



R2114

**UNDERSTANDING PROTECTED ENVIRONMENTS
AND THEIR USE IN PLANT CULTIVATION**

Level 2

Tuesday 28 June 2011

14.30 – 15.10

Written Examination

Candidate Number:

Candidate Name:

Centre Number/Name:

IMPORTANT – Please read carefully before commencing:

- i) The duration of this paper is **40 minutes**;
- ii) **ALL** questions should be attempted;
- iii) **EACH** question carries **10 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.

Answer all questions

Marks

1. Describe the differences between the environment inside and outside of a protected structure by completing the table below:

10

	Outside	Inside
Air temperature		
Natural light		
Relative humidity		
Carbon dioxide		
Air Movement		

Total Mark

Please see over

2. a) State **ONE** distinct horticultural use for **EACH** of the structures listed below:

- | | |
|-------------------|---|
| i) greenhouse; | 1 |
| ii) cold frame; | 1 |
| iii) cloche; | 1 |
| iv) conservatory. | 1 |

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b) For **ONE** of the structures listed in a), name **THREE** cladding materials and give **ONE** benefit of **EACH**. **6**

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Total Mark

Please turn over

3. a) State **THREE** methods by which shading can be provided for a crop growing in a protected structure.

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- b) Describe what is meant by the term 'supplementary lighting'.

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Total Mark

Please see over

- [illegible]

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5

5. a) Describe the 'drip' system of irrigation used for plants in containers.

4

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- b) State **TWO** characteristics of materials used in the manufacture of containers used to grow plants in protected environments by completing the table below:

6

	Characteristic 1	Characteristic 2
Polystyrene		
Plastic		
Peat		

Total Mark

Please see over

6. a) Name **FOUR** ingredients commonly used in house plant growing media.

- b) Describe **THREE** essential characteristics of growing media used for growing house plants.

Total Mark

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**The Royal Horticultural Society, Wisley, Woking, Surrey GU23 6QB
RHS Registered Charity No: 222879/SC038262**



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**UNDERSTANDING PROTECTED ENVIRONMENTS
AND THEIR USE IN PLANT CULTIVATION**

Tuesday 28 June 2011

Candidates Registered	855	Pass with Commendation	209 (30.07%)
Candidates Entered	695 (81%)	Pass	345 (49.64%)
Absent/Withdrawn/Deferred	160 (19%)	Fail	141 (20.29%)
Total Candidates Passed	554 (79.71%)		

Senior Examiner's Comments:

1. Candidates should be able to demonstrate a good range of plant knowledge and be able to give accurately named plant examples where appropriate. Common names and generic names are often too vague and cannot be rewarded in the positive manner that genus, species and where appropriate, variety/cultivar can. This is particularly important when answering questions relating to particular (named) plant(s). Marks can only be awarded for these narratives where the example(s) are correctly and fully identified.
2. Candidates must be able to display accurate knowledge of the technical terms and concepts detailed in the syllabus, in the context of horticulture and be aware that wider interpretation will not be rewarded. The examination should be regarded as a possible introduction to higher level studies, which will only be open to those who are in possession of a clear understanding of the horticultural terms and concepts which are current.
3. The introductory rubric given on the first page of each question paper should be read carefully by candidates. At each examination there are a significant number of candidates who ignore or misread the instructions given and consequently may not perform as well as they could have done.
4. Candidates should pace themselves during each paper. The most successful candidates allow sufficient time to read the question thoroughly before answering it and also take time to read through their answers. They should take care to write as legibly as possible, so that the examiner is in no doubt about what is intended.
5. Candidates need to interpret key words within questions, particularly those such as 'state', 'list' and 'describe'. Questions requiring descriptions or explanations obviously require a more detailed answer than those requiring a list.

6. It is important to ensure that responses to questions are to the point. Candidates should bear in mind that small sketches might be used to convey information more succinctly than words.
7. Successful candidates ensure that their answers are focused and to the point. It is disappointing when they cannot be rewarded for their efforts because the answer is irrelevant to the particular question. Candidates should take note of the mark allocation for specific sections and allocate their time and efforts accordingly.
8. Diagrams can enhance an answer and where appropriate can replace detailed descriptions. They should be large, clear and well annotated, and preferably in pencil. Colour may be used successfully but only where it is relevant to the answer.
9. In each examination it is clear that some candidates are ill prepared to answer papers of the type set. It is essential that candidates have the opportunity to practice questions. Ideally some papers should be answered in a time constrained situation.
10. Candidates should be aware of the reading list of suggested books for the RHS Level 2 Certificate in The Principles of Garden Planning, Establishment and Maintenance which is available from the Qualifications Section and can also be found on the RHS website together with past papers.

