



R2103

MAINTAINING PLANT HEALTH

Level 2

Monday 11 February 2019

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.

MARKS
2

Q2 a) Describe **ONE** example of cultural pest control.

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b) Identify **TWO** distinct benefits **AND TWO** distinct limitations of using cultural and chemical pest control methods by completing the table below:

	Cultural control	Chemical control
Benefit	1	1
	2	2
Limitation	1	1
	2	2

2

2

2

2

Total Mark

Please turn over/.....

MARKS
6

Q3 a) Describe the life cycle of vine weevil using a labelled diagram.

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b) Describe **TWO** distinct symptoms of vine weevil damage.

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4

Total Mark

Please see over/.....

MARKS

Q4 a) State what is meant by **EACH** of the following types of weed giving **ONE** named plant example for **EACH**:

- i) ephemeral;
- ii) perennial.

2
2

i).....

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ii).....

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b) Name **ONE** distinct perennial weed **AND ONE** distinct annual weed found in **EACH** garden situation by completing the table below:

Situation	Annual weed	Perennial weed
Lawns		
Recently cultivated soil		

2

2

c) State the mode of action of **ONE NAMED** herbicide for the control of weeds in an herbaceous border.

2

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Total Mark

Please turn over/.....

Q5 Describe potato blight under **EACH** of the following headings:

- i) life cycle;
- ii) method of spread;
- iii) **TWO** methods of control.

MARKS

4
2
4

i).....

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Total Mark

Please see over/.....

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**The Royal Horticultural Society, Wisley, Woking, Surrey GU23 6QB.
Charity Registration Number: 222879/SC038262**

R2103

MAINTAINING PLANT HEALTH

Level 2

Monday 11 February 2019

Candidates Registered	753		Total Candidates Passed	544	86%
Candidates Entered	634	84%	Passed with Commendation	271	43%
Candidates Absent/Withdrawn	106	14%	Passed	273	43%
Candidates Deferred	13	2%	Failed	90	14%

Senior Examiner's Comments:

- 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.
- 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.
- 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) Name **TWO** beneficial organisms which control **TWO** distinct outdoor plant pests by completing the table below:

Beneficial organism	Outdoor plant pest

2

2

b) Describe, for the beneficial organisms named in a), **TWO** distinct methods used to encourage/introduce them into a garden.

4

c) Describe **ONE** way that the natural balance of biological pest control can be disturbed in a garden situation.

2

Q1a) The majority of candidates were able to name a range of beneficial organisms which control specific outdoor plant pests and were awarded full marks. Suitable answers included:

- Frogs eat slugs
- Ladybirds eat black bean aphids
- Blue tits eat peach potato aphid
- Thrushes eat snails
- Hedgehogs eat slugs

Candidates who named glasshouse pests could not be awarded any marks.

Q1b) Many candidates provided good descriptions of suitable methods used to encourage/introduce beneficial organisms into a garden and gained maximum marks. These included:

Frogs – build a pond with sloping sides to allow the frog access and exit routes. Grow marginal plants to provide shelter and protection around the pond.

Blue tits – provide bird feeders containing peanuts, bird seed and fat balls to encourage the birds into the garden during winter and spring. They will then eat the peach potato aphid during the growing season.

Hedgehogs – log piles and undisturbed areas are required to provide overwintering habitats. Ensure that there are gaps at the base of fences to allow hedgehogs to migrate between gardens.

Candidates who used the term ‘Bug Hotel’ and ‘Hedgehog Hotel’ could not be awarded any marks as it does not provide sufficient detail of the habitat required. Similarly birds do not shelter in boxes, they use them for nesting.

Q1c) Full marks were gained by candidates who described ways that the natural balance of biological pest control can be disturbed in a garden situation. These included:

- Indiscriminate/incorrect/overuse of pesticides that could destroy natural predators or destroy the source of food for predators. This would reduce the population of beneficial insects.
- Cutting hedges during the nesting season will disturb nesting birds which can decimate the bird population which controls aphids.
- The overuse of fertiliser can lead to sappy green growth which is more susceptible to attack by pests.

Q2 a) Describe **ONE** example of cultural pest control.

2

b) Identify **TWO** distinct benefits **AND TWO** distinct limitations of using cultural and chemical pest control methods by completing the table below:

4

2

	Cultural control	Chemical control
Benefit	1	1
	2	2
Limitation	1	1
	2	2

Q2a) Candidates described a wide range of cultural pest controls and achieved maximum marks. Acceptable answers included:

- Removal of weeds from borders as some act as alternative hosts for specific pests and diseases e.g. *Capsella bursa-pastoris* is a host for clubroot
- Crop rotation prevents the build-up of pests and diseases
- Good hygiene practices e.g. cleaning and sterilising tools, equipment and greenhouses reduces the incidence of pests overwintering
- Not composting pest and disease infected material
- Not composting perennial weeds e.g. *Taraxacum officinale*
- Removal and burning fallen leaves of e.g. roses to prevent the spread of rose black spot
- Growing resistant cultivars e.g. Carrot 'Fly Away' which is resistant to carrot fly

Q2b) Most candidates were able to identify both benefits and limitations of using cultural and chemical pest control methods and were awarded full marks. Suitable answers included:

Cultural – Benefits

- Unlikely to harm beneficial organisms
- Safer for the environment compared to use of chemicals
- Safer for the operator as exposure to chemicals has been removed
- Can be used as a preventative

Cultural – Limitations

- Needs to be carried out frequently to be effective
- Some pest damage may have to be accepted
- Must be carried out at the correct stage of the life cycle
- May not provide total control
- Can be labour intensive

Chemical – Benefits

- Targets the pest/disease/weed at the most susceptible stage of its life cycle
- Can be pest specific
- Can be fast acting and reduce the pest problem quickly

Chemical – Limitations

- Pests and diseases can build up resistance to chemicals
- Beneficial organisms and wildlife can be damaged
- Damage can be caused to water courses/aquatic environment if used incorrectly

Q3 a) Describe the life cycle of vine weevil using a labelled diagram.

