



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

**10:00am Wednesday 6<sup>th</sup> July 2011**

**MODULE I**

**Restoring Established Ornamental Gardens  
Planning Layout & Construction of 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.

**Please turn over/.....**

## ANSWER ALL QUESTIONS

## MARKS

**Q1** Explain what is meant by the term 'champion tree'.

**2**

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**Q2** Describe an effective way to protect a collection of herbaceous plants from damage whilst gardens are being restored.

**2**

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**Q3** List **FOUR** criteria for assessing the condition of an established rose bed.

**2**

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**Q4** State the names of **TWO** important people in the evolution of Victorian gardens.

**2**

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Please see over/.....

## ANSWER ALL QUESTIONS

### MARKS

- Q5** Describe a method by which an irregularly shaped pond can be set out from a scale drawing.

**2**

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- Q6** State **TWO** reasons for incorporating an archway within a garden.

**2**

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- Q7** List **FOUR** hazards that could be encountered when constructing a timber pergola.

**2**

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## ANSWER ALL QUESTIONS

## MARKS

- Q8** State **TWO** factors that determine the success of a soakaway as a method for disposing of drainage water.

2

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- Q9** State **TWO** means of establishing a level in garden construction.

2

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- Q10** State **ONE** practical advantage and **ONE** limitation of a **NAMED** edging material for a lawn.

2

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**10:00am Wednesday 6<sup>th</sup> July 2011**

**MODULE I**

**Restoring Established Ornamental Gardens  
Planning Layout & Construction of 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 **ONE** question from Section **B** and **TWO** questions 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 – Restoring Established Ornamental Gardens

Answer **ONE** question only from this section

	MARKS
<b>Q11</b> a) State <b>FOUR</b> symptoms of a faulty drainage system.	4
b) Describe <b>SIX</b> faults that can cause the drainage system to fail.	6
c) Describe the remedial action that can be undertaken for the faults mentioned in b).	10

<b>Q12</b> a) Describe the operations that can be undertaken to protect <b>EACH</b> of the following in garden restoration work:	
i) mature trees;	4
ii) structures of historic importance;	4
iii) lawns;	4
iv) hard landscape surfaces.	4
b) Outline factors that can disrupt restoration work.	4

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Please see over/.....

## Section C – Planning Layout & Construction of Ornamental Gardens

Answer **TWO** questions from this section

	MARKS
<b>Q13</b> a) Review the advantages of walls in ornamental gardens.	8
b) Outline the factors which will need to be considered when specifying the foundations for a 90cm high retaining wall built of brick.	4
c) Draw a clearly labelled cross-sectional diagram to illustrate the foundations of a 90cm high brick wall on a sandy substrate.	8
<b>Q14</b> a) Assess the suitability of <b>EACH</b> of the following surface materials for the construction of a shady sitting area in a garden:	
i) pea shingle;	
ii) natural stone flags;	
iii) soft wood decking.	12
b) Evaluate <b>FOUR NAMED</b> surface materials suitable for a children's play area.	8

Please turn over/.....

## MARKS

**Q15** a) Describe the consequences of incorrect storage and reinstatement of topsoil during the construction stages of a landscape project. **10**

b) Describe the sequence of operations used to create a level terrace, 20m x 10m, from a sloping lawn. **10**

**Q16** Describe the impact of **EACH** of the following on a design for an ornamental garden:

- |      |                      |          |
|------|----------------------|----------|
| i)   | dimensions;          | <b>4</b> |
| ii)  | micro climate;       | <b>4</b> |
| iii) | views;               | <b>4</b> |
| iv)  | drainage;            | <b>4</b> |
| v)   | existing structures. | <b>4</b> |

