RHS LEVEL 2 CERTIFICATE IN HORTICULTURE

Wednesday 24 June 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	Define the term ‘hypocotyl’ and state its function.	**2**	

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		Marks	Do not write in this margin
Q2	Define **EACH** of the following terms: i) ‘calyx’; ii) ‘corolla’.	**2**	

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		Marks	Do not write in this margin
Q3	a) Define the term ‘evergreen’. b) Name **ONE** example for **EACH** of **TWO** distinctly different types of evergreen plant.	**2**	

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Please see over ……..

Marks

Do not write in this margin

Q4 State **TWO** reasons for using botanical/horticultural nomenclature. **2**

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Q5 State **TWO** characteristics of cell walls. **2**

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Q6 List, using the following table, **TWO** different **NAMED** plant examples of leaf adaptation. **2**

Leaf Adaptation	Named Plant Example

		Marks	Do not write in this margin
Q7	List **FOUR** desirable characteristics of an outdoor seedbed that can assist the germination of hardy plants.	**2**	

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Q8 a) Name **TWO** different types of stem cutting.

b) Name **ONE** example of a plant propagated by **EACH** method identified in a). **2**

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Q9 a) Define ‘scarification’ of seeds.

b) State **TWO** methods of scarifying seeds. **2**

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		Marks	Do not write in this margin
Q10	List **FOUR** safety precautions to be taken when pruning top fruit.	**2**	

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Q11	State **TWO** reasons for providing shelter for top fruit from the wind.	**2**	

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Q12	State how the productivity of a **NAMED** vegetable can be increased by irrigation.	**2**	

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	Marks	Do not write in this margin

Q13 State **TWO** aesthetic and **TWO** functional factors to be considered when selecting a **NAMED** hard landscape material for paving a patio. **2**

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Q14 State **TWO** benefits and **TWO** limitations of a south facing site for the development of a garden. **2**

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Q15 Name **FOUR** plants suitable for low maintenance ground cover planting. **2**

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RHS LEVEL 2 CERTIFICATE IN HORTICULTURE

Wednesday 24 June 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) Answer **THREE** questions only from Section 2;

iii) **EACH** question carries **10 marks**;

iv) Start **EACH** 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 only from this section.

			Marks
Q16	a)	Define the term ‘seed dormancy’.	**2**
	b)	State **TWO** reasons why seed dormancy is an advantage to plants.	**4**
	c)	Describe **TWO** different causes of dormancy, using **NAMED** examples.	**4**
Q17	a)	Define the term ‘fruit’.	**1**
	b)	State **TWO** characteristics for **EACH** of the following types of fruit, using a **NAMED** plant example for each:	
		i) dry, dehiscent;	**3**
		ii) dry, indehiscent;	**3**
		iii) fleshy (succulent).	**3**
Q18	a)	Describe the preparation of softwood cuttings of a **NAMED** plant.	**5**
	b)	Identify **FIVE** safety hazards associated with this process and state how **EACH** may be minimised.	**5**
Q19	a)	Draw a large clearly labelled diagram of a mist propagation unit.	**6**
	b)	State **FOUR** reasons why a mist propagation unit assists in the rooting of cuttings.	**4**

Please see over …….

Q20 Describe **TWO** distinct methods of extending the growing season of **TWO NAMED** crops in the vegetable garden. **10**

Q21 a) Describe **FOUR** factors to consider when planning a fruit and vegetable garden. **4**

b) Sketch a possible layout for the garden proposed in a), showing how **FIVE NAMED** features might be included in the design. **6**

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RHS LEVEL 2 CERTIFICATE IN HORTICULTURE

24 June 2009

Horticulture I

Candidates Registered	1530	**Pass with Commendation**	328 (25.25)
Candidates Entered	1299	**Pass**	652 (50.19)
Absent/Withdrawn/Deferred	231	**Fail**	319 (24.56)
Total Candidates Passed	980		

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 are 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 the Qualifications Department and can also be found on the RHS website together with past examination papers.

Examiners' Comments:

Section 1 - Short Answer Questions **Marks**

Q1 *Define the term 'hypocotyl' and state its function.* ***2***

Most candidates identified the hypocotyl as being situated between the radical and plumule. Many also mentioned that the hypocotyl was responsible for carrying the cotyledons through the soil and into the light, some identifying the U shape of the hypocotyls as it started to develop. Surprisingly few responses mentioned the fact that the hypocotyl carries water and nutrients as does any stem.

Q2 *Define **EACH** of the following terms:*
i) 'calyx';
ii) 'corolla'. ***2***

Most candidates correctly identified the 'calyx' as a ring of sepals and the 'corolla' as the ring of petals.

Q3 *a) Define the term 'evergreen'.* ***2***

*b) Name **ONE** example for **EACH** of **TWO** distinctly different types of evergreen plant.*

Most candidates were able to accurately define 'evergreen', although some stated that such plants don't shed their leaves (ever). There were good examples of evergreen plants.
Common names or just a genus was allowed if it was unambiguous, but general terms such as conifers were not accepted.

