



RHS LEVEL 2 CERTIFICATE IN HORTICULTURE

Wednesday 18 February 2009

10.00am – 11.30am

HORTICULTURE I – Planning, Principles & Production

Section 1 – Short Answer Questions

Candidate Number:

Candidate Name:

Centre Number/Name:

IMPORTANT - Please read carefully before commencing.

- i) The duration of the papers in Horticulture I is **1½ hours**;
- ii) **ALL** questions should be attempted in Section 1;
- iii) **EACH** question carries **2 marks**;
- iv) Write your answers legibly on the lines provided;
- v) Use metric measurements **ONLY**;
- vi) Where plant names are required, they should include genus, species and where appropriate, cultivar.

Please turn over

ALL questions should be attempted.

		Marks	Do not write in this margin
Q1	State the function of plant meristems and list TWO meristematic tissues.	2	
		
		
		
		
		
Q2	Name TWO distinct root adaptations and state the function of EACH .	2	
		
		
		
		
		
Q3	Define the terms: i) 'radicle'; ii) 'plumule'.	2	
		
		
		
		
		

Please see over

Marks

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Q4 List **FOUR** factors influencing the rate of photosynthesis.

2

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Q5 Define 'photoperiodism' in relation to a **NAMED** plant.

2

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Q6 Define 'epigeal' germination in relation to a **NAMED** plant.

2

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Please turn over

Q7 List **FOUR** distinct ways to encourage root production when propagating plants by simple layering.

2

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Q8 State **TWO** reasons for grafting fruit trees.

2

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Q9 List **FOUR** hazards relating to the use of propagation equipment in a greenhouse.

2

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Q10 Describe the term 'runners' in relation to **ONE NAMED** soft fruit crop.

2

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Q11 State **THREE** conditions which influence the successful storage of a **NAMED** vegetable.

2

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Q12 State **TWO** benefits resulting from planting certificated soft fruit.

2

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Please turn over

Q13 State how **FOUR NAMED** landscape materials may be sourced to minimise environmental impact.

2

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Q14 List **FOUR** factors to consider when planning a garden for ease of maintenance.

2

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Q15 State **FOUR** principles of design that help to achieve unity when planning a garden.

2

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The Royal Horticultural Society, Wisley, Woking, Surrey GU23 6QB



RHS LEVEL 2 CERTIFICATE IN HORTICULTURE

Wednesday 18 February 2009

10.00am – 11.30am

HORTICULTURE I – Planning, Principles & Production

Section 2 – Structured Questions

IMPORTANT - Please read carefully before commencing.

- i) The duration of the papers in Horticulture I is **1½ hours**;
- ii) Any **THREE** questions in Section 2 should be attempted;
- iii) **EACH** question carries **10 marks**;
- iv) Start **EVERY** new question on a separate answer booklet;
- v) Use metric measurements **ONLY**;
- vi) Where plant names are required, they should include genus, species and where appropriate, cultivar.

Please turn over

Answer **THREE** questions from this section.

		Marks
Q16	a) Define the following terms giving a fully NAMED plant example of EACH : i) species; ii) variety; iii) cultivar.	 2 2 2
	b) List FOUR reasons why it is important to use botanical nomenclature in horticulture.	4
Q17	a) Define the term 'plant tissue'.	2
	b) State ONE function of EACH of the following: i) xylem; ii) phloem.	 1 1
	c) With the aid of clearly labelled diagrams, describe EACH of the tissues listed in b).	6
Q18	Describe the propagation of a NAMED plant from leaf cuttings under the following headings: i) preparation of the cuttings; ii) rooting media and insertion of the cuttings; iii) rooting environment; iv) establishment after rooting.	 1 2 2 3 2
Q19	a) With the aid of a diagram, describe the siting and layout of a 'bed system' for outdoor vegetable production.	4
	b) Describe the establishment of a bed system on an area of open ground.	2
	c) State TWO benefits and TWO limitations of using a 'bed system'.	4

