



Candidate Number:

Candidate Name:

Centre Number/Name:

**RHS LEVEL 3 ADVANCED CERTIFICATE IN HORTICULTURE
WRITTEN EXAMINATION**

Tuesday 8 February 2005

IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module **A** is **2 hours**.
- ii) Answer **ALL** questions in Section **A**.
- iii) **ALL** questions in Section **A** carry equal marks.
- iv) Write your answers legibly in the spaces provided.
- v) Use **EITHER** metric **OR** imperial measurements but **NOT** both.
- vi) Where plant names are required they should include genus and species.

Module A

Plant Propagation, Growing Media & Plant Nutrition

Section A – Short Answer Questions

Please turn over/.....

Answer All questions.

Marks

Q1 Define the term 'colloid' in relation to soil.

2

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Q2 State the **TWO** primary agents of soil weathering.

2

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Q3 State the advantages of a water balance sheet.

2

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Please see over/.....

Answer All questions

Q4 Define the term calcifuge and give **ONE** example. **2**

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Q5 State **TWO** health and safety risks related to using seaweed as a soil mulch. **2**

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Q6 State the main health and safety risk in vegetative propagating *Euphorbia* species and handling *primula obconica*. **2**

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Q7 Name **TWO** bulbous plants suitable for propagation by scooping. **2**

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Answer All questions

Q8 Define the term 'sunframe'. **2**

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Q9 State **TWO** reasons for the grading of plant material used for propagation. **2**

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Q10 State the advantages of tissue analysis in plant nutrition. **2**

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Tuesday 8 February 2005

IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module **A** is **2** hours.
- ii) Answer **ONE** question from Section **B** and **TWO** questions from Section **C**.
- iii) **ALL** questions carry equal marks.
- iv) Write your answers legibly in the answer booklets provided.
- v) Use **EITHER** metric **OR** imperial measurements but **NOT** both.
- vi) Where plant names are required they should include genus, species and where appropriate, cultivar.

Module A

**Plant Propagation,
Growing Media & Plant Nutrition**

Sections B & C

Structured Questions

Please turn over/.....

Section B – Plant Propagation

Answer ONE question from this section.

- | | Marks |
|---|--------------|
| Q1 a) With the aid of diagrams, describe how each of the following plant modifications can be used for propagating:

i) runner;
ii) offset;
iii) sucker;
iv) rhizome.

Give a named example of EACH : | 12 |
| b) Describe the technique of propagating by crown division. Name FOUR distinct plants that can be propagated in this way. | 8 |
| Q2 Describe and evaluate EACH of the following seed treatments prior to sowing, giving a named example in EACH case:

i) mechanical scarification;
ii) refrigerated stratification;
iii) soaking in water;
iv) acid treatment. | 20 |

Please see over/.....

Section C – Growing Media & Plant Nutrition

Answer **TWO** questions from this section.

		Marks
Q3	a) State FIVE reasons for propagating hardy ornamentals and fruit trees by grafting and give ONE NAMED example for each.	10
	b) Describe the process of 'whip and tongue' grafting in the field for a NAMED plant.	7
	c) State SIX factors that would influence the success of the technique described in b).	3
Q4	a) Describe the properties of peat.	5
	b) Describe FIVE NAMED alternatives to peat suitable for:	
	i) container grown plants;	10
	ii) mulching an established shrub border.	5
Q5	a) Describe soil/compost conditions which affect the availability of nutrients for plants.	
	b) Explain the importance of EACH of the following in soils/compost:	
	i) cation exchange;	
	ii) anion interactions.	
Q6	a) With the aid of labelled diagrams, describe TWO distinct methods of hydroponic culture, providing a NAMED plant example in EACH CASE .	12
	b) List TWO advantages and TWO limitations of hydroponic culture.	8



RHS (LEVEL 3) ADVANCED CERTIFICATE IN HORTICULTURE

Tuesday 8th February 2005

MODULE A

Plant Propagation, Growing Media & Plant Nutrition

Examiners Comments

Candidates Registered	341		Total Candidates Passed		
Candidates Entered	261	(76.5%)	Passed with Commendation	72	(27.6%)
Candidates Absent	51	(15.0%)	Passed	131	(50.2%)
Candidates Deferred	13	(3.8%)	Failed	58	(22.2%)
Candidates Withdrawn	16	(4.7%)			

Senior Examiners Comments.

In the scripts marked from the four modules (A, B, D & E) of the February 2005 Advanced Certificate in Horticulture examinations, there were often too many generalisations. With many answers, there was a lack of clear factual information backed up by appropriate horticultural and technically correct examples. It is essential that candidates are briefed in the importance of providing factual information, appropriate and accurate examples to demonstrate their application and understanding of the questions.

Candidates should:

- ∞ Obtain instruction in basic examination techniques, i.e. **read questions carefully and answer the question as set**, allowing sufficient time for each part of the question and ensuring that all sections of a question are answered;
- ∞ Acquaint themselves with examination terminology and its meaning; for example the differences between state, describe, explain, evaluate, etc.

