Royal Horticultural Society

R2103

MAINTAINING PLANT HEALTH

Level 2

Monday 13 February 2012

13.30 – 14.10

Written Examination

Candidate Number: .....

Candidate Name: .....

Centre Number/Name: .....

IMPORTANT – Please read carefully before commencing:

i) The duration of this paper is **40 minutes**.

ii) **ALL** questions should be attempted.

iii) **EACH** question carries **10 marks**.

iv) Write your answers legibly in the spaces provided.

v) Use metric measurements only.

vi) Where plant names are required, they should include genus, species and where appropriate, cultivar.

vii) Please note, sufficient lined space is provided. It is **not** necessary that all lined space is used when answering a question.

ANSWER ALL QUESTIONS

MARKS

Q1 a) Identify **ONE** host plant for **EACH** of the diseases listed below:

i) club root;
ii) honey fungus. **2**

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b) State **TWO** symptoms and **TWO** control measures for **EACH** of the plant diseases listed in a), by completing the table below.

Disease	Symptoms	Control Measures	
Club Root	1 2	1 2	**4**
Honey Fungus	1 2	1 2	**4**

Total Mark

Please see over/.....

MARKS

Q2 a) Name **TWO** distinct annual weeds. **2**

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b) Describe the biology of annual weeds. **4**

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c) State **TWO** distinct types of herbicide used to control annual weeds.
Name **ONE** active ingredient for **EACH** type. **4**

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Total Mark

MARKS

Q3 a) Describe, with the aid of a clearly labelled diagram, the stages in the life cycle of the Cabbage White Butterfly. **8**

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b) State how **TWO** distinct methods of control relate to the life cycle of the Cabbage White Butterfly. **2**

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Total Mark

Please see over/.....

MARKS

Q4 a) Describe the damage caused by **TWO** distinct **NAMED** plant viruses. **4**

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b) State **TWO** methods by which viruses can spread and how **EACH** of these can be avoided. Complete the table below. **6**

Method of Spread	Method of avoidance

Total Mark

Please turn over/.....

MARKS

Q5 a) State what is meant by the term 'plant physiological disorder'. **1**

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b) List **FOUR** causes of plant disorders. **4**

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c) Name a plant susceptible to 'fireblight'. **1**

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d) State **TWO** symptoms of 'fireblight' and state **TWO** methods used to limit its spread. **4**

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MARKS

Q6 a) Describe **ONE** method of controlling weeds without using chemicals. **2**

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b) State **ONE** horticultural situation where translocated herbicides could be used appropriately. **2**

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c) List **SIX** safety precautions that an operative should take when using chemicals for pest and disease control to avoid risks to people and the environment. **6**

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Total Mark

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

R2103

MAINTAINING PLANT HEALTH

Level 2

Monday 13 February 2012

Candidates Registered	898	**Pass with Commendation**	247 (33.20%)
Candidates Entered	744	**Pass**	305 (40.99%)
Absent/Withdrawn/Deferred	154	**Fail**	192 (25.81%)
Total Candidates Passed	552 (74.19%)		

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 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, and preferably 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.

10. Candidates should be aware of the reading list of suggested books for the RHS Level 2 Certificate in The Principles of Plant Growth, Propagation and Development which is available from the Qualifications Section and can also be found on the RHS website together with past papers

Examiners' Comments:

Marks

Q1 *a) Identify **ONE** host plant for **EACH** of the diseases listed below:*

i) club root;
ii) honey fungus. ***2***

*b) State **TWO** symptoms and **TWO** control measures for **EACH** of the plant diseases listed in a), by completing the table below.*

Disease	***Symptoms***	***Control Measures***
Club Root	*1* *2*	*1* *2*
Honey Fungus	*1* *2*	*1* *2*

a) Full marks were awarded to candidates who gave full botanical names of host plants for clubroot e.g. *Brassica oleracea* 'Diablo', *Brassica oleracea* 'Hispi' and *Brassica oleracea* 'Beauty' and *Acer platanoides, Betula pendula* and *x Cuprocyparis leylandii* for honey fungus.

b) Symptoms were generally well described with the best answers giving detailed descriptions of specific symptoms for the diseases mentioned and avoiding generic symptoms that could be applied to a range of diseases. Symptoms of club root include; swollen, distorted roots and reddening of the foliage and wilting on hot days while symptoms of honey fungus which gained full marks included; sheets of mycelium under the bark and clusters of honey coloured toadstools around the base of the tree.

The better candidates provided more detailed information for the control of the diseases e.g. the distance and depth of vertical soil barriers for the control of the rhizomorphs in honey fungus or maintaining the soil at pH 7 by liming to discourage clubroot.

Very few candidates mentioned the use of modern brassica cultivars which are resistant to club root or the planting of species showing a degree of resistance to honey fungus whilst avoiding susceptible species.

Q2 *a) Name **TWO** distinct annual weeds.* ***2***

b) Describe the biology of annual weeds. ***4***

*c) State **TWO** distinct types of herbicide used to control annual weeds. Name **ONE** active ingredient for **EACH** type.* ***4***

a) The majority of candidates were able to give the botanical name for two annual weeds e.g. *Chenopodium album* and *Galium aparine* and were awarded full marks. A few candidates misread the question and gave examples of ephemeral and perennial weeds which were incorrect.

b) Most candidates were able to describe the life cycle of an annual weed correctly although it was essential to state that the weed dies after setting seed. The best candidates provided additional information e.g. large number of seeds produced, prolonged dormancy, vigorous dispersal mechanisms, shallow fibrous roots, early germination etc.

c) The majority of candidates were able to state two distinct types of herbicides i.e. translocated, residual or contact and their active ingredients e.g. translocated, glyphosate, residual, oxadiazon and contact, diquat. Some candidates lost marks where they gave product names. It is important that candidates only name current chemical products as listed on the UK Pesticide register.

