Royal Horticultural Society

RHS LEVEL 3 ADVANCED/DIPLOMA IN HORTICULTURE
WRITTEN EXAMINATION

Wednesday 9th February 2011
10:00am – 12noon

MODULE I

Planning Layout & Construction of Ornamental Gardens, Restoring Established Ornamental Gardens

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 **I** 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.

ANSWER ALL QUESTIONS

MARKS

Q1 Describe how site exposure may impact on the planning of a garden. **2**

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Q2 Describe a method of marking the position of a tree on a scale drawing from survey data. **2**

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Q3 State **FOUR** reasons why a water feature makes an important contribution to the garden. **2**

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Q4 State **ONE** advantage and **ONE** limitation for **EACH** of the following materials, used as the surface of a path:

i) reinforced grass;
ii) bark chippings. **2**

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Please see over/.....

MARKS

Q5 a) State what is meant by a 'plan section'.

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b) State how this information is used. **2**

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Q6 a) Name **ONE** method of laying pre-cast concrete slabs.

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b) State the situation in which pre-cast concrete slabs would be used. **2**

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MARKS

Q7 State **FOUR** problems that may be encountered when performing an initial site survey of an established garden. **2**

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Q8 State **FOUR** symptoms of the failure of a land drainage system. **2**

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Q9 List **FOUR** fungal diseases that could be present in neglected plantings. **2**

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Q10 State **FOUR** seasonal factors to be taken into account when scheduling work to be carried out in an historic garden during the summer. **2**

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**The Royal Horticultural Society, Wisley, Woking, Surrey GU23 6QB.
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RHS LEVEL 3 ADVANCED/DIPLOMA IN HORTICULTURE
WRITTEN EXAMINATION

Wednesday 9th February 2011
10:00am – 12:00noon

MODULE I

Planning Layout & Construction of Ornamental Gardens, Restoring Established Ornamental Gardens

Sections B & C - Structured Questions

IMPORTANT – Please read carefully before commencing.

i) The duration of the papers in Module **I** 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.

Please turn over/…..

Section B – Planning Layout & Construction of Ornamental Gardens

Answer TWO questions in this section

MARKS

Q11 For an ornamental garden with public access:

a) Evaluate the use of concrete as a suitable finished surface material. **6**

b) Outline the procedure for laying a concrete path. **8**

c) State the hazards that would be identified when preparing a risk assessment for laying a concrete path. **6**

Q12 a) State **THREE** symptoms of bad drainage which may be identified during a site appraisal. **3**

b) Describe, with the aid of clearly labelled diagrams, a piped land drainage system for a clay soil, showing dimensions and installation details. **10**

c) For setting out a 50m run of the drainage system described in b), state:

i) a suitable fall;
ii) equipment needed;
iii) procedure adopted. **7**

Q13 a) Explain the reasons for removing topsoil from areas prior to construction work taking place. **5**

b) Explain how soil type and ground conditions will determine the design and specification of a foundation for a **NAMED** hard landscape feature. **5**

c) In order to install an ornamental domestic lawn (20m x 20m) in a new housing development on clay soil:

i) describe the ground preparation procedures; and
ii) describe the equipment required. **10**

Please see over/.....

MARKS

Q14 a) Compare **TWO** materials for use in the construction of hard landscape features used as boundaries. **6**

b) Describe, with the aid of a clearly labelled diagram, the procedure for erecting a post and rail fence. **8**

c) Identify the hazards and list the health and safety precautions which need to be observed during the construction of a garden fence. **6**

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Section C – Restoring Established Ornamental Gardens

Answer ONE question only from this section

			MARKS
Q15	a)	Describe the characteristic plantings and features of particular interest in typical Italian style gardens.	**12**
	b)	Describe how the layout and features of a **NAMED** British garden show the influence of Italian style gardens.	**8**
Q16	a)	Identify **FOUR** factors which can be taken into account when making decisions on the retention of plants in an historic landscape.	**4**
	b)	Describe how the unintentional loss of significant plants can be avoided in garden restoration.	**8**
	c)	Describe **FOUR** remedial operations that can be carried out to improve plant specimens to be retained.	**8**

