Including Examiners comments

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R3103

THE MANAGEMENT OF PLANT HEALTH

Level 3

Wednesday 12 February 2020

11:45 – 12:50

Written Examination

Candidate Number: .....

Candidate Name: .....

Centre Name: .....

IMPORTANT – Please read carefully before commencing:

i) The duration of this paper is **65** minutes;
ii) **ALL** questions should be attempted;
iii) **EACH** question carries **10 marks**;
iv) Write your answers legibly in the spaces 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. Ensure that all diagrams are labelled accurately with the line touching the named object;
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.

Ofqual Unit Code D/505/2934

ANSWER ALL QUESTIONS

MARKS

Q1 a) Describe the symptoms of *Phytophthora kernoviae* as seen on *Rhododendron* sp. **4**

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b) When a *Phytophthora ramorum* outbreak is suspected, state:

i) **ONE** organisation which should be informed **1**

ii) **FIVE** distinct biosecurity measures which can be implemented to prevent its spread **5**

i).....

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ii).....

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Please see over…..

MARKS

Total Mark

Please turn over/…..

MARKS

Q2 a) Identify **THREE** benefits **AND THREE** limitations of partial soil sterilisation. **6**

MARKS

b) Describe **TWO** methods of partial soil sterilisation. **4**

Total Mark

Please turn over/…..

MARKS

Q3 a) State the certification required for professional pesticide operators when using hand held applicators. **1**

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b) State **FIVE** procedures to protect the public and the environment when using plant protection chemicals. **5**

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MARKS

c) Identify **FOUR** safety procedures a pesticide operator should implement to reduce the risk of chemical exposure to themselves. **4**

Total Mark

Please turn over/…..

MARKS

Q4 Explain how integrated pest management can be implemented to control a **NAMED** pest under **EACH** of the following headings:

i)	prevention of infestation	**2**
ii)	monitoring	**2**
iii)	control of pest	**3**
iv)	by reducing development of resistance to pesticides	**2**

Name of pest:..... **1**

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Total Mark

Please turn over/…..

MARKS

Q5 a) Describe the problems associated with the removal of couch grass (*Elymus repens*) from an established herbaceous border. **4**

b) Describe the control of couch grass (*Elymus repens*) growing in an allotment area under **EACH** of the following headings:

i) **ONE** physical control method **2**
ii) **ONE** chemical control method **2**

Please see over/…..

MARKS

c) Name **TWO** weeds (other than couch grass - *Elymus repens*) commonly found in an allotment area. **2**

Total Mark

Please turn over/…..

MARKS

Q6 a) Describe **TWO** symptoms of **EACH** of the following pests:

i) Western flower thrips **4**
ii) Horse chestnut leaf mining moth **4**

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ii).....

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Please see over/…..

MARKS

b) State **TWO** distinct control methods for **ONE** of the pests in a). **2**

Total Mark

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R3103

THE MANAGEMENT OF PLANT HEALTH

Level 3

Wednesday 12 February 2020

Candidates Registered	**116**		**Total Candidates Passed**	**84**	**87%**
Candidates Entered	97	84%	Passed with Commendation	24	25%
Candidates Absent/Withdrawn	18	15%	Passed	60	62%
Candidates Deferred	1	1%	Failed	13	13%

General comments

The majority of candidates attempted and completed all the questions.

Where named plant examples are asked for, **full botanical names were required** to achieve full marks: genus, species and where appropriate variety, cultivar etc. needed to be written and spelt correctly. Where genus alone was given, all species in that genus need to show the characteristic asked for to gain any credit. **Common names were NOT accepted** and misspellings were penalised. Candidates needed to use unambiguous plant examples from sources such as the RHS Plant Finder and/or the RHS A-Z Encyclopaedia of Plants together with examples given in the syllabus and avoid obscure or difficult to verify plant examples which risked being not credited.

Labels on diagrams needed to be carefully and correctly positioned to avoid ambiguity, not left hanging in mid-air. They needed to actually touch the appropriate part of the diagram. Annotations on diagrams were accepted as an alternative to description in the text as long as these were clear and answered the question. No marks were awarded for artistic merit or for unlabelled diagrams

Where a number of answers were specified in the question, e.g. 'List **TWO** plant names' or 'Describe **TWO** functions' **only the FIRST TWO answers** in a list were marked.

Candidates should take account of the command statements in the question e.g. 'list', 'describe', 'explain', together with the mark allocation, to judge the depth of the answer required. Extra information, even if it is accurate, does not gain extra marks.