Q3 *a) Describe, with the aid of a clearly labelled diagram, the stages in the life cycle of the Cabbage White Butterfly.* ***8***

*b) State how **TWO** distinct methods of control relate to the life cycle of the Cabbage White Butterfly.* ***2***

a) Most candidates were able to draw the basic stages of the Cabbage White Butterfly e.g. egg, larva, chrysalis and adult in the correct order. The best answers included additional detail e.g. timing, description and location of the parts of the life cycle i.e. yellow cigar-shaped eggs laid on the underside of the leaves in spring. A very few candidates described the production of two or more generations in the summer and gained maximum marks.

Cyclical diagrams were preferable and those candidates who provided their information on the diagram were able to save time rather than repeating it in additional text.

b) A range of control methods were provided by the majority of candidates and included; the use of appropriate pesticides, hand removal of eggs, larvae or pupae, covering with fleece and biological control measures e.g. *Bacillus thuringiensis,* the nematode *Steinernema carpocapse* or the naturally occurring parasitic wasp *Apanteles glomeratus.* The best candidates were able to state the timing of these measures in relation to the life cycle.

Q4 *a) Describe the damage caused by **TWO** distinct **NAMED** plant viruses.* ***4***

*b) State **TWO** methods by which viruses can spread and how **EACH** of these can be avoided. Complete the table below.* ***6***

Method of Spread	***Method of avoidance***

a) Viral diseases of glasshouse crops were chosen by most candidates but some described viruses relating to outdoor fruit crops. To gain full marks candidates were required to describe distinctly different viruses. Examples of viruses described included; Pea Leafroll Virus, Tomato Mosaic Virus, Blackcurrant Reversion and Tulip Break Virus.

The damage was mostly well described with the best candidates giving detailed descriptions relating to the viruses chosen e.g. leaves mottled green or yellow, leaves having a fern-like appearance rather than more generic damage such as leaf spotting which could be due to other agents.

b) Good descriptions of how viruses are spread and how to avoid this were provided by most candidates. To gain full marks candidates needed to link the two parts of the question together i.e. method and avoidance. The best candidates included detail such as sap sucking aphids (rather than just insects or pests) and tools in propagation aiding viral spread (rather than just tools). These candidates explained fully how the spread can be reduced by the control of sap sucking aphids with pesticides or the disinfection of propagation tools by a specific method or the purchase of virus free stock.

Q5 *a) State what is meant by the term 'plant physiological disorder'.* ***1***

*b) List **FOUR** causes of plant disorders.* ***4***

c) Name a plant susceptible to 'fireblight'. ***1***

*d) State **TWO** symptoms of 'fireblight' and state **TWO** methods used to limit its spread.* ***4***

a) The majority of candidates understood that a plant physiological disorder is caused by a factor which is not a pest or disease but generally a non-living environmental or abiotic factor.

b) Most candidates were able to list suitable causes of plant disorders such as high or low temperatures, drought or water-logging or nutrient deficiencies.

c) Candidates who gave the full botanical name for plants susceptible to fireblight gained full marks. Species from any genus in the sub-family Pomoideae could be named e.g. *Pyrus communis*, *Malus domestica* and *Crataegus monogyna*. Naming the family Rosaceae was not specific enough to gain full marks.

d) The majority of candidates were able to state two symptoms of fireblight and the methods used to control its spread. The best candidates gave details specific to the disease e.g. brown leaves retained on the plant, white slime and red/brown colouration under the bark. Full marks were awarded to those candidates who provided detail of suitable control measures for fireblight which included; pruning out diseased wood to 60cm beyond the infection and collecting and burning material. A few candidates stated not planting susceptible species nearby or not planting *Crataegus monogyna* as a hedge around orchards as suitable methods to control the spread of fireblight.

Q6 *a) Describe **ONE** method of controlling weeds without using chemicals.* ***2***

*b) State **ONE** horticultural situation where translocated herbicides could be used appropriately.* ***2***

*c) List **SIX** safety precautions that an operative should take when using chemicals for pest and disease control to avoid risks to people and the environment.* ***6***

a) The best candidates provided detailed information on the physical control of weeds rather than just stating the method itself. Full marks were awarded to candidates for mulching where this included timing and depth of specific materials and the use of a geotextile membrane beneath the mulch together with the need to remove perennial weeds first. Other acceptable answers were dense planting to block out light from the weeds and to reduce photosynthesis so weakening the weeds; hoeing including appropriate frequency, timing (before seed set) and weather conditions and the type of weeds for which this control measure is suitable; hand weeding including the removal of tap roots of perennial weeds with a hand fork to prevent regrowth and use of a 'stale seed bed' with a description of the meaning of this term.

b) Candidates who focused their answer on the horticultural situation gained the best marks. Situations provided by the candidates included; spot treatment (spraying or painting on) of broadleaved weeds in lawns or specific weeds in an established border explaining how other plants can be protected; total treatment of areas prior to planting and paths or paving.

c) The majority of candidates were able to list a range of appropriate safety precautions and gained high marks. The best answers named the PPE that was likely to be used as one precaution and included others e.g. not smoking, eating or drinking when using chemicals, disposing of containers appropriately, keeping animals and children away from treated areas and checking the proximity of the area to be sprayed to water courses to ensure that run off does not occur.

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