Candidate Number: ……..

Candidate Name: ……..

Centre Number/Name: ……

RHS (LEVEL 3) ADVANCED CERTIFICATE/DIPLOMA IN HORTICULTURE WRITTEN EXAMINATION

Wednesday 7th February 2007

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.

Module I

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

Section A – Short Answer Questions

Please turn over/…..

ANSWER ALL QUESTIONS

MARKS

Q1 Describe how **TWO** site factors may impose restrictions in garden planning. **2**

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Q2 Name **FOUR** surfaces suitable for use in children's play areas. **2**

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Q3 List **FOUR** factors, which are important in the correct storage of top soil during site construction. **2**

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Q4 Describe **TWO** methods of disposing water from a drainage system. **2**

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Please see over/…..

ANSWER ALL QUESTIONS

MARKS

Q5 State what is meant by the term ‘haunching’. **2**

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Q6 Name **TWO** organisations involved with heritage garden restoration. **2**

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Q7 State **TWO** trends that are significant in the evolution of English gardens. **2**

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Q8 State the origin and period of a generic garden design style. **2**

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Please turn over/…..

ANSWER ALL QUESTIONS

MARKS

Q9 Describe how to mark out a right angle on the ground, using a tape measure and pegs. **2**

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Q10 List **FOUR** criteria that can be used to assess the condition and future life expectancy of plants. **2**

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RHS (LEVEL 3) ADVANCED CERTIFICATE/DIPLOMA IN HORTICULTURE WRITTEN EXAMINATION

Wednesday 7th February 2007

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.

Module I

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

Sections B & C

Structured Questions

Please turn over/…..

Section B – Restoring Established Ornamental Gardens

Answer ONE question only from this section

MARKS

Q1 a) Describe the basic survey and recording methods that can be employed when surveying an historic ornamental garden. **10**

b) Explain the importance of the information gained for the future restoration and conservation work. **10**

Q2 a) Describe the use and installation of temporary safeguards to protect both ornamental plantings and hard features, when undertaking the restoration of a garden. **6**

b) List and explain the considerations that influence the production of a garden restoration schedule. **8**

c) Describe the circumstances, which lead to the modification of the restoration schedule. **6**

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Please see over/…..

Section C – Planning Layout & Construction of Ornamental Gardens

Answer TWO questions only from this section

MARKS

Q3 a) Compare the reasons for selecting either a wall or a fence as a boundary in a garden. **6**

b) Describe, with the aid of a labelled diagram, the construction procedure for a panel fence 1.8m high using timber posts. **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**

Q4 Explain the factors that influence the planning and layout of a site for an ornamental garden under **EACH** of the following headings:

i)	access;	**4**
ii)	existing drainage systems;	**4**
iii)	mature trees;	**4**
iv)	soil;	**4**
v)	slope.	**4**

Q5 For an ornamental garden with public access:

i)	review the use of 'in situ' concrete as a suitable surface;	**5**
ii)	list and describe the ingredients required to mix this on site;	**5**
iii)	state a suitable mix ratio for the concrete;	**2**
iv)	list the operations to be included in a risk assessment for the installation of the concrete.	**8**

Please turn over/…..

Q6 a) Describe **THREE** symptoms of bad drainage, which may be identified during a site appraisal. **3**

b) Draw a labelled cross-section of a piped land drainage system for a clay soil, showing dimensions and installation details. **8**

c) State a suitable drainage fall for this system and describe the equipment and how it would be used to set out over a distance of 50m. **9**

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RHS (LEVEL 3) ADVANCED CERTIFICATE/DIPLOMA IN HORTICULTURE WRITTEN EXAMINATION

Wednesday 7th February 2007

Module I

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

Examiners Report

Candidates Registered	26		Total Candidates Passed		
Candidates Entered	24	92.31%	Passed with Commendation	3	12.5%
Candidates Absent	1	3.85%	Passed	16	66.66%
Candidates Deferred			Failed	5	20.83%
Candidates Withdrawn	1	3.85%			

Section A – Short Answer Questions

Q1 Describe how **TWO** site factors may impose restrictions in garden planning.

Most candidates were able to name TWO site factors which included: slopes, aspect, exposure, shelter, soil, drainage, access, services, and tree preservation orders. However, a number of candidates failed to describe how these factors may impose restrictions in garden planning.

Q2 Name **FOUR** surfaces suitable for use in children's play areas.

A generally well answered question, Answers included wood chip, bark, shredded rubber, sand, rubber matting. A number of candidates incorrectly used tarmac and concrete as suitable surfaces.

