



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

**Wednesday 8 February 2012**

**10:00am – 12:00noon**

**MODULE I**

**Restoring Established Ornamental Gardens  
Planning Layout and 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.
- vii) Please note, sufficient lined space is provided. It is not necessary that all lined space is used in answering the questions.

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

## ANSWER ALL QUESTIONS

### MARKS

**Q1** List **FOUR** criteria for assessing the condition of a specimen tree. **2**

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**Q2** Name **TWO** organisations involved with heritage garden restoration from whom advice can be sought. **2**

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**Q3** List **FOUR** criteria to be used in assessing whether an established shrubbery should be retained or replaced. **2**

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**Q4** List **FOUR** perennial invasive weeds that may infest a neglected garden. **2**

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Please see over/.....

**Q5** State **FOUR** features of a low maintenance garden. **2**

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**Q6** Give **FOUR** contributions a water feature can make to a formal garden. **2**

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**Q7** Describe a method of marking out a diamond shape on the site. **2**

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**Q8** Describe a use for boning rods. **2**

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**Q9**

State **FOUR** factors to be considered when drafting a specification for a pergola.

**2**

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**Q10**

State **FOUR** reasons for assessing existing vegetation on a site before redevelopment.

**2**

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**MODULE I**

**Restoring Established Ornamental Gardens  
Planning Layout and Construction of Ornamental Gardens**

**Sections B and 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.
- vii) Please note, sufficient lined space is provided in the answer booklets. It is not necessary that all lined space is used in answering the questions.

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

## Section B – Restoring Established Ornamental Gardens

**Answer ONE question only from this section**

**MARKS**

- |            |  |           |
|------------|--|-----------|
| <b>Q11</b> | a) Describe the investigative techniques that can be employed when carrying out a survey of an ornamental garden in need of restoration. | <b>12</b> |
|            | b) Review the possible outcomes of the investigation in a) that may affect the feasibility of restoration.                               | <b>8</b>  |

**Q12** Describe the origin and characteristics of **EACH** of the following:

- |      |                 |          |
|------|-----------------|----------|
| i)   | parterres;      | <b>4</b> |
| ii)  | rock garden;    | <b>4</b> |
| iii) | wild garden;    | <b>4</b> |
| iv)  | carpet bedding; | <b>4</b> |
| v)   | garden rooms.   | <b>4</b> |

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**Please see over/.....**

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

### Answer TWO questions only in this section

	MARKS
<b>Q13</b> a) State <b>FIVE</b> consequences of incorrect storage and reinstatement of topsoil during the construction stages of a landscape project.	5
b) Describe the procedures involved in creating a level area from an existing slope.	10
c) State the implications of different soil textures in relation to modifying soil contours.	5
<b>Q14</b> a) State details that should be included in the specification for a natural stone patio.	6
b) State <b>THREE</b> methods that may be used on scale drawings of a proposed patio and its surrounding area to indicate existing and new levels.	6
c) Identify solutions to problems that may arise during the siting and construction of a patio.	8
<b>Q15</b> a) State the factors which will determine the type of drainage system for a small garden.	6
b) Review the options available for a small garden with impeded drainage.	14

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		<b>MARKS</b>
<b>Q16</b>	a) Review the hazards associated with hard landscaping operations.	<b>10</b>
	b) Produce a risk assessment for the maintenance of a piped land drainage system.	<b>10</b>

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

**10:00am Wednesday 8 February 2012**

### **MODULE I**

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

<b>Candidates Registered</b>	<b>32</b>		<b>Total Candidates Passed</b>	<b>26</b>	<b>86.67%</b>
Candidates Entered	30	93.76%	Passed with Commendation	6	20.0%
Candidates Absent	1	3.12%	Passed	20	66.67%
Candidates Deferred	-	-	Failed	4	13.33%
Candidates Withdrawn	1	3.12%			

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

**Q1** List **FOUR** criteria for assessing the condition of a specimen tree.

Good answers included comments on health status, including pest and disease, die back, vigour of growth, age of tree, physical damage tree may have sustained i.e. loss of limbs, damaged bark, poor pruning work. No marks were given for TPOs as it is the condition of the tree that is being assessed rather than its status.