Please see over

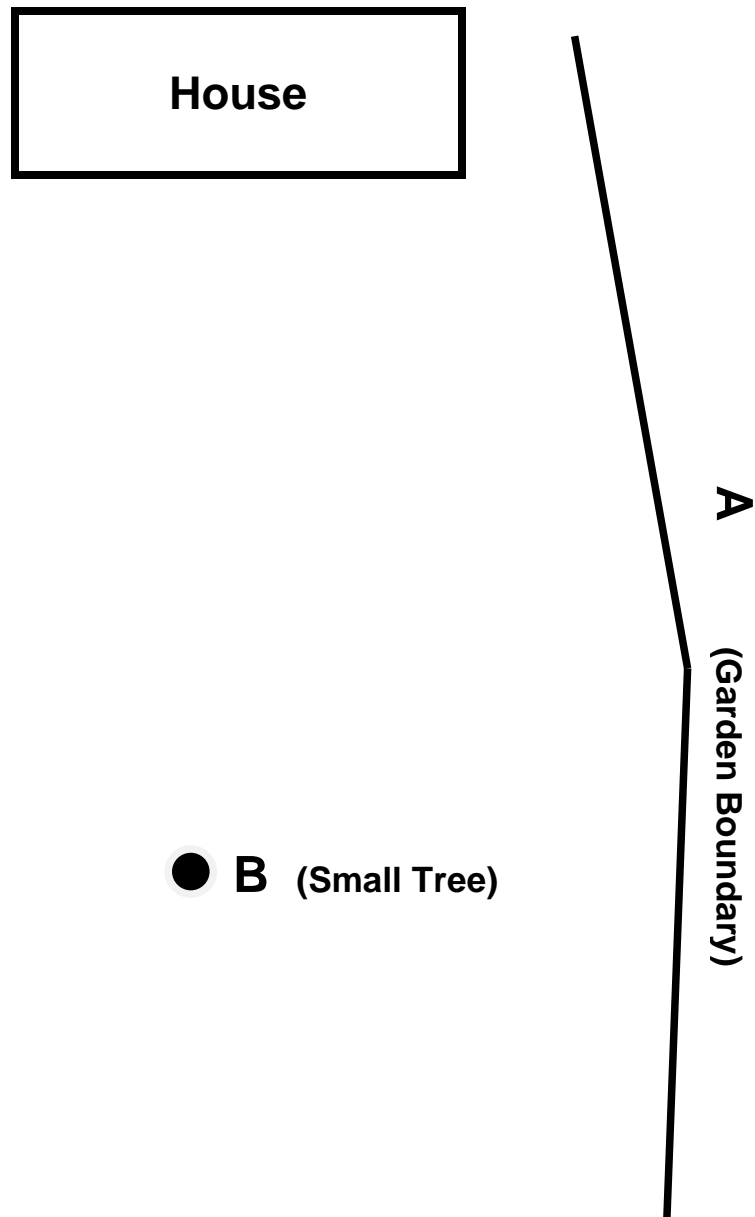
Q20 Describe the use of **FIVE NAMED** hard landscape materials in the planning of a low maintenance garden. **10**

Q21 The sketch below shows two features **A** and **B** which are to be added to an existing scale drawing of a house and garden.

With the aid of clearly labelled diagrams:

- i) show how the features **A** and **B** can be surveyed; **6**
- ii) describe the on-site records required to enable the features to be drawn on a scale plan. **4**

Diagram for Question 21



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RHS LEVEL 2 CERTIFICATE IN HORTICULTURE

18 February 2009

Horticulture I

Candidates Registered	1090	Pass with Commendation	23.52%
Candidates Entered	893	Pass	44.68%
Absent/Withdrawn/Deferred	197	Fail	31.8%
Total Candidates Passed	609		

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.
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.
3. The introductory rubric given on the first page of the 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. This is particularly so where candidates answer either more questions or more parts to a question than are required. Regrettably, some candidates quoted Imperial measurements in their answers, when required specifically to use Metric units.
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.
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. In the short answer sections it is important to ensure that responses are to the point and contained within the space allocated. 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 to structured questions are focussed 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 in structured questions 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 a proportion of candidates is ill prepared to answer papers of the type set. It is essential that candidates have the opportunity to practice both short and structured questions. Ideally some papers should be answered in a time-constrained situation. Appropriate feedback must, in any case, be provided.
10. Candidates should be aware of the reading list of suggested books for the RHS (Level 2) Certificate in Horticulture which is available from RHS Qualifications and can also be found on the RHS website together with past examination papers.

Examiners' Comments:

Section 1 - Short Answer Questions		Marks
Q1	<i>State the function of plant meristems and list TWO meristematic tissues.</i>	2
	A generally well answered question. However, some candidates confused meristematic tissues with the plant's vascular system. Although many candidates knew of lateral meristems, few could recall the actual tissue name, e.g. vascular cambium, cork cambium, pericycle. A few candidates wrongly offered a cell type, for example parenchyma as a meristematic tissue.	
Q2	<i>Name TWO distinct root adaptations and state the function of EACH.</i>	2
	Many good answers were seen, the most common citing tap root for food storage, aerial roots for gaseous exchange and/or adventitious roots for climbing. (Adventitious was often misspelled as "adventurous"). A proportion of candidates offered tap root as a plant support and root hairs for increasing surface area. However, these could not be rewarded as they are normal root tissues and not adaptations to specific conditions.	
Q3	<i>Define the terms: i) 'radicle'; ii) 'plumule'.</i>	2
	Many candidates displayed good appreciation of seed structure and of seedling development after germination. Marks for definition of the radicle were higher than those for the plumule, as many candidates failed to mention the context of the latter, assuming that it had already been stated. Full marks were only awarded for complete definitions in both parts.	
Q4	<i>List FOUR factors influencing the rate of photosynthesis.</i>	2
	Many excellent answers were seen, and rewarded. However, much unnecessary explanation was given, despite the question simply asking for a list which could have included any four from: temperature, light, water, carbon dioxide and a healthy plant.	

