chemicals.

Q5 a) State what is meant by the term 'plant disorder'.

2

b) Name **FOUR** plant disorders and state **ONE** symptom of each, by completing the table below.

Disorder	One symptom
1.	
2.	
3.	
4.	

2

2

2

2

Q5a) Candidates who showed a good understanding of the meaning of the term 'plant disorder' by stating that it is damage caused to a plant by adverse conditions that are not caused by pests or diseases, but non-living or abiotic factors received full marks.

Q5b) Candidates were able to name a range of plant disorders, stating appropriate symptoms of each and gained maximum marks. These included:

- 1) **Rose Balling** where the outer petals are fused together and the flowers fail to open.
- 2) **Fasciation** is where the stems of a plant are flattened and appear to be composed of several shoots that have fused together. Flattened, elongated flower heads also occur with the distorted flowers producing numerous flower heads.
- 3) **Excessive Shade** causes the shoots of plants to become weaker and etiolated where they grow towards the light and have long internodes.
- 4) **Frost Damage** is identified by the presence of blackened leaves and non-woody stems and in extreme cases, death of the plant.

	MARKS
Q6 a) Describe TWO symptoms of damping off disease.	4
b) Describe TWO methods used to control damping off disease.	4
c) State TWO symptoms of grey mould.	2

Q6a) Candidates who clearly understood the symptoms of damping off were able to describe them in detail and were awarded full marks. Acceptable answers included:

- Failure of seedlings to emerge, often in patches across the tray
- Seedlings having a 'pinched' appearance at the base and collapse, often in patches
- Yellow spotting on the foliage of the seedlings that have not collapsed. This is caused by the first stages of attack or by seedlings resisting attack

Q6b) A range of suitable methods used to control damping off disease were described by many candidates who gained maximum marks. These included:

- The use of sterile compost from commercial companies and sterile or new seed trays. Seeds should be sown as thinly as is appropriate for the species and pricked out as soon as possible to avoid overcrowding. The seedlings should be watered from below with mains water as rain water may carry the damping off fungi
- Always dispose of infected trays of seedlings immediately to avoid cross infection and destroy them by burning or by placing them in commercial green waste

Q6c) The best candidates were able to state specific symptoms of grey mould and gained full marks. Acceptable answers included:

- Fuzzy grey mould and rotting young stems, fruit or leaves
- Small black seed-like structures form in infected material
- Above ground parts of many plants, particularly buds and flowers, shrivel and die.