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RHS LEVEL 3 ADVANCED/DIPLOMA IN HORTICULTURE WRITTEN EXAMINATION

10:00am Wednesday 9th February 2011

MODULE I

Restoring Established Ornamental Gardens
Planning Layout & Construction of Ornamental Gardens

Candidates Registered	**34**		**Total Candidates Passed**	**21**	**87.50%**
Candidates Entered	24	70.59%	Passed with Commendation	6	25.0%
Candidates Absent	7	20.59%	Passed	15	62.5%
Candidates Deferred	2	5.88%	Failed	3	12.5%
Candidates Withdrawn	1	2.94%			

Section A – Short Answer Questions

Q1 Describe how site exposure may impact on the planning of a garden.

This was generally well answered. Marks were given for siting of patio, seating, provision of shelter belts, windbreaks, views, avoidance of wind tunnels, sun shading etc, lists of suitable plants were not asked for.

Q2 Describe a method of marking the position of a tree on a scale drawing from survey data.

A description of triangulation received full marks; a single mark was given for just the word. Descriptions should mention the use of a pair of compasses to achieve the arcs. This can be harder to describe than do but candidates who logically went through the task managed it. Some answers were rather muddled.

Q3 State **FOUR** reasons why a water feature makes an important contribution to the garden.

This question was very well answered with candidates showing understanding of the value of water to mood, reflection of light, movement, range of plants and wildlife.

Q4 State **ONE** advantage and **ONE** limitation for **EACH** of the following materials, used as the surface of a path:

i) reinforced grass;
ii) bark chippings.

This was well answered. Having to mow the grass could be taken as an advantage if it were reasoned that it was easy to do with a mower and kept the path tidy or as a disadvantage as it took maintenance time – but not both! Good answers mentioned the fact that it is permeable, takes wear but some systems need specialist contractors and sub base preparation. Several candidates misread the question as reinforced glass and so lost marks. The bark chippings were well understood, that they have a low environmental impact, look good in a woodland setting etc but need topping up, kick on to lawn etc. Marks were only given for cost if related to something else, rather than just 'expensive'.

Q5 a) State what is meant by a 'plan section'.

b) State how this information is used.

Answers to this question were generally poor, showing little understanding of a plan section. However successful candidates mentioned that it shows a cross section through the ground and is used to set out levels for ground terracing etc.

Q6 a) Name **ONE** method of laying pre-cast concrete slabs.

b) State the situation in which pre-cast concrete slabs would be used.

The question didn't really elicit the expected answer which was: screed bedded for smaller elements which are easy to man handle and of a consistent thickness and individual bedded for larger slabs of varying thicknesses. However answers that gave the correct instructions of how to lay slabs were given full marks i.e. mentioning hardcore, vibrating plate, binding sand, mortar etc. Marks were only not given for depths of materials if they were wildly out and would not practically work. No marks were given for 'dot' method as it is not considered best practice.
For the second part of the question marks were given for patios or paths but not for drives as they can crack and there are more suitable materials.

Q7 State **FOUR** problems that may be encountered when performing an initial site survey of an established garden.

This was well answered with points such as overgrown boundaries, obscured underground services, overgrown vegetation for putting down chains, hazards from decaying structures etc. Fewer marks were given for repetition i.e. overgrown paths, overgrown beds.

Q8 State **FOUR** symptoms of the failure of a land drainage system.

Good answers gave four very different symptoms, ponding, discoloured turf, ailing plant growth, indicator plants, gleying. sulphurous smell. Incorrect answers stated reasons for the failure.

Q9 List **FOUR** fungal diseases that could be present in neglected plantings.

Marks were awarded for fungal diseases that infect plants that are neglected rather than any fungal disease. Coral spot, honey fungus, mildews, fungal canker rather than botrytis for example.

Q10 State **FOUR** seasonal factors to be taken into account when scheduling work to be carried out in an historic garden during the summer.

