



RHS LEVEL 3 ADVANCED/DIPLOMA IN HORTICULTURE WRITTEN EXAMINATION

Wednesday 8 February 2012

10:00am – 12:00noon

MODULE D

Outdoor Plant Production Protected Plant Production

Section A – Short Answer Questions

Candidate Number:.....

Candidate Name:.....

Centre Number/Name:.....

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.
- vii) Please note, sufficient lined space is provided. It is not necessary that all lined space is used in answering the questions.

ANSWER ALL QUESTIONS

MARKS

Q1 List **TWO** advantages and **TWO** limitations of polythene structures compared with traditional greenhouses.

2

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Q2 List **FOUR** methods of irrigating pot plants in a greenhouse structure.

2

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Q3 List **FOUR** types of equipment used to monitor environmental factors in protected cropping.

2

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Q4 State **FOUR** methods of assessing marketing outlets for protected crops.

2

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Please see over/.....

Q5 List **FOUR** points for assessing quality of a **NAMED** shrub for marketing in a garden centre. **2**

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Q6 List **FOUR** essential items of equipment for a vegetable packhouse. **2**

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Q7 State the post-harvest treatment for a **NAMED** flower crop. **2**

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Q8 State **FOUR** possible advantages to the consumer of organic produce. **2**

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Q9 Describe **FOUR** effects of rootstocks on tree fruits. **2**

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Q10 Identify **FOUR** hazards associated with the harvesting of tree fruits. **2**

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Charity Registration Number: 222879/SC038262



**RHS LEVEL 3 ADVANCED/DIPLOMA IN HORTICULTURE
WRITTEN EXAMINATION**

Wednesday 8 February 2012

10:00am – 12:00noon

MODULE D

**Outdoor Plant Production
Protected Plant Production**

Sections B and C - Structured Questions

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.
- vii) Please note, sufficient lined space is provided in the answer booklets. It is not necessary that all lined space is used in answering the questions.

Please turn over/.....

Section B – Outdoor Plant Production

Answer TWO questions from this section

MARKS

- Q11** Describe how machinery is used for the production and marketing of **ONE NAMED** brassica **OR** root vegetable crop under **EACH** of the following headings:
- | | | |
|------|---------------------------------------|---|
| i) | ground preparation and establishment; | 5 |
| ii) | crop management; | 5 |
| iii) | harvesting including transporting; | 5 |
| iv) | storing, packing and marketing. | 5 |
- Q12** Describe the production of **ONE NAMED** outdoor annual cut flower crop under **EACH** of the following headings:
- | | | |
|------|---|---|
| i) | ground preparation and establishment; | 4 |
| ii) | crop management to include a yearly schedule; | 8 |
| iii) | harvesting including transporting; | 4 |
| iv) | storing, packing and marketing. | 4 |
- Q13**
- | | | |
|----|--|----|
| a) | Describe the annual maintenance of ONE NAMED tree fruit crop to ensure optimum yield and quality. | 12 |
| b) | Describe how this crop is picked and transported. | 5 |
| c) | Explain why the following criteria are used when harvesting the tree fruit named in a): | |
| | i) colour; | |
| | ii) size; | |
| | iii) ripeness. | 3 |
- Q14**
- | | | |
|----|---|----|
| a) | Explain the terms 'container grown', 'containerised' and 'open ground raised'. | 6 |
| b) | Explain the advantages of mechanising production to the grower. | 4 |
| c) | Describe how mechanisation can be used by a grower producing container grown plants for a range of customers. | 10 |

Please see over/.....

Section C - Protected Plant Production

Answer ONE question only from this section

MARKS

Q15

Explain the importance and practice of the following for a crop of tomatoes:

- | | | |
|------|------------------------|----------|
| i) | spacing; | 5 |
| ii) | irrigation; | 5 |
| iii) | trimming and training; | 5 |
| iv) | layering. | 5 |

Q16

- a) Describe, with the aid of a clearly labelled diagram, **FOUR** completely different types of Protective Structure.

8

- b) Describe the suitability and limitations for **EACH** of the **NAMED** structures in a), using crop examples.

12

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MODULE D

Outdoor Plant Production Protected Plant Production

Candidates Registered	8		Total Candidates Passed	8	100.0%
Candidates Entered	8	100.0%	Passed with Commendation	1	12.5%
Candidates Absent	-	-	Passed	7	87.5%
Candidates Deferred	-	-	Failed	-	-
Candidates Withdrawn	-	-			

Section A – Short Answer Questions

- Q1** List **TWO** advantages and **TWO** limitations of polythene structures compared with traditional greenhouses.

Candidates gained full marks for stating advantages were of the relative cheapness and the ease of erection of polythene structures. Limitations included the need to re-clad and susceptibility to weather damage.