			MARKS
Q1	*a)*	*Describe the symptoms of Phytophthora kernoviae as seen on Rhododendron sp.*	***4***
	b)	*When a Phytophthora ramorum outbreak is suspected, state:*	
		i) ***ONE*** *organisation which should be informed*	***1***
		ii) ***FIVE*** *distinct biosecurity measures which can be implemented to prevent its spread*	***5***

Q1 a) Descriptions of the symptoms of *Phytophthora kernoviae* were not well detailed in many cases. Several students gave descriptions of how the disease is spread not the symptoms and the choice of wording was often poor. If the word 'discoloured' is used then it must be qualified as it does not indicate to the examiner what colour this is meant to be. Candidates must be specific about details, using vague statements such as lack of vigour, poor growth and discoloured will not achieve high marks.

Full marks were given to candidates who described brown necrotic spreading lesions developing on leaves, often starting at the petiole, leaf tip or margin with no visible fungal growth. The other significant indicator is the lesions progressing rapidly down the main vein (midrib) of the leaf giving a V-shaped appearance. Lesions or bleeding cankers forming on twigs or stems progress back from or spread into side shoots and leaves. The internal tissues below the bark at these points can be seen as a brown colour.

b) **i)** The Forestry Commission or the Animal & Plant Health Agency (APHA) should be informed of a *Phytophthora ramorum* outbreak. Some candidates were aware of websites such as Tree Alert or Tree Check which can be used for reporting. DEFRA, and the Plant Health & Seed Inspectorate (PHSI**)** were stated by some candidates but this would be an indirect route for reporting an outbreak.

ii) Most candidates scored well on this section. Many candidates gave good information about controlling the outbreak by cordoning off the area, putting up warning notices to prevent access, not allowing vehicles into the area and ensuring that vehicles, tools and equipment were decontaminated. Candidates also referred to the restriction of plant movement and the use of plant passports and phytosanitary measures. Those who lost marks often failed to provide a full enough description of their point such as "Destroy all affected plants" would not gain a full mark as the method of destruction has not been stated e.g. by burning. Some candidates also had a tendency to repeat the same information so lost marks.

			MARKS
Q2	*a)*	*Identify **THREE** benefits **AND THREE** limitations of partial soil sterilisation.*	***6***
	b)	*Describe **TWO** methods of partial soil sterilisation.*	***4***

Q2 a) Many candidates were able provide a basic benefit or limitation for using partial soil sterilisation techniques, they did not then go on to give any explanation as to why this was a benefit or limitation. E.g. 'Partial soil sterilisation kills off weed seeds' needed to be expanded to include 'resulting in less competition for nutrients and water for the crop/plants'. Other benefits included reduction in populations of pathogenic micro-organisms, fungi and bacteria, and soil pests allowing better establishment and growth of the crop. Whereas beneficial heat-resistant, spore-forming bacteria can survive the process and revitalise the soil.

However, some candidates were confused about which beneficial organisms would survive and why it would be a useful technique. It is important that the candidate is guided as to the amount of content for each answer by the space provided for it; where a whole page has been provided it is likely that the examiner is expecting more than a one or two-line statement.

Limitations of partial soil sterilisation included potential loss of beneficial organisms such as mycorrhizal fungi; it is only effective when soil is friable and allows heat to penetrate through all soil aggregates otherwise if a lump of soil remains at low temperature it can act as a source of re-infection for the sterilized area of the growing medium, also if a soil pathogen is inadvertently introduced after soil sterilisation it may quickly spread due to lack of natural competitors.

b)

There was a mixed response to this part of the question, clearly some candidates had covered this topic and others had not. There were some unacceptable answers, which included putting plastic sheets on the ground and hoping the sun would sterilize the soil as well putting soil into a microwave or home oven. However, some candidates could name and describe the Hoddesdon grid method of steaming the soil as well as sheet steaming, use of dry heat and the use of chemical sterilisation methods.

MARKS

Q4 *Explain how integrated pest management can be implemented to control a* ***NAMED*** *pest under* ***EACH*** *of the following headings:*

i)	*prevention of infestation*	***2***
ii)	*monitoring*	***2***
iii)	*control of pest*	***3***
iv)	*by reducing development of resistance to pesticides*	***2***

Name of pest:..... ***1***

Q4 All candidates were able to name a suitable pest for control by integrated pest management. The most popular answers were peach potato aphid, glasshouse white fly, codling moth and vine weevil. The question was generally well answered with candidates who scored the most marks relating their answers to the specific pest that they had chosen. Some candidates overlapped their prevention and control answers and in cases where sticky traps were suggested this should be noted that they are only used for monitoring pest populations and not as a control method.