**Q2** Name **TWO** organisations involved with heritage garden restoration from whom advice can be sought.

Any organisation that gives advice, paid or unpaid such as The Garden History Society, The Walled Garden Society and professional consultants under such groupings as 'Historic Gardens and Landscapes of England'. English Heritage is not a good example as they have no embedded consultancy service and will only deal with outstanding Grade 1 and 2 listed gardens. The National Trust does not offer a consultancy service.

**Q3** List **FOUR** criteria to be used in assessing whether an established shrubbery should be retained or replaced.

Marks were awarded for answers that addressed the question as to whether the shrubbery should be 'replaced or retained', not its removal, therefore the health status of the shrubbery, vigour of growth, flowering capacity etc. were relevant. The value of the plants as a collection, the mix and interest of the plants were all pertinent. Answers that sought to justify if a shrubbery should be kept at all did not gain marks as they were irrelevant.

**Q4** List **FOUR** perennial invasive weeds that may infest a neglected garden.

Full marks were awarded for full botanical names for weeds that are both perennial and invasive. In this situation answers that include trees such as *Acer pseudo platanus* are correct.

**Q5** State **FOUR** features of a low maintenance garden.

Good answers included: use of mulches, ground cover plants, weed suppressing geotextiles, resilient hardy plants, evergreen plants, use of hard landscape materials, paving. Successful answers leave no room for doubt i.e. 'no lawn' is a more effective answer than 'small lawn' which is subjective. Where gravel was given as an answer it must be accompanied by use of a geotextile membrane as gravel without can generate considerable garden maintenance and therefore gained no marks.

**Q6** Give **FOUR** contributions a water feature can make to a formal garden.

Answers that including focal point, noise, reflection, movement, wider range of plants were awarded marks. Answers such as 'feeling of grandeur' depend on too many factors such as style, context, scale and subjectivity to gain marks.

**Q7** Describe a method of marking out a diamond shape on the site.

The most effective way to answer this question is to give the answer as a clear set of instructions which, if followed, would lead to the achievement of the task, for example: Using 3, 4, 5 triangles mark out a rectangle the length and width of the diamond. Mark the half-way point on each side with a peg and join the four pegs with string to form the diamond. Any practical method that would work gained marks.

**Q8** Describe a use for boning rods.

Full and coherent answers are needed for full marks. More detail allows more marks to be awarded including points such as; used to establish levels, set of at least three needed. Descriptions of the method of using boning rods showed good practical knowledge and were awarded marks i.e. one set up on known level, second on next level, both checked with spirit level. Third (traveller) 'sighted in' between the two and the level marked or adjusted.

**Q9** State **FOUR** factors to be considered when drafting a specification for a pergola.

. Answers were sought which included details of:

- materials to be used for uprights, timber posts or brick piers etc.
- size of timbers, treated, species and source (i.e. recycled) of timber for different elements,
- finish: rough sawn, planed all round, stained etc.
- construction: depth of posts into ground, concrete, fixings etc.

Successful answers showed a good knowledge of the process and detail needed to be considered when drawing up a specification.

**Q10** State **FOUR** reasons for assessing existing vegetation on a site before redevelopment.

Good answers understood from the question that in redeveloping the site it is assumed, unless otherwise argued, that the existing vegetation would go. Answers that addressed this were successful i.e. was there any historical, cultural or structural interest of collection that made it important. Would retained plants add maturity, shelter to new scheme. Wildlife habitats, TPOs were relevant and gained marks. Existing vegetation, even if weeds, gives evidence about pH, drainage etc.; this point gained marks. Mention of pest and disease status was awarded marks if linked to a pest or disease that could impinge on future planting choices i.e. honey fungus.

