



Candidate Number:

Candidate Name:

Centre Number/Name:

**RHS (LEVEL 3) ADVANCED CERTIFICATE/DIPLOMA
IN HORTICULTURE WRITTEN EXAMINATION**

Wednesday 7th February 2007

IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module **D** 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 metric measurements **ONLY**.
- vi) Where plant names are required, they should include genus, species and where appropriate, cultivar.

Module D

**Outdoor Plant Production,
Protected Plant Production.**

Section A – Short Answer Questions

Please turn over/.....

ANSWER ALL QUESTIONS

MARKS

Q1 List **FOUR** elements of risk in field vegetable production.

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Q2 List **FOUR** benefits of supplementary lighting in protected crops.

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Q3 State **FOUR** factors to be considered when selecting a site for the production of outdoor cut flowers.

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Q4 Explain the reasons for hygiene to ensure the healthy production of crops in a protected environment.

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Please see over/.....

ANSWER ALL QUESTIONS

MARKS

Q5 State **FOUR** methods of providing a continuity of supply to outdoor lettuce for as long as a season is possible.

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Q6 State **FOUR** essential characteristics of a greenhouse heating system.

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Q7 State **FOUR** conditions that must be met by growers qualifying for organic status.

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Q8 Describe **FOUR** factors to be considered when equipping a fruit pack house.

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Please turn over/.....

ANSWER ALL QUESTIONS

MARKS

Q9 Describe the benefits of the bed system for vegetable production with reference to **TWO NAMED** crops.

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Q10 **NAME TWO** major diseases of nursery stock and give **ONE** plant example affected by **EACH**.

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IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module **D** is **2 hours**.
- ii) Answer **TWO** questions from Section **B** and **ONE** question from Section **C**.
- iii) **ALL** questions carry equal marks.
- iv) Write your answers legibly in the answer booklets provided.
- v) Use metric measurements **ONLY**.
- vi) Where plant names are required, they should include genus, species and where appropriate, cultivar.

Module D

**Outdoor Plant Production,
Protected Plant Production.**

Sections B & C

Structured Questions

Please turn over/.....

Section B – Outdoor Plant Production

Answer **TWO** questions only from this section

MARKS

- Q1 a)** Explain the reasons for grafting tree fruit cultivars onto rootstocks. **6**
- b)** Review the factors that influence the choice of rootstocks used for grafting tree fruit cultivars. **6**
- c)** **NAME** and describe **FOUR** apple cultivars grown in the UK to ensure continuity of supply between August and March. **8**
- Q2 a)** Describe the mechanisation of production and harvesting of a **NAMED** crop of brassicas. **15**
- b)** Describe the EU grading schedule for the crop named in a). **5**
- Q3** Describe the nursery production of a **NAMED** deciduous tree by chip-budding using the following headings:
- i) propagation; **6**
 - ii) seasonal management; **8**
 - iii) marketing. **6**
- Q4** Describe the establishment of a field crop of **EITHER** strawberries **OR** raspberries using the following headings:
- i) site preparation; **7**
 - ii) planting for successional cropping; **6**
 - iii) aftercare and site management. **7**

Please see over/.....

Section C – Protected Plant Production

Answer ONE question only from this section

MARKS

- | | |
|---|-----------|
| Q5 a) Explain the reasons for carrying out a range of risk assessments in the production of a protected flower crop. | 10 |
| b) Outline the stages necessary in the preparation of a comprehensive risk assessment. | 10 |
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| Q6 a) Review the advantages and limitations of modern technology in the production of protected crops. | 10 |
| b) Compare and contrast the crop husbandry of a soil grown edible protected crop with a nutrient film system. | 10 |



RHS (LEVEL 3) ADVANCED CERTIFICATE IN HORTICULTURE WRITTEN EXAMINATION

Wednesday 7th February 2007

Module D

Outdoor Plant Production Protected Plant Production

Examiners Report

Candidates Registered	34		Total Candidates Passed		
Candidates Entered	24	70.58%	Passed with Commendation	10	41.60%
Candidates Absent	4	11.76%	Passed	14	58.33%
Candidates Deferred	4	11.76%	Failed	4	16.66%
Candidates Withdrawn	2	5.88%			

General Comments in relation to Questions

Short Answers; they should be just that. However some responses were **very long** & did not fit well in the space provided, this was usually due to a **description** being given in plain language, rather than good use of **technical** horticultural terms. Additionally, answers should only relate to the question that has been set.

Structured questions do not require candidates to write in essay form. It is important that candidates answer questions in a style that is appropriate to the question asked. This requires an understanding of the phraseology used.

It is of vital importance that candidates understand the meaning of the key words used in examination questions and respond accordingly. In many instances full marks could not be awarded because candidates had not understood what was required and as a result did not provide an answer that met the question in full, and thus failed to gain the available marks.