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

**10:00am Wednesday 6<sup>th</sup> July 2011**

### **MODULE I**

#### **Restoring Established Ornamental Gardens Planning Layout & Construction of Ornamental Gardens**

<b>Candidates Registered</b>	<b>71</b>		<b>Total Candidates Passed</b>	<b>51</b>	<b>91.07%</b>
Candidates Entered	56	78.87%	Passed with Commendation	19	33.93%
Candidates Absent	6	8.45%	Passed	32	57.14%
Candidates Deferred	4	5.63%	Failed	5	8.93%
Candidates Withdrawn	5	7.04%			

#### **Section A – Short Answer Questions**

**Q1** Explain what is meant by the term 'champion tree'.

Full marks were awarded for answers that contained the fact that a 'champion tree' is one that is recorded on the Tree Register as the oldest or tallest of its species in Britain or Ireland. Only one candidate achieved full marks, though half marks were awarded if the register was mentioned or that the tree was the tallest or oldest.

**Q2** Describe an effective way to protect a collection of herbaceous plants from damage whilst gardens are being restored.

Many good practical answers here noted the importance of either fencing off the area or lifting the collection whilst dormant and removing to a temporary site. The importance of labelling and recording the position of plants should be mentioned. Many answers contained the suggestion of propagating material as an insurance which was valid.

**Q3** List **FOUR** criteria for assessing the condition of an established rose bed.

Several good answers included assessing for pests and disease, age of plants, condition of soil, vigour of plants. The fact that the plants have suckers or not is a very valid point and of particular relevance to roses.

**Q4** State the names of **TWO** important people in the evolution of Victorian gardens.

Any person who was an eminent figure was acceptable, obscure figures, even of the period, are not by their nature, 'important' and so no marks are gained unless the candidate could justify their answer. Strong candidates chose uncontroversial famous names such as Joseph Paxton, Decimus Burton, and James Pulham. Figures, such as Loudon, provided a good answer, although a pre and very early Victorian, his impact on the 'evolution of Victorian Garden' was immense. Gertrude Jekyll and Edwin Lutyens were not acceptable, although they did some work during the reign of Victoria, their impact was on Edwardian gardening.

**Q5** Describe a method by which an irregularly shaped pond can be set out from a scale drawing.

The best answers gave a clear description of how to do this with triangulation. However, if the method given was practical and would work it gained marks.

**Q6** State **TWO** reasons for incorporating an archway within a garden.

This question was well answered with practical ideas for incorporating climbing plants, framing views, leading one through the garden, dividing the garden and giving height.

**Q7** List **FOUR** hazards that could be encountered when constructing a timber pergola.

The subject was well and comprehensively covered with good answers including the hazards of working at height, working with ladders, hazards of splinters, lifting heavy elements, use of power tools, use of chemical preservatives, hazards to do with mixing concrete. Preventative means were not called for and gained no marks.

**Q8** State **TWO** factors that determine the success of a soakaway as a method for disposing of drainage water.

Very good answers included the volume of water to be drained in relation to the size of the soakaway, the percolation rate of the soil, and the soakaway being above the water table. How effective the rest of the drainage system was, was not relevant. Maintaining it free from silt and debris, however, was and gained marks.

**Q9** State **TWO** means of establishing a level in garden construction.

Half marks were gained for the names of relevant equipment such as a laser level, automatic level or pegs, plank and a spirit level. Strong candidates gave a brief description of how the equipment was used and were awarded full marks. Use of a hose pipe filled with water is not deemed professional practice.

**Q10** State **ONE** practical advantage and **ONE** limitation of a **NAMED** edging material for a lawn.

Good answers gave a clear and defined edging material such as 'preserved timber plank held in place by wooden pegs' rather than merely 'wood' which is not precise enough to evaluate. Marks were given for cost considerations if they were related to another edging material, for example a limitation of steel edging could be that it is more expensive than plastic edging. Aesthetic reasons are subjective, and marks were awarded if they were justified by a reason i.e. 'steel edging is beautiful in a contemporary style garden', rather than 'it is beautiful'.

## Sections B & C – Structured Questions

### Section B – Restoring Established Ornamental Gardens

- Q11** a) State **FOUR** symptoms of a faulty drainage system.
- b) Describe **SIX** faults that can cause the drainage system to fail.
- c) Describe the remedial action that can be undertaken for the faults mentioned in b).