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## Sections B & C – Structured Questions

### Section B – Restoring Established Ornamental Gardens

- Q11** a) Describe the investigative techniques that can be employed when carrying out a survey of an ornamental garden in need of restoration.
- b) Review the possible outcomes of the investigation in a) that may affect the feasibility of restoration.

The answer to the first section of the question required a 'broad' review of the techniques used in carrying out garden survey work, and not a detailed concentration on one or two aspects. Marks were given for answers containing the following points:

- land surveying techniques including tape and chain, triangulation, levelling and contours and the use of base maps and plans such as ordnance survey,
- overall layout of the site,
- site factors such as soil, drainage, pH, location of services,
- identification of garden buildings and structures,
- statues and ornaments,
- lard landscaping,
- identification of plants,
- the general state of the above,
- the uniqueness of the various features named above,
- research of records such as old maps, photographs, paintings and drawings, use of geophysical survey techniques and metal detectors for items such as old labels.

The best answers to the second section included the following:

- uniqueness of the landscape in the context of national, regional and local importance,
- access to the site,
- health and safety considerations both for the workforce and general public, if they are to be admitted,
- general state of both buildings and plants,
- economic considerations in carrying out the work,
- the phasing of restoration operations,
- availability of knowledgeable advisors and skilled work force,
- conservation areas and SSSIs etc.,
- weather conditions and the need to protect plants and features.

**Q12** Describe the origin and characteristics of **EACH** of the following:

- i) parterres;
- ii) rock garden;
- iii) wild garden;
- iv) carpet bedding;
- v) garden rooms.

**Parterres** are geometric patterns made on the ground using various forms of short ornamental hedge. Most use **Buxus sempervirens 'Suffruticosa'** or **Taxus baccata**. Parterres originated in Roman Gardens and can also be found in some Muslim. However it was French designers that used the form to a great degree in their gardens. Early parterres were more square or labyrinth-like. Later French parterres used broderie or swirling patterns as at Versailles. Parterres are also found in gardens of the Italian renaissance and Dutch. The Victorians used parterres which were sometimes made of carved stone.

**The rock garden** originated in the 19<sup>th</sup> century, the earlier ones being in the form of heaps of stone or 'plum pudding' rock gardens. Some rock gardens were built to create an alpine scene (not necessarily for growing alpinists) such as the Paxton rock garden at Chatsworth House.

Some used artificial materials such as 'Pulhamite' a material resembling sandstone and developed by James Pulham in the 19<sup>th</sup> century.

Reginald Farrer was a pioneer in creating the 'natural' rock garden with account taken of the strata of the rocks. These were used to grow a wide range of alpinists to create the habitat that these plants like.

Most modern rock gardens are to be found in the botanic gardens or gardens such as Wisley.

**The wild garden** was a concept first created by the gardener/landscaper/writer William Robinson. Robinson put forward the idea of naturalistic plantings and the use of native plants. Wild gardens are feature also of some modern landscapes with the move to conservation and reduced maintenance. The use of wild flower meadows, the selection of plants to encourage wild life is an important aspect of this type of landscape.

**Carpet bedding** originated in the 19<sup>th</sup> century and involves the use of low growing plants selected for their colour, form and texture. Plants used include **Echeveria**, **Pyrethrum** and **Alternanthera**. These plants were used to create intricate patterns such as Coats-of Arms, floral clocks and the like. In recent years the beds have become three-dimensional with the creation of scene from nursery rhymes for example. It is very expensive to plant and maintain and is therefore a feature that is less frequently seen. It is now mainly the preserve of local authorities to provide these features.

**Garden rooms** is a phrase coined by the garden designer John Brookes who provided designs for smaller back gardens as an extension of the rooms of the house. The gardens were fully enclosed and included seating areas surfaced with hard paving, seats, ornaments, raised beds and small water features could be provided along with low maintenance style plantings.