Q3 List **FOUR** factors, which are important in the correct storage of top soil during site construction.

Most correct answers included: avoid waterlogged or polluted sites, length of storage time, keep weed free, keep top soil and substrate separate.

Q4 Describe **TWO** methods of disposing water from a drainage system.
Most candidates described TWO methods including the use of soakaways, sumps or disposal to a stream, river or ditch. Few mentioned checking with the Local Environment Agency in respect to water movement.

Q5 State what is meant by the term 'haunching'.

Most candidates understood that 'haunching' holds the edge units in a fixed position but failed to say that it adds mass to the retaining structure to stop lateral movement.

Q6 Name **TWO** organisations involved with heritage garden restoration.

Most popular correct answers included: National Trust, English Heritage, Garden History Society and NCCPG.

Q7 State **TWO** trends that are significant in the evolution of English gardens.

Correct answers included: British gardens have been continually stimulated by plant introductions from abroad; Nurseries have played an important role in the distribution and sponsorship of new plants; Gardening literature and gardening press have promoted and influenced the gardening public through the writings of influential gardeners and designers of the day giving rise to gardening fashions.

Q8 State the origin and period of a generic garden design style.

Well answered by the majority of candidates who were able to state a suitable design style and give the correct period or dates. One of the most popular answers was the Arts and Crafts/Surrey School 1880-1910 and the divergence of ideas between the formal and informal (William Robinson and Gertrude Jekyll)

Q9 Describe how to mark out a right angle on the ground, using a tape measure and pegs.
Most candidates used the 3,4,5 triangulation method when using a tape measure and pegs. Few were able to describe how to carry out the task accurately.

Q10 List **FOUR** criteria that can be used to assess the condition and future life expectancy of plants.
Correct answers included checking for: healthy roots, stems and leaves, soil conditions (pH, water logging, compaction, pans, drought susceptibility), age of plant, surrounding area for clues to health or condition of the coil and plants, aspect, vulnerable position with regard to any future development.

Structured Questions
Section B – Restoring Established Ornamental Gardens

Q1 a) Describe the basic survey and recording methods that can be employed when surveying an historic ornamental garden.

Some candidates described in some detail the methods of land surveying which only forms a small part of this question. The question should contain the following points:
Much of the initial survey work is carried out by observation. Before visiting any historic site location maps and basic historic information such as site maps and any published data such as guide books does provide useful background. A description of the site will include the layout of site and location of the landscape features. A set checklist can be used to check off the presence of landscape features and also in some cases to identify items that are missing. The general state of the features can also be briefly described.
Photographic record is used as further evidence both to the presence and general state of the features.
Site factors such as ownership, access and location information is included.

Following this survey a decision will have to be made whether to continue with a 'desk-top' investigation. Many initial surveys are used by the County Gardens Trust to form a register of historic landscapes and gardens.

b) Explain the importance of the information gained for the future restoration and conservation work.

The first major issue is whether the landscape is worth restoring. This will be dependant on what already exists on the site, is the landscape unique, are there other similar landscapes in the area. Most landscape restoration is dependant on attracting grants and finance from the potential visitors. Therefore depending on the health and safety issues, encouraging visitors creates a lot of interest, encourages revisiting and publicity.

Further desktop research needs to be carried out using archive records. This information can be gained in the form of old photographs, estate maps and records, paintings or the study of other contemporary landscapes.

Ornaments, structures need to be secured both for safety reasons and to reduce further deterioration. This can be done by erecting temporary structures or even temporary removal of the object.

Phasing of restoration work both to encourage revisiting and to even out the costs over a period of time. Much restoration can be extremely complex and very expensive especially when dealing with hard landscape features.

Application for 'listing' under English Heritage scheme is important to encourage further grants.
Protecting and in some cases listing of plant material.

Q2 a) Describe the use and installation of temporary safeguards to protect both ornamental plantings and hard features, when undertaking the restoration of a garden.

Hard features should be protected by temporary shelters, this may well enable the public to inspect the object.
Temporary removal of statues and ornaments for restoration.
Covering can be used for paving and steps.
Fences can be erected to protect both hard features and plants.
Temporary access can be arranged to enable both the removal of over-aged plants and the restoration work on buildings.

b) List and explain the considerations that influence the production of a garden restoration schedule.

The layout of the site and access arrangements both for restoration and possible access by the general public.
The general state of the site and the state of the landscape features within the site.
The scheduling of work will involve firstly work on the basic layout of the site, this will be followed by individual items.
The restoration work schedule will also be dependant on the degree of detail which is to be restored on the site.

c) Describe the circumstances, which lead to the modification of the restoration schedule.