Marks were awarded for visitor numbers, day length, drought, birds nesting, labour tied up, dormancy of plants but not sunny weather too hot for workers as precautions can be taken and not a usual problem in UK. Marks were lost by answers being too similar i.e. dormancy of bulbs, dormancy of trees, but generally the question was very well answered.

Sections B & C – Structured Questions

Section B – Restoring Established Ornamental Gardens

Q11 For an ornamental garden with public access:

a) Evaluate the use of concrete as a suitable finished surface material.

b) Outline the procedure for laying a concrete path.

c) State the hazards that would be identified when preparing a risk assessment for laying a concrete path.

The aim of this question was to assess the candidate's knowledge of a range of paving surfaces and understanding of safe installation procedures.

Marks were awarded for descriptions and explanations of the following in relation to concrete paved surfaces:

- aesthetics (surface finish texture and colour, and patterns) and practical design considerations (i.e. shape, slope, function),
- slip resistance (safety) and suitability for disabled use,
- frost resistance and durability,
- cost of materials and associated labour,
- construction considerations (time to set and full use, expertise required etc).

Concrete as a surface was familiar to everyone but it sometimes wasn't clear if the answer was referring to in situ concrete or pre-cast units. Many candidates' answers were based on widespread prejudices against concrete as a mundane, utilitarian material rather than giving a balanced evaluation. It was almost universally condemned as being ugly with few seeing its advantages, especially in public situations, for such things as wheelchair ramps. Due to its hard nature safety problems were sometimes quoted as disadvantages of concrete surfaces but this certainly would not be generally considered unless specified for such as a children's play area. Most said that its appearance could be improved with the addition of pigments or surface finishes. Observations on cost were often only that it were "relatively cheap"; comparisons would have to be made with other surface finishes of similar durability and function.

In part b) marks were awarded for outlining the procedure to include:

- appropriate excavation and ground preparation,
- laying and specification of sub-base including membranes, blinding, consolidation, suitable dimensions,
- installation of shuttering/formwork,
- concrete mix specifications to include ingredients (plus any additives) and appropriate proportions of each,
- placing and compaction in situ, tamping and surface finishes
- curing procedures.

Most candidates had an understanding of the processes but answers were often basic and frequently missed vital information, particularly dimensions and shuttering details.

In part c) stated hazards could have included appropriate operations for both hand and machine mixing. Answers should outline aspects of; manual handling, working near open excavations, safe surfaces (level / non slip, trip hazards), use of chemicals (wet and dry), dust, power sources (petrol diesel, electric), noise.
There is still some confusion as to the difference between hazards, risks and precautions in the preparation of a risk assessment. Most answers identified many of the hazards listed above and were awarded marks appropriately, but then went on and described precautions which should be in place, particularly the use of PPE, which the question did not require, and hence they wasted time and gained no extra marks.

Q12 a) State **THREE** symptoms of bad drainage which may be identified during a site appraisal.

b) Describe, with the aid of clearly labelled diagrams, a piped land drainage system for a clay soil, showing dimensions and installation details.

c) For setting out a 50m run of the drainage system described in b), state:

i) a suitable fall;
ii) equipment needed;
iii) procedure adopted.

The aim of this question was to show that the candidate is able to recognise drainage problems during the site appraisal process, to specify an appropriate system to alleviate poorly drained areas and to describe how to set out such a system.

Very few candidates answered this question so little generalisation can be made as to overall performance.

Candidates who did answer this question were able to describe three symptoms of bad drainage with variations on the presence or signs of standing water, indicator plants, smell and gleying.

The second part of the question required clear drawings to include a plan of the layout of the pipes and a cross section showing correct specifications and materials with appropriate dimensions for a clay soil. In general, although the actual construction details, particularly the layout of a herringbone system, were shown reasonably accurately, vital information such as specifications of the actual pipe, associated dimensions, depths and spacings was often missing.

Candidates were able to state a suitable fall in part c), but these tended to be steeper than necessary and didn't state that the relationship to the actual slope of the ground surface needs to be considered.

Answers should include an appropriate selection of equipment with correct naming and description– i.e. automatic or laser level, profile boards (sight rails), boning rods and traveller, etc.