Below is provided a definition of the key words used in questions which may help to clarify the requirement of questions.

State means *to write down the facts briefly*

Describe means– *to give an account of*

Explain means– *to make the meaning clear – (answers will normally need to include details of how, when, why and to relate horticultural practice to underlying scientific principles).*

Evaluate means - *to judge the worth of (state the benefits and limitations of..)*

List means– *to itemise*

Diagrams must be annotated if they are to be of any value. It is advisable (but not essential) to draw them in pencil as mistakes can easily be rectified. The use of colour is a luxury and should only be carried out when clear differentiation is required.

In some instances handwriting again proved to be difficult to decipher. Candidates should remember that if the examiner cannot read what has been written it will not be possible to award any marks.

Wherever possible, named examples should be given in answers as these indicate to the examiner that the candidate has a comprehensive understanding of the subject concerned.

Where a question is set in different sections, eg a,b,c or i,ii,iii, iv candidates are advised to set out their answers to follow the structure of the question, section by section.

Section A – Short Answer Questions

Q1 List **FOUR** elements of risk in field vegetable production.

The “risk” in this question basically referred to Health and Safety working practices. This was well answered by candidates giving examples of spray problems, potential damage to operators using machinery, lifting excessive weights and damage to hands when handling containers. Candidates who interpreted the “risk” as general problems in field vegetable production – late frosts, drought conditions, weed infestations and other relevant conditions were credited with marks and in no way penalised.

Q2 List **FOUR** benefits of supplementary lighting in protected crops.

The majority of candidates gave good answers including – more rapid growth, greater throughput, better flower stems for cut flowers, help to plants during winter period.

Q3 State **FOUR** factors to be considered when selecting a site for the production of outdoor cut flowers.

A well answered questions where the factors to be considered when selecting a site for outdoor cut flowers were well understood. The importance of suitable soil, protection from wind and the avoidance of frost pockets featured in candidates answers. The importance of available services – water, electricity and access to a good road all helped to provide good answers.

- Q4** Explain the reasons for hygiene to ensure the healthy production of crops in a protected environment.

This question could be attempted in a number of ways. A short explanation was required rather than a short essay. The importance of providing an environment which reduced attacks from pests and diseases was emphasised by candidates. The removal of all plant debris, cleaning or sterilising knives and ensuring that protective clothing was clean provided good hygienic conditions for plant growth.

- Q5** State **FOUR** methods of providing a continuity of supply to outdoor lettuce for as long as a season is possible.

There are several methods of providing a continuity of lettuce from which candidates could select. The selection of a range of varieties, the use of soil blocks, some form of protection at planting – covering early crops with fleece can bring the harvest date forward by up to 15 days. Reference was not made to the NVRS model linking sowing, planting and harvesting dates with temperature. Marks were lost when candidates used similar methods to achieve the same result – the use of fleece, cloches and low tunnels basically give the same result.

- Q6** State **FOUR** essential characteristics of a greenhouse heating system.

Essential characteristics include a standby system, the correct boiler size, even distribution of heat through the greenhouse, computer controls to reduce labour and provide accurate details and a system with adequate safety precautions.

- Q7** State **FOUR** conditions that must be met by growers qualifying for organic status.

Production using organic systems has become increasingly popular in recent years. This was reflected in candidate's answers which highlighted the necessary conditions to meet the standards. The need for a two year conversion period, restriction on the use of herbicides and fertilisers and the EU legislation requiring all food crops to be inspected annually were well understood by candidates.

- Q8** Describe **FOUR** factors to be considered when equipping a fruit pack house.

The aim when equipping a fruit pack house is to ensure operations are carried out effectively taking full advantage of equipment and machinery. Operators require good conditions especially, warmth, light and labour saving equipment to carryout their duties. Conditions which store fruit effectively and extend shelf life are important.

- Q9** Describe the benefits of the bed system for vegetable production with reference to **TWO NAMED** crops.

The benefits of bed system for vegetable production were well understood by candidates. Reduced compaction, more uniform crops, and the better use of land were described as benefits. Unfortunately a number did not read the question carefully and included fruit and other non vegetables as examples.

Q10 NAME TWO major diseases of nursery stock and give **ONE** plant example affected by **EACH**.

This question provided some problems. Examples of nursery stock were incorrectly given including plants used for summer bedding geraniums and bedding fuchsias and in some cases vegetables. A number of candidates were unable to identify the category of nursery stock. The naming of examples of major diseases created some difficulty.

Structured Questions

Section B – Outdoor Plant Production

Q1 a) Explain the reasons for grafting tree fruit cultivars onto rootstocks.