Symptoms of the faults that can occur with a failing drainage system were well understood by candidates. The main points are as follows:

- area generally badly drained and remaining so for long periods after rain fall,
- wet and muddy soil and puddles of water in patches,
- plants that indicate a wet soil such as *Juncus* sp,
- subsidence of, and uneven ground,
- slippery and mud patches in the turf which causes poor wear quality.

Answers to the second part of the question are as follows:

- silting up of drains which can be caused by blocked silt traps, lack of aggregate over the drain pipes,
- drains have collapsed due to subsidence or the use of heavy machinery,
- inadequate falls causing slow water flow thus causing silting-up,
- rising water table which means that drainage water is unable to flow away,
- obstructions to the outlets caused by vegetation or the incursion of rodents,
- soil capping and poor soil water percolation caused by the formation of pans,
- poor percolation of the soil water (see above) lacks of porous backfill over the drains,
- drainage system too deep or too shallow,
- lateral drains too widely spaced,
- drains of an insufficient diameter.

Description of remedial actions should include the following:

- rodding through drain pipes to remove silt and other debris,
- clearing slit traps,
- replacement of sections of collapsed or deformed drains,
- clearing outfalls,
- use of plastic perforated pipes to replace worn and broken clay drains,
- relaying entire drainage systems using appropriate sized drains: 73mm for laterals and 100mm for main drains,
- falls from 1 in 25 to ideally 1 in 80, 1 in 100. Falls can be as little as 1 in 300 but these tend to lead the water to run slower and therefore increase the risk of silting-up,
- depth of drains between 80cm and 100cm,
- suitable materials for 'back-fill' which includes coarse clean aggregate 18mm and sand 0.5mm to 0.05mm for operations such as sand slitting,
- arrangement of outfalls use of herringbone or grid system,
- use of 'funnels' (these are holes filled with aggregate) to solve wet patches,
- soil amelioration to improve infiltration rates of the soil and the use of sub-soiling and aerators.

**Q12** a) Describe the operations that can be undertaken to protect **EACH** of the following in garden restoration work:

- i) mature trees;
- ii) structures of historic importance;
- iii) lawns;
- iv) hard landscape surfaces.

b) Outline factors that can disrupt restoration work.

This question was generally answered well by candidates. However in answers to section a), some candidates assumed that only four answers were required, as each section was worth four marks. In fact there are as many as eight potential answers to some parts of this question. The answers are as follows:

- the correct identification of the trees,
- tree preservation orders that are in existence and implementation of preservation orders,
- tree surveys to assess the general state of the trees,
- check pests and diseases particularly those that may threaten the life and safety of the tree,
- 'Champion' trees recorded for particular note,
- reduction of compaction around roots by fencing off,
- remedial pruning and pruning back branches,
- wrapping of the trunk,
- aeration of the soil around the base of the tree.

For the second part of section a), points that could have been made are;

- inspected by specialist in historic architecture,
- check if the structures are 'listed' within the English Heritage register,
- photographs taken of structures in current state of repair to record for both restoration purposes and the structures removal,
- check for structural soundness,
- unique structure will also influence restoration measures,
- use of temporary supports,
- fenced off to keep general public out and to reduce problems such as vandalism,
- protected from frost and the weather, use temporary shelter,
- removal for restoration period to storage.

For the third part of section a), points that could have been made are;

- use of temporary fencing,
- surface protection which includes boarding,
- if the sward is botanically diverse may use transects,
- temporary removal of the turf,
- consider appropriate reseeding with similar grass seed mixture,
- eventual use of the area,
- aeration and scarification to improve grass areas.

For the final part of section a), points that could have been made are;

- check the historic uniqueness of the surface,
- protect the surface from vehicular and foot traffic and spillage of materials such as concrete and cement,
- temporary removal of the paving,
- photographic records should be kept,
- survey for remedial action to be undertaken,
- replacement of broken surfaces with identical materials.

