Including examiner comments

R3103

THE MANAGEMENT OF PLANT HEALTH

Level 3

Wednesday 8 February 2023

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 Describe how the Colorado Beetle has been prevented from being a pest of potatoes within the UK, by the control of:

i) its introduction **4**
ii) its establishment following a suspected outbreak **6**

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Total Mark

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MARKS

Q2 a) Describe the problems that couch grass (*Elymus repens*) causes in a garden. **4**

Please see over/…..

MARKS

b) Evaluate **TWO** methods of control for couch grass. **6**

Total Mark

Please turn over/…..

MARKS

Q3 Describe the disease of cucumber mosaic virus under **EACH** of the following headings:

i) **TWO** specific symptoms of infection on a **NAMED** plant **3**
ii) **THREE** methods of transmission **3**
iii) **TWO** distinct methods of control **4**

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MARKS

iii)

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MARKS

Q4 a) Name **TWO** insect pests that cause damage to trees. **2**

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b) Describe **ONE** control method for **EACH** of the pests named in a). **4**

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MARKS

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c) Describe the symptoms and damage caused by **ONE** of the pests named in a). **4**

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MARKS

Q5 a) Explain what is meant by the term 'Economic Damage Threshold'. **3**

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b) For a **NAMED** biological control of peach potato aphid **1**

i) state the considerations to be taken before application/introduction of this biological control **3**

ii) describe how effective control of the pest can be achieved by its use **3**

i).....

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MARKS

ii)

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MARKS

Q6 a) Name the source of information for the safe handling of pesticides for professional users. **1**

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b) Describe the safe handling of pesticides under **EACH** of the following headings:

i) transport, including loading and unloading **5**
ii) preparation of pesticide solution **4**

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MARKS

ii)……

Total Mark

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DO NOT USE THIS PAGE

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R3103

THE MANAGEMENT OF PLANT HEALTH

Level 3

Wednesday 8 February 2023

Candidates Registered	**TBC**		**Total Candidates Passed**	TBC	76%
Candidates Entered	89	TBC%	Passed with Commendation	19	21%
Candidates Absent/Withdrawn	TBC	TBC%	Passed	49	55%
Candidates Deferred	TBC	TBC%	Failed	21	24%

General comments

Candidates who wrote more detailed answered gained higher marks, fully qualified statements are expected in answer to Level 3 questions.

Questions - It is essential to read the question carefully and to note the **key words** before starting to write to ensure answers are relevant. 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.
Where a number of answers were specified in the question and a candidate gave a list with more than that number, **only the first answers** in the list were marked, e.g. where the question stated 'Name **TWO** locations' or 'State **TWO** ways' only the first **TWO** answers were marked even if the correct answers were given further down. It is helpful (but not essential) if the answers are numbered in the text or separate paragraphs or bullet points are used.

Plant names - Where named plant examples were asked for, **full botanical names are 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 must be carefully and correctly positioned to avoid ambiguity. Marks can be easily lost if this is not followed. Labels must actually touch the appropriate part of the diagram and must not be left hanging in mid air. Annotations on diagrams can be accepted as an alternative to description in the text as long as these are clear and answer the question. No marks were awarded for artistic merit or for unlabelled diagrams.

Continuation sheets - Where these have been included, it is vital that the relevant question number is included in the left hand margin if information written here is to be considered. These should also be attached to the answer booklet in the appropriate place and candidates should indicate in their answer booklet that they have written part of their answer on the attached sheet/s.

MARKS

Q1 Describe how the Colorado Beetle has been prevented from being a pest of potatoes within the UK, by the control of:

i) its introduction **4**
ii) its establishment following a suspected outbreak **6**

Q1)

i) Candidates were aware import controls such as document checks and physical checks of crops and containers were required to prevent the introduction of Colorado Beetle into the UK. Since leaving the EU, the EU plant passport is now longer valid in Great Britain and a phytosanitary certificate is required on imported plant material from the EU, including potato tubers. The beetle is most commonly intercepted in spring and summer on a wide range of produce such as salads, herbs and ware potatoes. The majority of candidates used outdated terminology such as 'Protected Zone' instead of the current term of 'Pest Free Area' and discussed the requirement for Plant Passports rather than Phytosanitary Certificates. Many candidates understood that there is a need for education through posters and information for those that might be in a position to come across the beetle at work. Correct identification of all stages of its life cycle is very important for control of introduction.

ii) The second part of the question was often not well answered. Colorado beetle is a notifiable pest but many candidates could not name the correct organisation to notify in the event of an outbreak, which is DEFRA via the UK Plant Health Services portal, and whilst some understood the actions that would be taken, many did not and gave little information on the process. Expected answers were that the Plant Health and Seed Inspectorate must trace the source of infection back to its origin to eradicate the problem at its source and destroy the pest. This may involve establishment of a quarantine zone. If the crop consignment and pest are still within a sealed container, chemical fumigation can be carried out, or if not, the crop is destroyed by burning, or deep burying, or application of pesticide, along with establishment of a buffer zone around the site.
Candidates were also credited for mentioning the Seed Potatoes Regulations and the Seed Potato classification scheme as a method for inspecting and checking the health of seed potatoes under either a) or b).