State - to write down the facts briefly

Describe - to give a descriptive account of

Explain - to make the meaning clear –it requires more information than a description, invariably based on an understanding of the underlying principles.

List - to itemise

Evaluate - to review the best points and problem areas

- ∞ Practise interpreting examination questions;
- ∞ Undertake mock examinations (time constrained) and seek constructive feedback;
- ∞ Understand vocational terminology;
- ∞ Use large, clearly labelled diagrams where it is helpful to do so but do not waste time by giving annotated diagrams and then repeating the information in text form, the use of colour should only be used where it enhances the interpretation of the diagram.
- ∞ Give the full name to an item when it is first stated and avoid the use of quick lecture shorthand e.g. –ve for negative & +ve for positive.
- ∞ Demonstrate full understanding of a subject by relating answers to named examples and or principles, whether or not requested in the question.
- ∞ Present the answer in the order required by the question or clearly mark the answer with the appropriate question sections;
- ∞ **When naming plants use full botanical names, i.e. genus and specific epithet.**

Examination paper markers commented that it was difficult to mark some of the exam scripts because candidates failed to properly identify the question. There were many instances of poor handwriting and the way in which the answer was laid out exacerbated this problem. If an examiner cannot read the candidate's writing it is not possible to award marks. Candidates need to identify their answers by clearly writing the question and section numbers.

Section A. Short Answer Questions

Q1. Define the term 'colloid' in relation to soil.

A clear definition was usually provided, with a named example, e.g. Clay or Humus also given, but often the size aspect was not included, as part of a full statement. General statements should still define the term and link it to its role in Cation Exchange Capacity.

*Q2. State **TWO** primary agents of soil weathering.*

Most candidates stated the required primary agents, such as: rain, frost & wind, for this popular question. A clear statement was required for each, however extra detail was usually included to clarify the understanding of the processes.

Q3. *State the advantages of a water balance sheet.*

Some confusion was shown in this area, with some statements of definition being given, rather than the advantages; such as: maintaining the soil water level as near Field Capacity as required; Control of Soil Moisture Deficit, linked to plant response periods; monitoring of current and future trends and economy of water use. However matching the intended crop/plants to a suitable soil was highlighted by some candidates.

Q4. *Define the term calcifuge and give **ONE** example.*

For this question greater care must be taken in reading the wording, as problems were shown with misreading the word calcifuge for calcareous. In addition, the point needs emphasising that the term relates to a group of plants growing in acidic conditions, not the media itself. Unfinished plant names e.g. No species given, was an area of concern as full marks could not be awarded.

Q5. *State **TWO** health and safety risks related to using seaweed as a soil mulch.*

A very strong response was enjoyed by this question, with slipping & potential back problems being the most popular. Pollution from raw sewage, glass and Oil were also successfully highlighted as possible risks with Seaweed.

Q6. *State the main health risk in vegetative propagating *Euphorbia* species and handling *Primula obconica*.*

Excellent understanding was shown related to *Euphorbia* species and the problems that can occur with the release of latex on to the skin/eyes. However the skin irritation caused by the fine hairs of *Primula obconica* was less well known, which can also lead to respiratory problems in extreme cases of inhalation.

Q7. *Name **TWO** bulbous plants suitable for propagation by scooping.*

A wide range of bulbous and non-bulbous plants were present in response to this question, with only some being suitable, e.g. *Hyacinthus orientalis* & *Hippeastrum* "Apple Blossom", due to their size of bulb. Again, unfinished or mis-spelt plant names were commonly given, which marred good answers.

Q8. *State **FOUR** differences between metamorphic and sedimentary rocks.*

For this rock based question four differences were requested, which lent its self to a tabular response. Areas that could have been contrasted were: method of deposit, hardness, porosity, structure, erosion & weathering. Both sides of each difference were required to obtain full marks and were usually provided.

Q9. *State **TWO** reasons for the grading of plant material used for propagation.*

The grading of plant propagation material provided excellent responses, these included: matching scion & stock for maximum cambium contact when grafting; batch cuttings for the production process towards a common sales/use point and same potential amount of stored carbohydrates providing common rooting times.

Q10 State the advantages of tissue analysis in plant nutrition.

Some clear advantages were provided, including: speed of analysis; plant take-up of nutrients, showing suitable, toxic or deficient levels; monitoring plant responses, before visible systems; accurate identification of chlorosis and minimal plant material. Also statements on the assessment of crops before storage e.g. apples and bitter pit were excellent. However the value of regular monitoring of plant nutrient levels, before problems are seen, was overlooked by many candidates.

Section B. Structured Questions (Plant Propagation)

Q1. a) With the aid of diagrams, describe how **EACH** of the following plant modifications can be used for propagating:

- i) runner;
- ii) offset;
- iii) sucker;
- iv) rhizome.