Examiners' Comments:

Marks

1. *Describe the differences between the environment inside and outside of a protected structure by completing the table below:*

10

	<i>Outside</i>	<i>Inside</i>
<i>Air temperature</i>		
<i>Natural light</i>		
<i>Relative humidity</i>		
<i>Carbon dioxide</i>		
<i>Air Movement</i>		

Candidates who clearly understood the protected environment were able to describe the differences between the inside and the outside of a protected structure. Examples described included; air temperature which can drop well below freezing outside depending on prevailing weather conditions and inside where the temperature will be higher although it can still be below freezing. Natural light levels outside will be dependent on weather conditions and local shading but will be reduced inside due to the cladding material used.

2. a) State **ONE** distinct horticultural use for **EACH** of the structures listed below:
- | | |
|-------------------|---|
| i) greenhouse; | 1 |
| ii) cold frame; | 1 |
| iii) cloche; | 1 |
| iv) conservatory. | 1 |
- b) For **ONE** of the structures listed in a), name **THREE** cladding materials and give **ONE** benefit of **EACH**. 6

- a) The majority of candidates gave a distinct use for the structures listed. Examples provided included; growing a main season crop e.g. tomatoes in a greenhouse, raising vegetable plants in a cold frame, covering row crops with a cloche and displaying ornamental plants in a conservatory.
- b) Candidates who named suitable cladding materials for a named structure provided a good range of benefits for them. Examples given for a greenhouse were horticultural glass which provides good light transmission, polythene which is relatively cheap, twin walled polycarbonate which has good heat retention and acrylic plastic which is lightweight.

Where candidates named construction materials instead of cladding materials marks could not be awarded.

3. a) State **THREE** methods by which shading can be provided for a crop growing in a protected structure. 6
- b) Describe what is meant by the term 'supplementary lighting'. 4
- a) Application of a shading material to the cladding of the protected structure was the most common method stated by candidates. Shading materials given included the use of materials e.g. netlon or shade screens made from wooden slats, the use of shade paints for the outside of the structure and the use of thermal screens for the inside of the structure.
- b) Those candidates who described supplementary lighting as additional artificial lighting used in conjunction with natural light within a greenhouse or polythene tunnel to increase the rate of photosynthesis and achieve optimum growth were awarded full marks.

4. a) Describe the production of a **NAMED** bedding plant under the following headings: 1
- i) propagation and establishment; 3
- ii) plant maintenance. 3
- b) Name **ONE** pest, **ONE** disease and **ONE** disorder that can affect the plant named in a). 3
- a) A range of suitable bedding plants were named by candidates e.g. *Petunia hybrida*. Good descriptions included details on the method of seed sowing, density of sowing, equipment and materials used (growing media) and environmental conditions required for propagation. Establishment included details of pricking out seedlings, containers used etc. Those candidates who described the need for irrigation, feeding, removal of dead or diseased plant material and the provision of shading if required for plant maintenance gained full marks.
- b) Most candidates were able to name one pest, disease and disorder for the plant that they had named. Suitable answers included; aphids, whitefly, slugs and sciarid fly for pests, botrytis, damping off and mildew for diseases and leaf scorch and nutrient deficiency for disorders.

5. a) Describe the 'drip' system of irrigation used for plants in containers. 4
- b) State **TWO** characteristics of materials used in the manufacture of containers used to grow plants in protected environments by completing the table below: 6

	Characteristic 1	Characteristic 2
Polystyrene		
Plastic		
Peat		

- a) The best answers were from candidates who described the drip system of irrigation as one where the water is delivered by mains alkathene pipes to the growing benches or plant containers. Individual spaghetti tubes are pegged into the plant root ball delivering water as a drip to each plant. Every plant receives the same amount of water applied slowly over a set period of time according to the plants requirements and can be operated automatically.

b) The candidates who gained maximum marks for this section of the question provided a good range of characteristics for the materials used in the manufacture of containers. Polystyrene retains heat and is lightweight, plastic is long lasting and is not porous and peat breaks down quickly and is porous.

6. a) Name **FOUR** ingredients commonly used in house plant growing media. **4**

b) Describe **THREE** essential characteristics of growing media used for growing house plants. **6**

a) A wide range of ingredients used in houseplant growing media were named by candidates and included; sphagnum moss peat, sharp sand, washed grit, partially sterilised loam, bark, perlite, vermiculite and nutrients.

b) The majority of candidates provided good descriptions of the essential characteristics of growing media used for house plants. The most widely described were water retention as the ability of the growing media to retain moisture and make it available to the plant. Nutrient availability to provide nutrients to the plant over extended periods of time and adequate drainage to ensure that the growing media remains 'sweet' by maintaining a good air to water ratio, avoiding anaerobic conditions within the root environment.

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