Descriptions as to how the initial levels are set, the falls calculated over 50m, and the importance of working back from the outfall should be included together with methods of controlling a consistent fall and depth along the length of the trench. Diagrams would help in answering this question and would save a lot of description in words.

Section C – Planning Layout & Construction of Ornamental Gardens

Q13 a) Explain the reasons for removing topsoil from areas prior to construction work taking place.

b) Explain how soil type and ground conditions will determine the design and specification of a foundation for a **NAMED** hard landscape feature.

c) In order to install an ornamental domestic lawn (20m x 20m) in a new housing development on clay soil:

i) describe the ground preparation procedures; and
ii) describe the equipment required.

The aim of this question was to show that the candidate has an understanding of site preparation techniques in relation to the properties of soils and how they are handled safely on a construction site, using a range of techniques and equipment, prior to the installation of both hard and soft landscape features.

In part a), marks were awarded for references to:

- the presence of organic matter and pore spaces in top-soil being unsuitable to support constructed features,
- the detrimental effects on top-soil of heavy machinery movements and the storage of materials (compaction),
- contamination from fuel and construction chemicals,
- mixing of top-soil and subsoil during the construction phase especially if cut and fill or major re-contouring is involved,
- loss of ability to support plant growth if top-soil structure is damaged.

Most answers were able to explain some of these reasons but tended to relate their answer to smaller domestic projects where the heavy machinery which causes many of the problems are unlikely to be extensively employed.

Part b) needed an explanation as to how it is ensured that the foundation is constructed on a safe bearing area of the subsoil. Usually the ground conditions will then dictate the type and dimensions of the foundation that is required and particularly the depth at which it is placed. Marks were awarded for discussions as to how soil types and ground conditions might affect this based around:

- the need to have a stable formation on subsoil,
- the presence and effects of pore spaces and organic matter in topsoil causing settlement and therefore the depth of topsoil and the need to be below this,
- clay soils shrinkage and swelling,
- proximity of trees affecting water content (especially clay soils) and roots causing physical damage. (Also recent removal of trees can affect existing ground conditions).
- shifting sandy soils,
- sulphate (or other deleterious) content,
- height of the water table and bad drainage causing instability and erosion - underground springs,
- possible problems with made up ground,
- frost penetration depths.

This part of the question was generally not well answered with few candidates being able to relate their named feature to the ground conditions by giving examples of specifications of a suitable foundation for it. Most quoted a strip foundation for a wall but didn't then suggest the variations that different ground conditions might require.

In part c), marks were awarded for the inclusion of:

- drainage requirements,
- sub-soiling/ripping of sub-soil / builders residue (likely on a new housing estate),
- removal of weeds etc
- primary and secondary cultivation techniques, amelioration, consolidation.

The question only asked for the ground preparation techniques and, although not specified if the area would be seeded or turfed, many answers included details for this – usually seeding. Higher marks were awarded for more detailed answers including the necessity to prevent spreading of weeds, bulking and compaction factors / settlement, suitable depths, not to be done in waterlogged conditions etc.

The size of site indicated that large tractor drawn machinery would not be manoeuvrable and that probably it would be too large for hand contouring and cultivation. Most answers took this into account and suggested a pedestrian operated rotovator or mini-tractor. Few answers considered final preparation attachments for these machines and specified at least secondary cultivation by hand with spades, shovels and rakes, although the actual details of the type of rake was sometimes a bit vague.

Q14 a) Compare **TWO** materials for use in the construction of hard landscape features used as boundaries.

b) Describe, with the aid of a clearly labelled diagram, the procedure for erecting a post and rail fence.

c) Identify the hazards and list the health and safety precautions which need to be observed during the construction of a garden fence.

The aim of this question was to assess the candidate's knowledge of a range of landscape features and materials and their understanding of safe installation procedures.