			MARKS
Q2	a)	Describe the problems that couch grass (*Elymus repens*) causes in a garden.	**4**
	b)	Evaluate **TWO** methods of control for couch grass.	**6**

Q2 a)

This question on problems caused by couch grass was reasonably well answered with candidates having a good understanding of couch grass competing with garden plants for nutrients and water; spoiling the appearance of borders, it smothers more desirable plants, and spreads rapidly by rhizomes and is very difficult to remove from the roots of established herbaceous plants. Couch grass can regenerate from small pieces of rhizome and is difficult to eradicate once established.

Couch grass can also pierce potato tubers and damage a potato crop.

b) For this part of the question candidates were asked to evaluate two methods of control for couch grass and most were able to discuss manual removal of the weed through forking, although some wrongly stated that a spade should be used when a fork is the better option as there is less opportunity to break up the rhizome and propagate new plants by doing so. For their second method most candidates recommended a herbicide treatment with a systemic herbicide, Glyphosate, which was correct for use in a border, but little detail was given when it came to describing how to do this whilst ensuring an effective control of the weed and not sacrificing the plants in the border that were to remain. There was little discussion of timing of herbicide treatment such as when the grass was actively growing and not in drought conditions.

Very few candidates discussed covering the area with a plastic mulch to exclude light, but failed to continue with the fact that this would be a long process, and suitable for clearing new ground rather than trying to incorporate the approach into an existing border.

However, some candidates wrongly believed that rotovating bindweed to break up the root is a suitable control method, which it clearly isn't as it would in fact propagate more plants.

MARKS

Q3 Describe the disease of cucumber mosaic virus under **EACH** of the following headings:

i) **TWO** specific symptoms of infection on a **NAMED** plant **3**
ii) **THREE** methods of transmission **3**
iii) **TWO** distinct methods of control **4**

Q3 This question on Cucumber mosaic virus was in the main very well answered with the majority of candidates achieving a high mark.

i) Commonly candidates lost marks commonly by not including a named susceptible plant in the first part of the question, or by only using the common name, and by doing so, only achieving a half mark. The symptoms were often correct, though needed more details to be clear. A qualified statement might be expected at this level. Depending on the selected plant, examples of symptoms could include uncharacteristic yellow mottling on leaves, distorted leaves that curl downwards and can be smaller in size, malformed fruits and reduced yield.

ii) This part of the question was well answered with most candidates being able to provide three methods of transmission including on tools, seeds, infected plants and seeds, insect vectors and plants touching each other.

iii) Most marks were lost on this section of the question by candidates only providing a simple answer and not expanding it to describe fully the methods of control. For instance, most candidates knew that infected plants should be removed and destroyed, but did not go on to explain that this should be done by burning to avoid the risk of further infection as a result of poor disposal, or, where they stated that host weeds should be removed there were no examples given of what these host plants could be. Other credited methods were tools sanitised, quarantine for new plants and insect vector control. Many did state that resistant varieties could be used and could give a relevant example. No candidate mentioned micropropagation as a method of virus free propagation material.

			MARKS
Q4	a)	Name **TWO** insect pests that cause damage to trees.	**2**
	b)	Describe **ONE** control method for **EACH** of the pests named in a).	**4**
	c)	Describe the symptoms and damage caused by **ONE** of the pests named in a).	**4**

Q4 a) Most candidates were able to name two appropriate tree pests, some very common such as the Horse Chestnut Leaf Mining Moth and codling moth, others less so such as the Eight Toothed Spruce Beetle.

b) This section was generally well done. Candidates who provided correct control methods with a good description of the way that the control is carried out / applied achieved the best marks. Unfortunately, some descriptions were less detailed resulting in lower marks.