Q5 Define 'photoperiodism' in relation to a **NAMED** plant. **2**

Most definitions referred to the effect of changes in day length on the growth pattern of the named plant. However, many failed to mention what the affect was e.g. flower initiation, breaking of seed dormancy, leaf abscission etc. Naming was inadequate in some cases to fully identify the plant whose behaviour was being described. A significant proportion of candidates misread the question and defined phototropism.

Q6 Define 'epigeal' germination in relation to a **NAMED** plant. **2**

Most candidates were able to define epigeal germination as where the hypocotyl extends above the soil surface carrying the cotyledons at its tip. However, many gave incorrect examples such as *Vicia faba* and *Phaseolus coccineus*, both of which have hypogeal germination. Other common correct examples included *Helianthus annuus*, *Cucurbita pepo* and *Lycopersicon esculentum*.

Q7 List **FOUR** distinct ways to encourage root production when propagating plants by simple layering. **2**

Some good answers were seen, emphasizing the winter processes of bending the growth from the previous season, making a cut at the base of the bend, which is pegged down and covered with soil. Often the pegged shoot is tied to a vertical cane. However, a large number of candidates gave ways to encourage root production in stem cuttings, or general vegetative propagation, without any specific knowledge of simple layering.

Q8 State **TWO** reasons for grafting fruit trees. **2**

Many answers were of a high standard, candidates correctly identifying for example, control of height and vigour, vegetative propagation, ensuring trees are true to type, and imparting pest and/or disease resistance to the rootstock.

Q9 List **FOUR** hazards relating to the use of propagation equipment in a greenhouse. **2**

Unfortunately, many candidates assumed that this question referred to plant safety, discussing, for example, the transfer of pests and diseases. However, in accord with the syllabus, the question actually refers to hazards to humans, not plants. Many responses described objects that could be hazardous, but failed to mention what the hazard actually was. Hence, for example, a hosepipe does not in itself constitute a problem, but it could cause a tripping hazard in a particular position on the greenhouse floor.

Q10 Describe the term 'runners' in relation to **ONE NAMED** soft fruit crop. **2**

Strawberry (*Fragaria x ananassa*) was offered in almost all answers as a named plant. Many candidates knew what runners were, but failed to describe them as horizontal stems on the surface of the soil, rooting at the tip to form new plants. Some responses mistakenly described runners to be modified roots, rather than stems. Many answers gave unnecessary descriptions of propagation from runners, which were not rewarded.

Q11 State **THREE** conditions which influence the successful storage of a **NAMED** vegetable. **2**

Well answered in terms of: vegetables in sound condition, cool, dry, moisture level retained and frost free. Fruit examples were occasionally mistakenly offered.

Q12 State **TWO** benefits resulting from planting certificated soft fruit. **2**

Many candidates stated that certified fruit to be more resistant to pests and diseases, which is not the case. It is, however, guaranteed pathogen free. Many responses indicated that the plants are true to type, and were duly rewarded.

Q13 State how **FOUR NAMED** landscape materials may be sourced to minimise environmental impact. **2**

Generally answered well, most candidates having a good knowledge of environmentally sustainable sources. The value of recycled or reclaimed material was well explained, although the actual sourcing was less well covered. The use of locally available materials was well understood as a way of reducing 'carbon footprint'. Peat free compost was often offered as a landscape material, but no source offered, and hence given no marks.

Q14 List **FOUR** factors to consider when planning a garden for ease of maintenance. **2**

The value of easy access to garden areas was noted, as was that of woody plants which need little pruning. Ground cover planting received little attention, as did other weed suppression techniques.

Q15 State **FOUR** principles of design that help to achieve unity when planning a garden. **2**

Many candidates simply offered design terms e.g. balance, form, colour, but failed to explain how these factors could be used to create unity and so were unrewarded. Ideas such as consistent use of materials, repetition of features, the use of themes, and uniformity of scale, were all positively marked.