i) Prevention of infestation for many of the named pests required reduction of pest population from previous season, good hygiene, use of resistant cultivars or other valid points.

ii) Monitoring pest population for codling moth involves the use of pheromone traps which attract and trap the male moths; for other pests this would involve checking the crop for signs of damage or for presence of the pest itself.

iii) Candidates were expected to describe the control of the named pest using the integrated pest management hierarchy of controls, first choosing physical or biological controls and then targeted chemical controls when the economic damage threshold is reached, with examples of specific control methods for the named pest.

iv) Marks were given for reducing development of resistance to pesticides by selection of appropriate pesticide using the IRAC code, changing the mode of action of pesticide where possible for a repeated pesticide treatment, and application of the pesticide at the correct rate and at the correct life cycle stage.

			MARKS
Q5	*a)*	*Describe the problems associated with the removal of couch grass (Elymus repens) from an established herbaceous border.*	***4***
	b)	*Describe the control of couch grass (Elymus repens) growing in an allotment area under **EACH** of the following headings:*	
		i) ***ONE** physical control method*	***2***
		ii) ***ONE** chemical control method*	***2***
	c)	*Name **TWO** weeds (other than couch grass - Elymus repens) commonly found in an allotment area.*	***2***

Q5 a) There was generally a good understanding of the growth of couch grass and the resultant problems with removing it from an established herbaceous border. It was important that candidates understood how it spreads by producing horizontal underground stems, rhizomes, which spread rapidly. This can be a particular problem particularly when the rhizomes become entangled in clumps of herbaceous perennials as they are difficult to remove without damaging the desired plants. Candidates should have indicated that the application of herbicides can be difficult as the rhizomes will be entangled in the herbaceous plants and without careful spot treatment the chemical could kill the desired plants as well as the weeds. The rhizomes are brittle so can break off at any point if forking out or hand weeding and will re-grow into a new plant very readily. When removing the weed from the herbaceous plant roots few candidates explained about root washing to enable the identification and removal of the pernicious *Elymus repens* rhizomes.

Many candidates lost marks as they incorrectly stated that *Elymus repens* can reproduce profusely by seed. This is not correct as it is is self-sterile and, as each spreading colony is usually a single clone, seeds are not often produced so seeding is not a problem.

b) **i)** Physical control methods were generally well described. Most included digging out with a fork or spade and those who gained full marks made reference to ensuring that all roots are removed. Some candidates suggesting hoeing or rotovating which are not practical or effective. Some mentioned the use of a weed suppressant membrane to cover the ground but it is important to state that this would be in place for at least two growing seasons.

ii) Most candidates knew that Glyphosate was the appropriate chemical to be used but did not always give detail of how or when it should be applied for effective results.

c) There were many possibilities for names of other weeds which might be present in an allotment area but the most popular answers included *Poa annua*, *Cardamine hirsuta*, *Capsella bursa-pastoris*, *Taraxacum officinale* and *Urtica dioica*.

MARKS

Q6 *a)* *Describe **TWO** symptoms of **EACH** of the following pests:*

i) Western flower thrips ***4***
ii) Horse chestnut leaf mining moth ***4***

b) *State **TWO** distinct control methods for **ONE** of the pests in a).* ***2***

Q6 a) **i)** Most candidates did not give sufficient details of symptoms caused by western flower thrips and horse chestnut leaf mining moth. Many omitted to state the colouration that occurs as a result of western flower thrips which causes a silvering of the leaf and very few mentioned distortion of the shoot tips and flower buds.

ii) The horse chestnut leaf mining moth lays its eggs in the leaves which hatch into caterpillars within the leaf tissue. Candidates were very good at describing the early signs of elongated blotches, at first white but later turning brown developing on the foliage from June onwards. Some also mentioned that the caterpillars can be seen within the mined areas. Many stated that by summer, most of the leaf area may be occupied by leaf mines and that heavily infested trees will drop their leaves prematurely.

b) Control of horse chestnut leaf miner was described in detail by most candidates. Most candidates described collecting up the leaves but often lost marks for not stating that they would be destroyed by burning. Many candidates stating the use of resistant cultivars such as *Aesculus indica*, *Aesculus* × *neglecta* and *Aesculus chinensis in place of A. hippocastanum.*

Those candidates describing control of western flower thrips gained marks if they stated the use of biological controls - with predatory mites such as *Amblyseius* species*, Hypoaspis* species and *Macrocheles robustulus, or the* predatory bug *Orius laevigatus.* There are also approved chemical controls such as deltamethrin, lambda-cyhalothrin, cypermethrin, acetamiprid, pyrethrum, or plant oils and extracts which can be used for thorough spraying of the infested plants.

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