6

b) Describe **TWO** distinct symptoms of vine weevil damage.

4

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

- Virtually all vine weevils are female
- Female vine weevil lay approximately 500-600 eggs during spring and summer in the soil near the base of plants
- Eggs hatch into larvae between 8 days at 27°C and 56 days at 9°C
- Larvae are 'C' shaped, 1mm in length, creamy white with a chestnut brown head
- Larvae burrow into the soil to overwinter and then pupate when they are fully grown, 13mm
- Adults emerge as dull black beetles in April
- Vine weevil have a life cycle that is a complete metamorphosis

Q3b) Candidates who correctly described the symptoms of vine weevil damage were awarded maximum marks. 'Notching' of the leaf edges is carried out by adult weevils on evergreen foliage. Root damage is also carried out by the larvae which causes wilting, total collapse and often death of the plant especially in ornamental herbaceous plants.

Q4 a) State what is meant by **EACH** of the following types of weed giving **ONE** named plant example for **EACH**:

- i) ephemeral;
- ii) perennial.

2
2

b) Name **ONE** distinct perennial weed **AND ONE** distinct annual weed found in **EACH** garden situation by completing the table below:

Situation	Annual weed	Perennial weed
Lawns		
Recently cultivated soil		

2
2

c) State the mode of action of **ONE NAMED** herbicide for the control of weeds in an herbaceous border.

2

Q4a) Candidates who showed a good understanding of the meaning of the specific terms received full marks. Acceptable answers included:

- i) **Ephemeral** is where a weed completes several life cycles in one growing season e.g. *Cardamine hirsuta* or *Stellaria media*.
- ii) **Perennial** is where a weed lives for more than two years e.g. *Taraxacum officinale* or *Ranunculus repens*.

Q4b) The best candidates were able to name both annual and perennial weeds for specific garden situations and gained full marks. Suitable answers included:

Lawns – annual weed e.g. *Poa annua* or *Veronica persica*

Lawns – perennial weed e.g. *Bellis perennis* or *Ranunculus repens*

Recently cultivated soil – annual weed e.g. *Chenopodium album* or *Urtica urens*

Recently cultivated soil – perennial weed e.g. *Taraxacum officinale* or *Aegopodium podagraria*

Q4c) The majority of candidates stated Glyphosate which is a translocated herbicide or Diquat, Acetic Acid or Fatty Acid which are all contact herbicides suitable for an herbaceous border and were awarded maximum marks.

Q5 Describe potato blight under **EACH** of the following headings:

- | | |
|-------------------------------------|----------|
| i) life cycle; | 4 |
| ii) method of spread; | 2 |
| iii) TWO methods of control. | 4 |

Q5 Maximum marks were awarded to candidates who were able to describe potato blight and its control. Acceptable answers included:

- i) Potato blight is a microscopic, fungal organism whose spores (sporangia) easily break away from infected foliage and may be wind-blown during dull, humid weather. If a spore lands on a wet leaf surface it soon produces many zoospores that are dispersed on air currents which then settle and grow into the tissues of the leaf. After approximately 4 – 7 days in humid conditions a lesion is visible and new flagellate zoospores are formed which grow out from the lower leaf surface. These can detach from the stalks in air currents, drift off and may land on another leaf or stem and start a new infection.
- ii) Potato blight overwinters as oospores in crop debris or composted crop residue. The most common overwintering host is on composted or discarded tubers which then grow infected shoots in early spring. These release sporangia and the cycle commences again.
- iii) Potato blight can be controlled by growing resistant varieties e.g. Sarpo 'Mira', Sarpo 'Gwyn' or planting early varieties e.g. 'Charlotte', 'Duke of York' which are harvested before the peak time for infection. The purchase of certified seed potatoes is preferable to saving potatoes from the previous crop which may harbour fungal spores. Practicing good hygiene by removing all traces of the previous crop and burning unwanted tubers is beneficial. It is important to check foliage regularly for signs of blight and removing infected parts by cutting down haulms to the base of the plant and burning infected material.

MARKS

- Q6 a)** Name **TWO** distinct plants which tolerate drought conditions. **2**
- b) Describe **THREE** effects of waterlogging on the growth of plants. **6**
- c) Describe **ONE** suitable method used to avoid waterlogging. **2**

Q6a) Most candidates named suitable plants which tolerate drought conditions e.g. *Rosmarinus officinalis*, *Lavandula angustifolia* and received full marks.

Q6b) Candidates who showed a good understanding of the effect of waterlogging on the growth of plants gained maximum marks. Suitable answers included:

- Anaerobic conditions occurring in the root of plants
- Reduction in the uptake of nutrients and water causing yellowing of the leaves and wilting
- Blue-black roots which may be accompanied by a sour or rotting smell
- Plants may be stunted and have a reduced yield/flowers/fruit
- Some plants can suffer from oedema which can be identified as bumps or blisters on the leaves and stems

Q6c) Candidates described a range of suitable methods used to avoid waterlogging and were awarded full marks. These included:

- Improve soil structure and drainage by incorporation of bulky organic matter or grit when cultivating
- Grow plants in raised beds with free draining soil
- Install a drainage system e.g. French drain
- Grow *Salix* and *Alnus* spp. which will take up water and reduce prolonged waterlogging