Q4 *State **TWO** reasons for using botanical/horticultural nomenclature.* ***2***

A well answered question.
Most candidates were aware of the importance of having a universal naming system and not using 'common' names.
They also mentioned grouping similar plants into families etc.

Q5 *State **TWO** characteristics of cell walls.* ***2***

Many candidates referred to the characteristics of plant cells rather than those of cell walls. Some answers showed confusion between characteristics and function. Most candidates mentioned the fact that cell walls were semi-permeable. Lignin was mentioned in some scripts without explaining when this might or might not be present. However, lignification appeared to be well understood. There were some exceptional answers which were very detailed and accurate.

Q6 *List, using the following table, **TWO** different **NAMED** plant examples of leaf adaptation.* ***2***

Leaf Adaptation	***Named Plant Example***

Many candidates were able to give two examples of adaptation: for example spines, hairs, climbing/twisting, waxy leaves. Good plant examples were generally given.

Q7 *List **FOUR** desirable characteristics of an outdoor seedbed that can assist the germination of hardy plants.* ***2***

Some candidates just mentioned water, air and warmth, which was not sufficient, as practical application was expected. However a majority mentioned relevant points such as tilth, drainage, moisture holding, freedom from weeds and stones and shelter.

Q8 *a) Name **TWO** different types of stem cutting.*

*b) Name **ONE** example of a plant propagated by **EACH** method identified in a).* ***2***

Most scripts mentioned suitable types of cutting, including softwood, semi-ripe, and hardwood.
Plant examples were generally accurately identified.

Q9 *a) Define 'scarification' of seeds.*

*b) State **TWO** methods of scarifying seeds.* ***2***

The majority of candidates gave an accurate definition of scarification, giving two examples of how this might be done, usually using sandpaper and nicking with a blade. Some mentioned soaking in water which is chitting rather than scarification.

Q10 *List **FOUR** safety precautions to be taken when pruning top fruit.* ***2***

Safety precautions were well understood and most candidates were able to answer this question successfully.
Safety did relate to the gardener/operator and not the tree in this case.

Q11 *State **TWO** reasons for providing shelter for top fruit from the wind.* ***2***

Well answered with most responses mentioning damage to buds/ fruit/ branches or wind-rock and the need for still conditions for pollinating insects. Some gave frost protection as a reason, but a line of shelter could create a frost pocket, just as much as giving protection so this point needed clarification in the answer

Q12 *State how the productivity of a **NAMED** vegetable can be increased by irrigation.* ***2***

Salad crops were accepted as part of vegetable production practice. The majority of candidates gave botanical names for their example.
Some answers gave a detailed account of photosynthesis, transpiration and the general need for water for plant growth, which was not rewarded. Water need for germination, flower setting, fruit or root swelling culminating in extra yield were examples of good answers. The effects of irregular watering – fruit splitting on tomatoes or carrots and blossom end rot - were examples of the link between principles and practice.
It was essential in this question to have named a vegetable, general remarks not being accepted.

Q13 *State **TWO** aesthetic and **TWO** functional factors to be considered when selecting a **NAMED** hard landscape material for paving a patio.* ***2***

Some candidates lost marks because they did not name the landscape material. Others managed to mention it in passing They were also able to suggest two functional factors. For example wear resistance and non-slip surface. Unfortunately several mentioned that stone ‘looked good’ which wasn’t adequate.

Q14 *State **TWO** benefits and **TWO** limitations of a south facing site for the development of a garden.* ***2***

The majority of candidates answered this question well.
Some related to a south facing wall, which wasn’t what the question asked. Most mentioned better light, the soil warming more quickly than other aspects, earlier growth in spring and the opportunity, perhaps, to grow Mediterranean plants for example.
Limitations mentioned were also very sensible; with reference to the need for irrigation being often cited, together with the possible need for shade for some plants.
Some candidates suggested that there would be shelter from cold, northerly winds, but this might not necessarily be true as the situation was a south facing site rather than a south facing wall.

Q15 *Name **FOUR** plants suitable for low maintenance ground cover planting.* ***2***

The majority of candidates were able to give suitable examples.
Correct genus and species was required according to the rubric in this question. Marks were lost by candidates who just gave genus or common names.

Section 2 – Structured Questions **Marks**

Q16 *a)* *Define the term 'seed dormancy'.* ***2***

b) *State **TWO** reasons why seed dormancy is an advantage to plants.* ***4***

c) *Describe **TWO** different causes of dormancy, using **NAMED** examples.* ***4***

a) Most answers gained 1 mark for stating that seed dormancy is the inability of the seed to germinate. However, very few scripts gained an extra mark for adding that this was so even though conditions for germination were suitable and the seed was viable.

b) Reasons for dormancy were well described with full marks being awarded, for remarks such as: to stagger germination so that competition for water, nutrients and space could be reduced. The most common reason given was so that germination would take place when conditions for seedling survival were optimal – higher temperatures, plentiful rainfall, greater day length as in spring.

c) Many candidates referred to the two types of dormancy named in the syllabus, i.e. physical and physiological dormancy.
Popular examples given were hard testa for physical dormancy and presence of germination inhibitors for physiological dormancy.
Appropriate plant examples were given in most cases, although some candidates lost marks because they failed to give named examples.
The highest marks were awarded to candidates who named the mechanism correctly along with an appropriate named example and then described how that mechanism worked, e.g. hard testa, *Lathyrus odoratus* , prevents uptake of water until scarified, nicked or soaked overnight.