In answer to section b), factors that can disrupt restoration work are as follows:

- inclement weather conditions,
- seasonal factors such as short days and frost,
- access to the site for heavy materials,
- sources of finance,
- availability of skilled labour and specialist consultants,
- continued public access to provide continued income.

## **Section C – Planning Layout & Construction of Ornamental Gardens**

- Q13**
- a) Review the advantages of walls in ornamental gardens.
  - b) Outline the factors which will need to be considered when specifying the foundations for a 90cm high retaining wall built of brick.
  - c) Draw a clearly labelled cross-sectional diagram to illustrate the foundations of a 90cm high brick wall on a sandy substrate.

The aim of this question was to show that the candidate has an understanding of the purposes and uses of a range of hard landscape features along with their specifications and safe construction techniques.

In part a), marks were awarded for the inclusion of: marking boundaries, division within a garden, privacy, screening, shelter for plants and people including heat retention/creation of microclimates, security, safety, unity with architecture, retaining soil and water, support for roof/beams as in the construction of a building or pergola, support for climbing plants.

The question asked for a review and better answers included comparisons with suitable alternatives such as fences and hedges for similar situations.

In part b), marks were awarded for explanations of the following factors:

- soil type,
- depth of topsoil,
- stability of subsoil,
- drainage requirements,
- potential imposed load of soil (and water) behind wall,
- possible slippage,
- proximity to trees,
- presence of underground services.

Most candidates were aware of the impact on foundation design imposed by the soil conditions and on the loading of the wall and the dead load of the wall itself. Better answers included some explanation of the reasons as to how these factors affect the foundation design and included an appropriate diagram.

In part c), marks were awarded for clearly labelled diagrams showing:

- consolidated sub-grade (undisturbed stable subsoil),
- appropriate depth of excavation (with possible reference to frostline),
- appropriate width of foundation,
- appropriate profile and thickness of concrete,
- concrete ingredients and mix ratio.

Most candidates could produce a cross-section drawing but some were very untidy and poorly labelled. Although not strictly the foundation, many answers included details of the brickwork below ground, but details of this would be required to specify the width of the foundation. The actual wall details and drainage methods for removing water from behind a retaining wall (not specified in the question) were not asked for but were often included. Few candidates referred to the sandy subsoil but in many ways this was irrelevant providing the foundation is specified as being on a stable consolidated sub-grade at an appropriate depth; more reference would have had to be made to shrinking and swelling if a clay soil had been asked for. Many depths quoted were too shallow and some were excessively deep with more wall below ground than the 900mm above as in the question. The concrete specifications were often very vague.

**Q14** a) Assess the suitability of **EACH** of the following surface materials for the construction of a shady sitting area in a garden:

- i) pea shingle;
- ii) natural stone flags;
- iii) soft wood decking.

b) Evaluate **FOUR NAMED** surface materials suitable for a children's play area.

The aim of this question was to show that the candidate had an understanding of the properties of a range of hard landscape materials and can apply this knowledge to different garden situations.

In part a), all candidates were familiar with the materials and were awarded marks for inclusion, as appropriate to each one;

- durability and longevity,
- slip resistance – particularly with regards to resistance to algae and moss
- frost resistance,
- flexibility, both in design and construction,
- safety,
- disabled use considerations – i.e. wheelchairs,
- suitability for furniture,
- cost (comparisons),
- aesthetics,
- need for edging/retention,
- suitability on slopes (although the question does say for a sitting area, this could include access),
- expertise required in installation,
- environmental issues – i.e. sustainability,
- maintenance requirements.



To gain full marks there must have been some reference to a shady sitting area – this was particularly relevant to the non-slip and algae resistant aspects. Most points needed further clarification specific to the material and many candidates used some comparisons between the three materials. This was particularly important for cost as “cheap” or “expensive” alone is meaningless. Aesthetics too can be quite subjective and some indication of adaptability to a suitable theme or style was required – not just “looks nice” or “attractive”. Some answers were vague as to the identification of natural stone flags with many just quoting “limestone” or “sandstone”; there is a range of both of these which can vary greatly, in particular, density and hence durability and algae resistance. There is a common misapprehension that decking is cheap.