- Q2** List **FOUR** methods of irrigating pot plants in a greenhouse structure.

Most candidates were able to name four suitable methods of irrigation including trickle, timed overhead spraylines, sandbeds, seep hose and capillary benches.

- Q3** List **FOUR** types of equipment used to monitor environmental factors in protected cropping.

All candidates were able to give four types of relevant equipment for monitoring environmental factors including temperature, CO₂, wind speed, humidity and ventilation (including computers).

Q4 State **FOUR** methods of assessing marketing outlets for protected crops.

The question provided some difficulty in interpretation. Some candidates did not gain any marks by just listing four possible outlets. The question required assessing the market. Marks were gained for market research, identifying niche markets, interviewing possible customers, contacting hotels and other potential markets.

Q5 List **FOUR** points for assessing quality of a **NAMED** shrub for marketing in a garden centre.

A relevant named shrub was required. Shrubs must be true to type, free from pests and diseases have well spaced branches and good root systems.

Q6 List **FOUR** essential items of equipment for a vegetable packhouse.

Some candidates were unable to list four essential items of equipment for a commercial vegetable packhouse and listed items used in a domestic situation. Forklifts, packing machines, grading, packing and cooling equipment are all relevant.

Q7 State the post-harvest treatment for a **NAMED** flower crop.

The importance of keeping the flowers cool and immersing in water, after harvest, avoidance of ethylene damage by keeping the flowers away from fruit, careful handling and correct grading and packing are all relevant and were correctly mentioned by candidates.

Q8 State **FOUR** possible advantages to the consumer of organic produce.

Candidates had a good understanding of the advantages of organic produce - free from contamination from pesticides potentially better taste, often locally grown and less contamination to the local environment.

Q9 Describe **FOUR** effects of rootstocks on tree fruits.

Candidates gained marks where rootstocks were named correctly. The relevance of vigour, resistance to diseases, final fruit size and cropping period should have been stated.

Q10 Identify **FOUR** hazards associated with the harvesting of tree fruits.

Candidates are aware of hazards. Carrying excessive heavy weights in the orchard, tripping over equipment, falling off ladders and accidents involving moving machinery were all correctly mentioned.

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Structured Questions

Section B – Outdoor Plant Production

Q11 Describe how machinery is used for the production and marketing of **ONE NAMED** brassica **OR** root vegetable crop under **EACH** of the following headings:

- i) ground preparation and establishment;
- ii) crop management;
- iii) harvesting including transporting;
- iv) storing, packing and marketing.

Candidates gaining good marks in the first part of the question were those who were able to demonstrate that they had first hand experience of farm-scale crop production. Generally this section was well answered although some candidates lost marks as they could not show a logical sequence to operations or relate the machinery used to its contribution to preparing for crop establishment. Candidates lost marks for not accurately describing establishment.

Answers to the second section were disappointing as few candidates identified the machinery involved in the activities that make up crop management; control of weeds (chemical and mechanical), control of pests and diseases, irrigation. Good marks were available for explaining what each machine (or type of machine) achieved.

Surprisingly in the last part of the question, few candidates chose crops that are harvested and packed mechanically, or if they did they failed to describe the mechanised harvesting procedures. Good marks could have been gained for describing the use of harvesting rigs for crops such as broccoli. An accurate description of this type of operation could have gained high marks in both this section and final section.

Q12 Describe the production of **ONE NAMED** outdoor annual cut flower crop under **EACH** of the following headings:

- i) ground preparation and establishment;
- ii) crop management to include a yearly schedule;
- iii) harvesting including transporting;
- iv) storing, packing and marketing

This question was generally well answered. As usual in this module, the candidates who could demonstrate first-hand knowledge of the growing crops were able to score good marks.

Most candidates showed disappointing knowledge of ground preparation as applied to production on a scale suitable for cut-flower production. Marks were available for the various stages of preparation and planting/establishment but a clear understanding of the sequence of operations was called for. The use of diagrams would have enhanced the answers.

The second part of the question was worth the biggest proportion of marks and deserved more attention to detail. Few candidates took the opportunity to gain marks for this section (and the previous section) by use of a diagrammatic time-line. It would have made explaining the activities easier and facilitated getting higher marks for the same amount of writing. Good marks were available for identifying and describing the activities that make up the schedule; the timing from ground clearance to harvesting, establishment, irrigation, weed control, pest and disease control, support and trimming.

The marks in the third section were for explaining how the crop is picked; timing, crop stage, equipment, technique, where you put the cut flowers. Candidates lost marks by either not knowing, or not including the practical details such as use of scissors or clippers for harvesting, and frequency of picking. Candidates needed in the final section, to be aware of the specific needs of marketing flower crops. Good marks were gained by including the storage, the method of selling (e.g. when in bloom), grading for uniformity, labelling including bar-codes and pricing, stacking on unit loads and transport.