Q17 *a)* *Define the term 'fruit'.* ***1***

b) *State **TWO** characteristics for **EACH** of the following types of fruit, using a **NAMED** plant example for each:*

i) *dry, dehiscent;* ***3***
ii) *dry, indehiscent;* ***3***
iii) *fleshy (succulent).* ***3***

a) Some definitions of 'fruit' failed to mention that it is derived from an ovary and therefore were unrewarded.

b) Some candidates confused 'fruit' and 'seed' in their answers.
Most candidates gave appropriate named plant examples, but there are always some who fail to include this detail and throw marks away as a result.
i) Dry dehiscent – peas and beans were the commonly given examples and some candidates mentioned legume as the correct name for the fruit. Papaver capsules were

also a frequent choice. The explanation of dehiscence as the splitting of the fruit to release the seeds was generally well understood.

ii) Dry, indehiscent – nut was the most frequently referred to example and the explanation of indehiscence, where the fruit does not split to release the seed, was generally stated accurately.

iii) Fleshy fruits – tomato and berry were frequently given as named fruit and fruit type. Digestion and dispersal by animals and birds gained candidates the extra marks, along with the statement that seeds are released as the flesh breaks down.

Q18 *a) Describe the preparation of softwood cuttings of a **NAMED** plant.* ***5***

*b) Identify **FIVE** safety hazards associated with this process and state how **EACH** may be minimised.* ***5***

a) Most candidates gave a suitable plant example, *Fuchsia* being the most common.
A description of the condition of the stem tissue as soft, current season's growth and healthy, was usually well covered and some candidates also mentioned that it should be a non-flowering / juvenile shoot.
Removal of lower leaves was well described but in a few cases there was some confusion between making the basal cut above a node on the parent plant and below a node on the cutting itself.
Keeping cutting material turgid was usually well described and explained.
Unfortunately, many candidates spent much time and energy on describing the insertion of the cutting material – the selection of compost, environmental conditions and rooting - none of which was relevant to the question, and was therefore unrewarded.

b) The safety issues were generally very well explained, with most candidates referring to the care to be taken with cutting tools, the dangers of slip and trip, safe use of electricity and of chemicals. Candidates lost marks by misunderstanding the question and referring to plant and environmental hygiene. Several candidates scored no marks for this section as a result.

Q19 *a) Draw a large clearly labelled diagram of a mist propagation unit.* ***6***

*b) State **FOUR** reasons why a mist propagation unit assists in the rooting of cuttings.* ***4***

a) Many diagrams were not clear, details were confused and labelling was inaccurate.
A minority of candidates showed a detailed knowledge of mist propagation principles and practices.

b) The most frequently given reason, and the best described, was that of the reduction of transpiration.
The importance of basal heat to speed up cell division and

promote rooting was also well described.
A few candidates mentioned the cooling effect of misting, while the reduction in fungal infection occasioned by the periodic drying of the cutting leaf surfaces was poorly understood by most.

Q20 *Describe **TWO** distinct methods of extending the growing season of **TWO NAMED** crops in the vegetable garden.* ***10***

Candidates scored the highest marks where they set out their answer in two separate sections, each one naming and describing a distinct method of extending the growing season for a named crop.
Some answers were poorly structured, and could not be fully rewarded.
Successional sowing was usually well described with lettuce being the most common example given.
Use of cloches to warm up the soil and extend the season for, e.g. carrots, was also a well described method.
Use of first/second early and main crop potatoes was well covered with some candidates showing a good knowledge of appropriate cultivars.
There was some confusion with intercropping, which scored no marks at all.
The highest marks were awarded to candidates who gave a good description of the method, e.g. including details of the frequency of sowings, appropriate cultivars and selection of structures.

Q21 *a) Describe **FOUR** factors to consider when planning a fruit and vegetable garden.* ***4***

*b) Sketch a possible layout for the garden proposed in a), showing how **FIVE NAMED** features might be included in the design.* ***6***

a) Candidates received full marks for this section if they mentioned and explained four factors from among access, aspect, soil type, pH and structure, drainage, the need for shelter, microclimates and frost pockets.

b) The standard of sketches varied enormously from those confident of producing a detailed ground plan to those whose drawings were difficult to decipher. The best sketches were large and well labelled with some candidates choosing to add extra written detail on a separate page.
Most candidates chose to illustrate a raised bed system for vegetable growing, some also including a bed for permanent crops such as asparagus and rhubarb. Marks were awarded if some indication of the size of beds was given. However imperial measurements could not be rewarded.
Areas dedicated to top fruit and soft fruit were indicated, often against the shelter of a wall or fence.
Marks were awarded for features such as a glasshouse, tool shed, water butts and compost bays.

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