In part b), marks were awarded for evaluations as in part a) above if relevant to play areas plus additional mention of critical fall heights, cleanliness, abrasive qualities, transition between surfaces etc. The four materials should have been distinctly different – i.e. rubber, be it shredded, tiles, or poured insitu, is just one material technically. Although most candidates correctly quoted critical fall heights as being a key factor, there is some confusion as to its application – it is the height of the play equipment that dictates this, not the surface material. Apart from various forms of rubber, wood or bark chips, sand and grass, including artificial and reinforced, other suitable materials were chosen.

- Q15** a) Describe the consequences of incorrect storage and reinstatement of topsoil during the construction stages of a landscape project.
- b) Describe the sequence of operations used to create a level terrace, 20m x 10m, from a sloping lawn.

The aim of this question was to show that the candidate had an understanding of soil storage and reinstatement techniques and the procedures for maintaining soil quality when changing levels on a site.

Very few candidates answered this question so no generalisation can be made as to overall performance.

Answers to the first part of the question should have included descriptions of effects on soil quality if not stored or re-instated correctly to include: compaction, excess organic matter content, anaerobic conditions, weed content (particularly noxious/notifiable weeds), drainage problems, waterlogging, leaching and nutrient loss, erosion, pests, diseases, chemical contamination, bio security issues, etc. This would require reference to recognised soil storage and re-instatement techniques which could be put in place to prevent these problems.

In part b), answers should have included descriptions of setting out, cut and fill theory, cut and fill calculations, stripping turf, stripping and storing top/sub-soil, correct machine selection, installation of retaining devices (banks, walls, gabions, crib construction etc ) to include appropriate foundations, drainage assessment and installation, re-grading and soil re-instatement including subsidence avoidance with fill, bulking and consolidation factors. This should all be relevant to the size of the site which would not be suitable for hand excavation.

**Q16** Describe the impact of **EACH** of the following on a design for an ornamental garden:

- i) dimensions;
- ii) micro climate;
- iii) views;
- iv) drainage;
- v) existing structures.

The aim of this question was to show that the candidate was able to analyse factors noted during a site appraisal, identify potentials and constraints and evaluate the effect these will have on the design solution.

Marks were awarded in each case for:

- i) explanations of practical/functional use of areas within size constraints, site size/shape suitable for dimensions of proposed materials and features, access width and height restrictions, scale and proportion, planting potential and restrictions, with examples,
- ii) explanations of the effects of sun traps, shade, wind tunnels, frost pockets, rain shadows etc, with reference to comfort of users, planting problems and potentials, seasonal effects etc, with examples,
- iii) explanations of external views, internal views, views from within house, views of site from outside, security/privacy, borrowed landscapes, ways of hiding views, enhancing views, diverting views, seasonality, with examples,
- iv) explanations of bad (and excessive) drainage causing problems, soil stability (foundations), erosion, possible lack of outfalls/disposal points, potential features/styles and planting problems and potentials for both badly and well drained sites (i.e. bog garden, gravel garden), functionality of surfaces/areas, particularly lawns, seasonality, existing systems able to cope with proposals, possible damage/blockage to existing systems impact on existing ground drainage patterns by changing levels or adding features, with examples,
- v) explanations of potential suitability/functionality in proposed layout, unity of style, materials, colours etc, shade problems and requirements, access, services (present and/or proposed), need to hide, possible demolition problems, safety of rotting/crumbling structures, historical value/listed status, wildlife protection status (i.e. bats) with examples.

In general most candidates covered the planting design aspects well, giving good examples as appropriate in each section. Better answers included more detail about the functions of proposed designs from the users' point of view and the positioning of hard landscape features to accommodate this.

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