Candidates were expected to explain in their answer **WHY** cultivars of tree fruits are grafted onto rootstocks and their influence on: control of growth (width and height), crop uniformity, yield and earliness of cropping, also some influence on suckering, and disease resistance (of the rootstock).

b) Review the factors that influence the choice of rootstocks used for grafting tree fruit cultivars.

Candidates were expected to explain the correlation between rootstock, cultivar and soil fertility, and how it affects growth, development and management. Also the vigour of the cultivar and its ploidy, triploid cultivar etc. Some candidates were under the impression that two diploid cultivars were required to fertilise a single triploid cultivar, and failed to explain that three cultivars were actually required to ensure that all **three** cultivars produced fruit. Further, some candidates could not distinguish between fertilisation and pollination, **none** of which was **actually** required in the answer, thus wasting time. Most candidates concentrated on apples, few pears, plum or cherry examples were given. Production systems were poorly described.

c) **NAME** and describe **FOUR** apple cultivars grown in the UK to ensure continuity of supply between August and March.

Although candidates were able to name and describe a range of apple cultivars, some that were given were NOT grown in the UK; marks were lost because the season of use was not given.

Q2 a) Describe the mechanisation of production and harvesting of a **NAMED** crop of brassicas.

This question was well answered by the one candidate that attempted it.

b) Describe the EU grading schedule for the crop named in a).

As above

Q3 Describe the nursery production of a **NAMED** deciduous tree by chip-budding using the following headings:

- iv) propagation;
- v) seasonal management;
- vi) marketing.

Few candidates answered this question and of those that did, few showed an in-depth knowledge of the nursery production of a standard tree. Diagrams of chip-budding were either absent from their answer, poorly drawn or incorrect. A Few candidates mentioned rootstocks, muddled up grafting in winter with chip-budding and its timing.

Seasonal management was poorly understood, few candidates mentioned heading-back, placement of canes, tying-in, shortening or side-shoot removal, and heading back and labelling. Most mentioned weed control, watering and feeding.

Candidates were expected to mention undercutting, lifting and grading, trimming and bundling, labelling, pricing and attachment of care cards etc.

Q4 Describe the establishment of a field crop of **EITHER** strawberries **OR** raspberries using the following headings:

- iv) site preparation;
- v) planting for successional cropping;
- vi) aftercare and site management.

i) This was a popular question with candidates. Most candidates had a good knowledge of site preparation.

ii) Candidates were expected to name a range of early, mid and late cultivars, comment on glasshouse and tunnel and table-top production, (Strawberries) timing of strawing-down, EMLA grades, cold-stored runners, 100-day cropping, timing of planting etc. And generally explain how using all these techniques, the season could be extended at both ends of the natural season of production.

iii) Most candidates were able to give a reasonable account of the seasonal management of raspberries or strawberries, however some candidates did not state the most appropriate time for the cane pruning of raspberries after fruiting, thinning-out and tying-in. Few candidates also did not describe the removal of runners, foliage and straw from strawberries and disposal, and some candidates recommended herbicides no longer approved.

Section C – Protected Plant Production

- Q5** a) Explain the reasons for carrying out a range of risk assessments in the production of a protected flower crop.

Most candidates had a clear understanding of the reasons for carrying out risk assessments. Aspects of accident reduction and the legal obligations of the employer were all included in most of the answers. Some candidates overlooked aspects of flower crop production and were not specific in relation to their answers.

- b) Outline the stages necessary in the preparation of a comprehensive risk assessment.

A well answered section of the question with candidates illustrating a clear understanding of the stages necessary in the preparation of any risk assessment. Many candidates rightly highlighted the importance of continual review and updating of the process. A few candidates interpreted the risk as being financial rather than that of health and safety, here credit was given although the question intended a health and safety interpretation.

- Q6** a) Review the advantages and limitations of modern technology in the production of protected crops.

Limited answers without enough detail resulted in a rather poor mark allocation for some candidates in this part of the question. Most candidates identified that the ariel environment was part of the controlled environment but few specified all of the factors which effected the plants growing in it. Some of the more obvious advantages were overlooked in some cases the financial aspects, and in others the accuracy and ease of control.

Reliance on modern technology and the problems of power cuts and system failure seemed to be well understood and included by most candidates.

- b) Compare and contrast the crop husbandry of a soil grown edible protected crop with a nutrient film system.

Most candidates approached this answer in a logical way using a line down the centre of the page to provide a table comparison. Some candidates were confused regarding the nutrient film system and did not appreciate the importance and relevance of the film of water and nutrient which provided the optimum environment for the root system. Cleanliness, accuracy and predictability of growth response were rarely sited as aspects of nutrient film production. The aspects of reduced use of water in hydro-culture systems were included by most candidates.