Give a **NAMED** example of **EACH**.

b) Describe the technique of propagating by crown division. Name **FOUR** distinct plants that can be propagated in this way.

a) This question was generally answered very well. Diagrams were used effectively to show the nature of runners, offsets and rhizomes with written explanations of propagation methods. Suckers were less clearly understood with respect both to their nature (i.e. as adventitious shoots arising from the root system) and to their significance in propagation. Some candidates recognised suckers only as undesirable features of plants and reluctantly cited rose cultivars as suitable examples. Various types of layering were sometimes described under the headings of offsets and suckers.

b) Crown division was described well with most candidates mentioning at least two different methods of separating the divisions and paying attention to other details such as soil amelioration/growing media for planting into. A high proportion of the marks for this question were awarded for citing suitable examples. Clear identification of suitable species or cultivars was required to obtain full marks for the examples. Naming of a genus which contains suitable species or cultivars only achieved half marks.

Q2 Describe and evaluate **EACH** of the following seed treatments prior to sowing, giving a **NAMED** example in **EACH** case:

- i) *mechanical scarification;*
- ii) *refrigerated stratification;*
- iii) *soaking in water;*
- iv) *acid treatment.*

The four seed treatments were generally correctly recognised by candidates, as was their role in breaking seed dormancy. Methods for scarification and soaking were described well but those for stratification and acid treatment less so. Suitable acids and containers were sometimes not mentioned and many candidates described dry chilling of seeds as stratification.

Evaluations of the treatments were generally less effective than the descriptions. The potential for embryo damage, reduced storage capabilities and increased susceptibility to pathogens, were often not mentioned as appropriate to the particular treatments. Many candidates paid undue attention to the ecology of seed dormancy opposed to the treatments. The naming of suitable taxa for each treatment was normally achieved well.

Section C. Structured Questions (Growing Media & Plant Nutrition).

- Q3. a) State **FIVE** reasons for propagating hardy ornamentals and fruit trees by grafting and give **ONE NAMED** example for each.
- b) Describe the process of 'whip and tongue' grafting in the field for a **NAMED** plant.
- c) State **SIX** factors that would influence the success of the technique described in b).

- a) The majority of candidates who attempted this question managed to successfully state five valid reasons for grafting and were awarded marks accordingly. The named example in some instances did not relate to the reason stated, this indicated that whilst many candidates had a good theoretical knowledge of the principles of grafting, they lacked detailed knowledge of the practice.
- b) Some candidates provided excellent answers, however the majority of candidates failed to adequately describe the process of 'whip and tongue' grafting in the field. Diagrams were poorly drawn and rarely labelled. Of the many examples given for a NAMED plant only a small number were actually correct. This confirmed that the majority of candidates lacked detailed subject knowledge. n.b. Whip and tongue grafting is generally performed as a back up to over-graft bud failures on ornamentals and top fruit. It is not used to graft Roses as a number of candidates stated.

- c) The majority of candidates were able to provide six factors that would influence the success of the technique and were awarded with marks accordingly. Because of the way that the question was structured a high percentage of candidates managed to achieve a pass mark despite not being able to adequately describe one of the most important methods used in the production of hardy ornamentals and fruit trees.

- Q4. a) *Describe the properties of peat.*
b) *Describe **FIVE NAMED** alternatives to peat suitable for:*
i) *container grown plants;*
ii) *mulching an established shrub border.*

- a) The majority of candidates were able to provide a satisfactory description of the various properties of peat. However it should be noted that some candidates merely stated the properties and did not provide any descriptions, full marks could not then be awarded.

- b) Candidates were able to provide suitable alternatives to peat for container grown plants and in the majority of answers they were able to properly describe them. It should be noted that Peat based compost and John Innes compost should not be considered an alternative peat, as both contain a proportion of Peat.

- Q5. a) *Describe soil/compost conditions which affect the availability of nutrients for plants.*
b) *Explain the importance of **EACH** of the following in soils/compost:*
i) *cation exchange;*
ii) *anion interactions.*

- a) This part of the question was answered very well with nearly every candidate being able to provide five alternative materials suitable for mulching a border. In the majority of cases the descriptions provided were good.

- b) A fundamental requirement of this examination is the ability to link scientific principles to horticulture practice, this question gave candidates the opportunity to demonstrate their knowledge in precisely this manner. This question asked candidates to explain the importance of cation and anion exchange in soils/compost. Disappointingly only a limited number of candidates were able to successfully explain the importance of these two important soil processes.

Q6. a) *With the aid of labelled diagrams, describe **TWO** distinct methods of hydroponic culture, providing a **NAMED** plant example in **EACH** case.*

b) *List **TWO** advantages and **TWO** limitations of hydroponic culture.*

a) The majority of candidates were able to provide basic details of two distinct methods of hydroponic culture. However only a limited number produced good-labelled diagrams, which clearly showed the chosen method. In some instances the plants cited as examples were not suitable to that method of culture.

b) In the majority of cases two clear advantages and two clear limitations of hydroponic culture were listed which gained candidates full marks.