Section 2 – Structured Questions

Marks

Q16 a) Define the following terms giving a fully **NAMED** plant example of **EACH**:

- | | |
|----------------|---|
| i) species; | 2 |
| ii) variety; | 2 |
| iii) cultivar. | 2 |

b) List **FOUR** reasons why it is important to use botanical nomenclature in horticulture. 4

- a) As this was a question about botanical nomenclature, candidates needed to underline the part of the name which should be in italics to indicate their knowledge of this, for full marks. It was not sufficient just to give one plant name to illustrate all three terms – for full marks three separate names were needed. Most candidates correctly stated that species is a subgroup of a genus and that plants of the same species have characteristics in common. Few mentioned that species can interbreed unlike individuals of different species. Few candidates mentioned that individuals within a species show continuous variation whereas those of different species show discontinuous variation. Some answers were unable to clearly distinguish between a botanical variety and a cultivar and very few correctly named an example of a botanical variety.
- b) Generally well answered although some candidates confused nomenclature (which is about naming plants) with classification (which is about putting plants in groups). For example, Linnaeus did not invent botanical nomenclature, but he did suggest a classification system for plants.

Q17 a) Define the term 'plant tissue'. 2

b) State **ONE** function of **EACH** of the following:

- | | |
|-------------|---|
| i) xylem; | 1 |
| ii) phloem. | 1 |

c) With the aid of clearly labelled diagrams, describe **EACH** of the tissues listed in b). 6

- a) Candidates often described a particular plant tissue (which was not fully rewarded) rather than defining it as a 'group of cells performing a particular function'.
- b) Most candidates were able to state a suitable function for xylem (e.g. water transport), and phloem (e.g. sugar transport).
- c) For full marks candidates were expected to describe features such as sieve tubes, companion cells and xylem vessels together with their structure. For this a longitudinal section is the most useful diagram and was provided by better candidates.

Q18 Describe the propagation of a **NAMED** plant from leaf cuttings under the following headings: **1**

- | | | |
|------|--|----------|
| i) | preparation of the cuttings; | 2 |
| ii) | rooting media and insertion of the cuttings; | 2 |
| iii) | rooting environment; | 3 |
| iv) | establishment after rooting. | 2 |

Overall this question was poorly answered although a large number of candidates attempted it. Generally candidates failed to provide specific detailed information and a few candidates provided incorrect plant examples which meant that their answers were invalid.

Many candidates provided only the common name or generic name of a plant where the full botanical name for a plant example was required. Very few candidates named the type of leaf cutting selected.

- i) Very little detail was provided for the type of cutting material required.
Poor descriptions of the preparation of the cutting material i.e. length of the petiole, trimming of the petiole etc. for example *Saintpaulia ionantha*.
- ii) Most responses were very vague with regard to a suitable rooting media. Few candidates stated the materials in the rooting media or the ratio between materials required. Minimal detail was provided with regard to insertion of the cuttings, use of a dibber, depth of insertion or firming.
- iii) Many candidates were able to state a suitable environment in which to root the cuttings and some described it well. However, very few stated a suitable temperature for the aerial and rooting environments. A large number of scripts did not state or even describe the weaning of cuttings.
- iv) Most answers included potting off but information on the environment in which the cuttings should be placed afterwards was poor.

Q19 a) With the aid of a diagram, describe the siting and layout of a 'bed system' for outdoor vegetable production. **4**

b) Describe the establishment of a bed system on an area of open ground. **2**

c) State **TWO** benefits and **TWO** limitations of using a 'bed system'. **4**

A large number of candidates attempted this question but many answers were poor and lacked detail. Areas where candidates lost marks included:

- a) Many of the diagrams were very poor and did not show long, narrow beds. A large proportion of candidates drew diagrams depicting crop rotation which was not required. Dimensions of the beds were not stated. Details of a suitable orientation for the beds were not provided.

- b) Most responses discussed the need for digging but did not state which type. Most candidates stated correctly the need to eradicate weeds and some described the use of a stale seed bed which was rewarded.
Most candidates discussed the need to include organic matter. Some candidates referred to the establishment of crop rotation systems which was not awarded marks.
- c) Most responses gave two benefits of using the bed system, with most stating the benefit of lack of soil structural damage and higher crop yields per unit area cultivated.

Q20 Describe the use of **FIVE NAMED** hard landscape materials in the planning of a low maintenance garden.

10

This was not a popular question. Areas where marks were lost included: lack of description of the use of the material, incorrect use of the material, misunderstanding of the question, providing inappropriate examples of materials e.g. bark chippings, referring to features e.g. sculptures, planters etc. which were inappropriate.

Q21 The sketch below shows two features **A** and **B** which are to be added to an existing scale drawing of a house and garden.

With the aid of clearly labelled diagrams:

- i) show how the features **A** and **B** can be surveyed;
- ii) describe the on-site records required to enable the features to be drawn on a scale plan.

6

4

Very few candidates attempted this question. Areas where candidates lost marks included:

- i) Lack of clearly labelled diagrams and of suitable explanations to accompany them. However, many candidates were able to explain how the features should be surveyed even though some did not use the house as the base line.
- ii) Very few candidates explained the use of field books and how the records should be laid out. There was very little mention of the importance of a sketch plan, or of what figures should be recorded and where in the field book.

Diagram for Question 21