- Q13** a) Describe the annual maintenance of **ONE NAMED** tree fruit crop to ensure optimum yield and quality.
- b) Describe how this crop is picked and transported.
- c) Explain why the following criteria are used when harvesting the tree fruit named in a):
- i) colour;
 - ii) size;
 - iii) ripeness.

This question offered good marks to the candidate with a clear knowledge of production of fruit crops on a commercial scale.

Good marks in the first part of the question were available for demonstrating a basic understanding of fruit production. It is best answered by a month-by-month description of what happens in an orchard once it is established. The sections that were looked for were; control of vegetation, control of pest and disease, irrigation and nutrition and pollination. It was disappointing that candidates spent time describing how to establish orchards; the question was about established production areas.

In the second part of the question, good marks were available for candidates who could demonstrate first hand experience of fruit production. There was plenty to write about that would gain the candidate good marks: timing and crop stage, selection and picking (no candidates mentioned how the picker selects fruit or the importance of avoiding bruising), use of ladders or picking trains, bulk boxes, trailers or trolleys. It was worrying that some candidates suggested that tree shakers are used for dessert apples. This technique is only used for cider crops where avoiding bruising is less important.

In the final section, good marks were available for the candidates who have a basic scientific understanding of fruit development and its relationship to harvest timing, storage and transport.

- Q14** a) Explain the terms 'container grown', 'containerised' and 'open ground raised'.
- b) Explain the advantages of mechanising production to the grower.
- c) Describe how mechanisation can be used by a grower producing container grown plants for a range of customers.

This question was popular with candidates and in some cases was answered very well.

The first section offered six easy marks for candidates who had a clear understanding of the three types of production used in outdoor nursery stock production. Some gained almost full marks, only falling down on the important fact that container-grown are sold in containers as well as being grown in them. Others lost a lot of marks by not knowing the answer and describing something else.

The second section required the candidate to explain the basic principles of mechanisation as applied to any sector; labour saving, avoidance of heavy, monotonous or risky activities, accuracy or timeliness of activities, ability to respond quickly to market needs or weather conditions. Surprisingly few candidates got high marks, or spent a long time writing around the answers, but good marks were gained in some parts.

Although marks for the other sections of the question were more generic, the final section required the candidate to demonstrate good knowledge of nursery stock production. The marks were available for three sections; transport (trolleys, tractors, unitised systems, dollies) production (potting, pot and tray filling, transplanting, irrigation and pesticides) and maintenance (pruning, tying in, labelling). Some candidates gained good marks by demonstrating a broad knowledge of the mechanisation of production. Others lost marks by failing to concentrate on the issue – mechanisation of crop production, or by only writing about a few parts of the process.

Section C – Protected Plant Production

Q15 Explain the importance and practice of the following for a crop of tomatoes:

- i) spacing;
- ii) irrigation;
- iii) trimming and training;
- iv) layering.

Spacing – most candidates appreciated the link between spacing and method or media in which the crop is grown. Few were able to give actual recommendations in terms of spacing and those who did gave in row spacing but had no idea of between row spacings or row arrangements. The effects of spacing on plant growth and yield were much better understood.

Irrigation – few candidates were able to describe a comprehensive approach to irrigation including all of the plant requirements throughout the life of the crop. Hydroponic or rockwool systems included the method of irrigation. Those growing in more traditional media such as growbags or the border soil often used drip systems or low level spray application methods.

Trimming and Training – this created some confusion with the layering of the plant. Candidates misunderstood what practical operations had to take place in order to ensure plant vigour and maintain a single growing point. It was obvious that candidates had not managed or worked in a main season tomato crop.

Layering – candidates were confused and unable to describe an appropriate layering system. It was apparent that they were unable to appreciate the importance or necessity of accommodating the length of stem whilst maintaining the growing area of the plant.

- Q16**
- a) Describe, with the aid of a clearly labelled diagram, **FOUR** completely different types of Protective Structure.
 - b) Describe the suitability and limitations for **EACH** of the **NAMED** structures in a), using crop examples.

Diagrams given in the first part of the question were poor. They were well out of scale and in some cases focussed on the cladding material rather than the shape or outline of the structure. In most cases candidates were able to identify four completely different structures but a few drew four different types of glasshouses. This made answering section (b) much more difficult for those particular candidates. Descriptions of the structures were poor with little reference to materials that made up their basic framework.

Some good crop examples were provided in answers to the second part of the question which were entirely appropriate to the structure named. However many were not, and these answers reflected a poor understanding of the type of cropping that the structures named could be used for. Limitations on height, economy of heating, framework strength, and durability were often overlooked completely. The obvious strengths of modern glasshouse structures and constructions were not well known or understood.

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