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

- Q13**
- State **FIVE** consequences of incorrect storage and reinstatement of topsoil during the construction stages of a landscape project.
  - Describe the procedures involved in creating a level area from an existing slope.
  - State the implications of different soil textures in relation to modifying soil contours.

The aim of this question was to show that the candidate has an understanding of level changing procedures during the construction of a garden and the requirements for the safe and efficient handling of soil in the undertaking of these procedures.

Most candidates could state a range of appropriate storage procedures but often then failed to gain a higher mark by not describing the consequences to the soil and the surrounding area if these procedures were not carried out correctly. Marks were awarded for the inclusion of the following:

- inadequate weed control causing spread and infestation of noxious or notifiable weeds i.e. Japanese knotweed,
- inappropriate sizes/depths of storage bunds causing compaction and loss of structure,
- inappropriate siting/angles of slope of storage bunds causing erosion and leaching of nutrients,
- working when soil is waterlogged, storing in waterlogged condition leading to anaerobic conditions,
- inappropriate spreading/machines during re-instatement causing mixing of top soil and subsoil and detrimental effect on nutrient status.

In the second part of the question, marks were awarded for explanations of the following procedures:

- calculations and explanation of cut and fill,
- choice of retaining methods at top/bottom of slopes as appropriate – angle of repose if banks,
- methods of marking out (pegs/profiles etc.),
- removing and disposing of turf/vegetation,
- stripping and storing topsoil, keeping segregated from sub-soil,
- assessing drainage need and installing drains,
- establishing retaining walls/banks,
- grading subsoil,
- consolidation as appropriate,
- re-instatement of topsoil.

Most candidates were aware of the implications of soil profile alterations when designing a terraced area and usually correctly quoted cut and fill procedures, but this was not always explained in adequate detail. Retaining methods and positioning of appropriate structures was also not always well explained. Only the actual contouring was asked for but some answers wasted time explaining hard or soft landscape surface applications for the terracing.

In the final part of the question implications of different soil textures included:

- type and size of machine required (bucket type, tracked/wheels etc.),
- angle of repose of banks,
- drainage capabilities and requirements,
- level change implications on the ability to support proposed structures and the design of the foundations,
- level change implications on the ability to support existing and proposed plantings,
- compaction and bulking factors,
- amelioration requirements.

Again many candidates lacked detailed explanations of these implications which were necessary to achieve higher marks.

- Q14** a) State details that should be included in the specification for a natural stone patio.
- b) State **THREE** methods that may be used on scale drawings of a proposed patio and its surrounding area to indicate existing and new levels.
- c) Identify solutions to problems that may arise during the siting and construction of a patio.

The aim of this question was to show that the candidate has an understanding of the properties of a range of hard landscape features and materials and can apply this knowledge to different garden situations. Part b) tests the candidates understanding of the components of a scale plan.

Most candidates were familiar with a range of details required for the specification of a patio and were awarded marks for inclusion as appropriate:

- overall dimensions of patio,
- type of stone (e.g. York sandstone),
- colour,
- finish (riven, sawn, etc.),
- shape of units (e.g. rectangular),
- size(s) of units,
- pattern,
- pointing/jointing method, materials and finish,
- foundation dimensions,
- foundation material,
- fall/drainage,
- bedding method/material,
- blinding or membranes,
- safety and disabled use considerations e.g. wheelchairs.

Three possible methods that could have been put forward in answers to part b) were:

- spot levels on a plan drawing
- contours on a plan drawing
- cross section/elevation drawings

Higher marks were awarded to those candidates who could describe these methods, indicate what type of drawing they may be found on and distinguish possible differences as to how they might appear if they were existing or proposed levels.