Credited control methods for the Horse Chestnut Leaf Mining Moth included collecting and burning all fallen leaves in the autumn to reduce overwintering pupae. Infested leaves can be stored in sealed bags for a period of one year (trapping any adults that emerge). Use of chemical and biological controls are unrealistic due to the size of the tree but there are pheromone traps available to monitor the male moth population. *Aesculus indica* may be suitable as a replacement specimen tree as it is less badly affected.

For control of codling moth on apple trees, hanging pheromone traps on branches to attract and trap male moths (not a complete control but for monitoring numbers), placing a band of sacking or cardboard around the trunk which will trap the overwintering pupae before being removed and burnt, and when moth numbers indicate, spraying with an approved pesticide to kill hatched caterpillars. A biological control of nematodes can be sprayed onto the bark and branches and surrounding soil in September to kill caterpillars.

c) Some candidates were unable to answer this part of the question with appropriate symptoms and damage relative to their selected pest and as a result they scored poorly, but the majority provided well informed responses and were rewarded with higher marks. This section lacked detail in respect of describing symptoms and damage caused by Horse Chestnut Leaf Mining Moth. Detailed description of the time and appearance of leaf mines was expected. Credit was given for leaves falling early and that the health of the tree was not overly affected. Codling moth symptoms were described better i.e., tunnelling inside the fruit, presence of frass inside or around exit hole of the caterpillar, which could be in the side or eye end of the apple, with infested fruit falling early and not being commercially saleable.

Q5 a) Explain what is meant by the term 'Economic Damage Threshold'. **3**

b) For a **NAMED** biological control of peach potato aphid **1**

i) state the considerations to be taken before application/introduction of this biological control **3**

ii) describe how effective control of the pest can be achieved by its use **3**

Q5 a) Whilst most candidates achieved well, their explanation of Economic Damage Threshold was often muddled and did not clearly identify the three main elements to the answer; which is the pest or disease population density, at which it would be of economic benefit to initiate control measures, otherwise financial losses would occur.

b) **i)** Most candidates scored poorly on this part of the question. Whilst most could give an appropriate named biological control, such as parasitic wasp, predatory midge, lacewing larvae, they did not identify what should be considered before applying the control to the crop. Appropriate answers included: monitoring pest levels to ensure that the control is introduced at the right time and in the right quantity, the environmental conditions it requires to thrive, interactions with other biological controls etc. Candidates were not always clear on when to implement the control, in that there has to be a population of pest for the predator or parasite to succeed, otherwise the biological control will fail.

ii) This part of the question required the candidate to describe how effective control is achieved, requiring answers that demonstrated knowledge of understanding the management of the biological control once in place such as crop monitoring to assess pest density in relation to biological control density, pest location, whether repeat treatments might be needed during the season, and at what point the Economic Damage Threshold is reached for the crop.

In answering section b) candidates were credited for accurate information given in sections b i) or b ii).

			MARKS
Q6	a)	Name the source of information for the safe handling of pesticides for professional users.	**1**
	b)	Describe the safe handling of pesticides under **EACH** of the following headings:	
		i) transport, including loading and unloading	**5**
		ii) preparation of pesticide solution	**4**

a)

Full marks were awarded to those that named the Code of Practice for using Plant Protection Products. A half mark was awarded for the websites www.pesticides.gov.uk or www.hse.gov.uk.

b)

i) The safe handling of pesticides during transport and mixing proved to be generally well understood by the majority of candidates.

Better candidates provided a number of safety precautions that should be in place when transporting pesticides, such as having copies of the data sheets with the driver in case they are needed, appropriate PPE, spill kits and using safe manual handling techniques for large containers. Candidates correctly mentioned the need for the chemicals to be stored in sealed, secure, bunded containers in the rear of the vehicle and separated from the driver either by a bulkhead in a closed van or on the back of a pick-up with the relevant hazard warning signs in place on the vehicle. “in the boot of the car” was not acceptable as fumes could still penetrate the vehicle and affect the driver’s ability to control the vehicle and their health.

ii) Candidates’ answers concerning the preparation of pesticides showed less understanding; those that did score marks mainly described “reading the label / reading the COSHH assessment” and complying with it. The most awarded marks included preparing the appropriate amount at correct dilution and the return of unused concentrate to store, not eating or drinking whilst preparing and preparing in a sheltered, bunded environment away from water courses.

Some answers such as wearing the correct PPE, what this is, and having spill kits available were correct answers to both part i) and part ii) of the question but marks were only awarded once for these.

Overall, the general impression is that many candidates do not ‘describe’ fully and use a qualified statement. Descriptions need to be more detailed, and many candidates’ answers needed a few more words. There was a lack of writing on many papers to ensure that questions were answered fully, and in some instances understood.

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