In part a), marks were awarded for including comparative details of the following for two distinctively different materials:

- function of boundary and whether materials are fit for purpose,
- cost – needs to be comparative between the two materials, not just expensive or cheap, could look at material, labour and maintenance costs,
- ease of construction, skilled labour requirements,
- strength and durability,
- maintenance requirements,
- size of footprint,
- longevity,
- unity with surroundings / existing features,
- possible legal requirements i.e. planning requirements.

Most candidates provided good answers for this but some quoted two materials which were too similar – i.e. two different kinds of timber.

The procedure for erecting the fence should include the correct sequence of operations for establishing line and levels (checking for services), excavation of holes and attachment of rails. Appropriate specifications and dimensions could be included in the text or the diagram.

Higher marks were often not awarded because it was not always clear that candidates understood what a post and rail fence is, either in the text or diagrams. Most answers advocated the use of concrete for securing the posts which is not normal for this kind of fence. Many diagrams were very poor. Dimensions and specifications for the posts were often missing altogether. Post and rail fences normally follow the lie of the land – most answers said that all the rails should be level. Although it is possible with nailed type fences, it is not usual to insert and secure all the posts in the ground before attaching the rails – and this would be impossible with mortised posts.

In part c), marks were awarded for identification of appropriate hazards including awareness of underground services, use of tools and equipment, use of hazardous materials. Precautions included use of correct PPE, training of personnel, exclusion zones/signage, safe use and storage of machinery and equipment and chemicals.

This was well answered in most cases with candidates understanding most of the hazards which could be encountered and what should be in place, or put in place to lower the risks of injury.

Q15 a) Describe the characteristic plantings and features of particular interest in typical Italian style gardens.

b) Describe how the layout and features of a **NAMED** British garden show the influence of Italian style gardens.

This question was attempted by only one candidate. The answer to this part of the question should be based on features to be found within a typical Italian renaissance garden of the mid to late 17th century. Such landscapes are based on a strongly symmetrical layout with the features listed below:

- Terraces
- Water features
- Balustrades
- Stairways
- Statues
- Topiary
- Parterres (though this was a French influence)

The Italian renaissance landscape influenced developments throughout Western Europe, in particular both French and Dutch landscapes.

The Italian landscape style has influenced both formal landscapes of the Victorian period and in the design style employed by designers of the Arts and Crafts period such as Edwin Lutyens and Harold Peto.
Ornamental plantings make a far greater contribution to these landscapes. The Victorian landscape included parterres which contain formal bedding. The Arts and Crafts landscapes included hard features often using local materials, especially those designed by Lutyens. Much of the planting is of a softer style using informal plantings of both herbaceous and seasonal bedding plants. Much of the plant arrangement was based on the use of colour effects.
Victorian Italianate gardens quoted e.g.: formal garden at Tatton Park or Lutyens design at Hestercombe.

Q16 a) Identify **FOUR** factors which can be taken into account when making decisions on the retention of plants in an historic landscape.

b) Describe how the unintentional loss of significant plants can be avoided in garden restoration.

c) Describe **FOUR** remedial operations that can be carried out to improve plant specimens to be retained.

This question was attempted by the majority of candidates. Answers to this part of the question should have included the following points:

- Rarity of plant specimens;
- Notable specimens e.g.: champion trees;
- Ease of propagation;
- Ease of remedial such as pruning;
- How common is the plant?
- Dominant weed species on the site;
- Condition of the plants and the presence of pests and diseases;
- Conservation issues such as conservation areas and TPOs;
- Role of the plants and their impact on the original design of the site.

Steps to be taken to avoid the unintentional loss of plants are as follows:

- Surveying all plants;
- Correct plant identification;
- Plant propagation;
- Recording and marking on a plan;
- Protection of plants;
- Ensuring the recording of plants in the dormant season;
- Removal to a safer location;
- Labelling and marking on site;
- Careful management of, and access by, machinery..

The four remedial operations can be chosen from the following list: (plant propagation is considered as a strategy for avoiding unintentional loss rather than a remedial operation).

- Addition of nutrients;
- Mulching and mulching materials;
- Removal of unwanted growth;
- Restorative and remedial pruning including details of operations;
- Control of pests and diseases and examples.