The type of problems, amongst others, that could arise (with solutions) would be:

- design problems e.g. excessive cutting of slabs required, area not square/not a multiple of unit sizes (re-design pattern/sizes/orientation of units),
- shade cast by trees and buildings creating unwanted microclimate affecting user comfort/plant growth, algae growth, falling leaves (re-site, specify alternative materials, thinning or removal of trees),
- privacy from overlooking (provide pergolas, screening structures and planting),
- drainage (incorporate adequate fall, install drainage system),
- insufficient bearing capacity of soil for foundation e.g. shifting sand, high water table (redesign foundation e.g. raft),



- unforeseen underground objects/services/drains or ugly access points e.g. manholes (redesign, reroute services),
- legal problems, planning, SUDS, building regulator etc. (ensure knowledge of latest codes of practice and obtain permissions if necessary),
- variation in mortar/pointing colour and texture (ensure mixes are gauged accurately, no work in wet or frosty conditions).

Most candidates could identify some of the problems but then often did not go on to propose solutions.

- Q15** a) State the factors which will determine the type of drainage system for a small garden.
- b) Review the options available for a small garden with impeded drainage.

The aim of this question was to show that the candidate has an understanding of drainage needs and can propose possible solutions to overcome bad drainage in gardens.

Factors which determine the type of drainage system could include:

- existing / proposed function of area (lawn, border etc.),
- soil type,
- soil depth,
- height of water table,
- existing/proposed slope/level changes,
- existing trees/vegetation,
- existing/proposed hard and soft features,
- position/proximity of buildings or other existing structures (including underground services),
- method of disposal/dispersal, position of available outfall,
- elevation of available outfall,
- dimensions of site/area to be drained,
- access to site for machinery and materials,
- amount of water likely, including any irrigation,
- budget.

Most answers included an adequate range of factors but then described a type of suitable drainage system which was not required.

Review was to include the pros and cons of different options, including:

- raising levels, including raised beds,
- surface cultivation/addition of organic/inorganic matter (probably sand slitting unlikely in small garden),
- subsoiling/ripping/pan alleviation,
- installation of piped systems,
- installation of French drains,
- ditches and swales,
- alternative paving surfaces, i.e. decking,
- moisture loving plants bog/water gardens.

Most candidates were able to describe a piped system in some detail and many also put forward proposals for planting schemes, but then missed out some of the other options or did not compare their suitability in a small garden situation.

- Q16** a) Review the hazards associated with hard landscaping operations.
- b) Produce a risk assessment for the maintenance of a piped land drainage system.

The aim of this question was to show that the candidate has an awareness of safety when carrying out landscape construction and is able to identify hazards and produce a risk assessment.

Clearly defined hazards could include:

- untidy materials, tools and cables trip hazards,
- slippery/muddy surfaces,
- use of electrical equipment (electrocution and heat),
- machinery with moving parts, cutting and trapping / flying objects,
- abrasive materials/sharp edges/splinters etc.,
- sharp tools, cutting and piercing,
- working at height (ladders),
- using chemicals (cement, preservatives etc.),
- hazardous materials such as asbestos,
- exposure to dust (e.g. cement) eyes and respiratory organs,
- heavy lifting (manual handling),
- open excavations, collapsing and falling in,
- hand/arm vibration,
- noise,
- dealing with contaminated soil or water.

Most candidates were not able to identify more than a few of these possible hazards.

The second part of the question required a Risk Assessment set out in appropriate format (e.g. from HSE 5 step guidelines) in context with the *maintenance* of a piped drainage system so:

- identify hazards,
- decide who might be harmed and how,
- evaluate the risks and decide on precautions, what is in place (e.g. signage, exclusion, legislation) and what needs to be put in place (e.g. training, PPE) including calculations as to level of risk (various good practice methods)
- record findings and implement them,
- review risk assessment and update if necessary.

Very few candidates were able to answer this part of the question adequately, with there being a lot of confusion between “hazard” and “risk”. Many answers didn’t relate to the piped drainage system or just quoted personal protective equipment. The final two parts of the risk assessment process were hardly mentioned in any answer.

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