The general state of the site and the extent of the restoration work.
Problems with buildings and trees may only be discovered once work has started.
Site access problems.
Weather conditions particularly during the winter months can delay restoration work especially with the use of heavy machinery.
Seasonal work includes new planting.
If public access is required, arrangement for safe access.
Shortage of skilled labour for some restoration work.
Lack of finance and delays in obtaining grants for specific work.

Section C – Planning Layout & Construction of Ornamental Gardens

Q3 **a)** Compare the reasons for selecting either a wall or a fence as a boundary in a garden.

Most candidates who answered this question set this out as a list, usually in table format, of advantages and disadvantages of walls and fences. In many cases this was not then expanded or cross referenced adequately to include a full comparison. There were often presumptions that a fence would be cheaper and not as attractive, and require more maintenance than a wall, which might not necessarily be the case with bespoke hardwood or steel fencing structures. Marks were awarded for appropriate and fully explained comparisons to include: cost, ease and expertise of construction, timescale of construction, strength, maintenance requirements, size of footprint, topography, exposure, longevity, unity with surroundings / existing features, legal requirements.

b) Describe, with the aid of a labelled diagram, the construction procedure for a panel fence 1.8m high using timber posts.

There appeared to be some confusion as to what a panel fence is, with some candidates describing the construction of a closeboarded fence.
Marks were awarded for detailed descriptions and diagrams to include:
Correct specifications and dimensions of materials in both the narrative and diagrams
Establishment of line and levels (checking for services)
Excavation of first hole and erecting and consolidating first post (at highest end)
Measuring and excavating second hole
Attaching panel to first post (appropriate method stated)
Levelling panel and attaching to second post (strut if required)
Continuation of post/panel sequence, ensuring line and levels
Attachment of cappings and post caps as required.

Materials, dimensions and erection techniques were often not described accurately in either the text or the diagrams. Diagrams were often disproportionate, messy, poorly labelled/dimensioned and unclear.

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

Most candidates understood the process of risk assessment and were able to identify the important hazards associated with fence construction. Marks were awarded for the inclusion of: an understanding of the implications of damaging underground services, dangers involved with the storage and use of materials, tools and equipment, open excavations, and the handling of hazardous materials.
Precautions to include: correct training and awareness of safety standards procedures (HASWA, PUWER, COSHH etc), correct manual handling and storage, the setting up of exclusion zones/signage etc and appropriate use of PPE.

Q4 Explain the factors that influence the planning and layout of a site for an ornamental garden under **EACH** of the following headings:

vi) access;
vii) existing drainage systems;
viii) mature trees;
ix) soil;
x) slope.

This was a popular question but many candidates who answered it failed to interpret the question correctly. Rather than describing the effect the factors could have on *planning and layout*, they described the influences of these factors on the *construction* phase. Although some of these might have similar potential or problems, this will not necessarily be for the same reasons. For example the presence of underground services will have different implications for the planners to what it will have for the construction contractors. It is necessary to avoid planning hard landscape features to be built within the root spread of a mature tree, but it is just as important to avoid damage to the root system during construction work. Likewise a sloping site may be inconvenient or even dangerous to work on for the contractors, but the future functions of the garden could have a completely different bearing on the possible incorporation of terracing, drainage and retaining walls when planning the layout. However problems with present access to the site could have more similar impact on both stages of the development if the size or weight of proposed features or materials precludes them from the site, so both planning and construction could be implicated in this case.
Marks were awarded in each section for explanations of, but were not limited to, the following:

i. <u>Access</u>
Legal considerations – ie access on to a public highway
Width, height and weight restrictions, both local and distant
Disabled requirements
Safety and security – especially if public are to have access
Functionality – most direct route? – most welcoming route?
- frequency of use? etc

ii. <u>Existing drainage systems</u>
Often difficult to change site levels or layout
Old, broken or blocked – feasibility of repair / replacement
Cut off by previous re-development? – either up or downstream
Adequate for proposed extra input?
Inspection covers unsightly and/or require access
Could restrict positions and species of proposed plantings

iii. <u>Mature trees</u>
Tree preservation orders
Rarity and/or local amenity value
Ground heave or swell if removed
Views opened up if removed?
Condition, life expectancy?
Difficulty in changing site levels
Hard landscape problems within root spread

Creation of excessive shade – possibility to reduce or lift crown

iv. Soil
Suitability for proposed style or function? -
Indicator plants?
Depth of topsoil
pH
Structure and texture – free draining? compacted?
Fertility
Organic Matter content
Stone content
Native or imported?

v. Slope
Aspect – relative to property and north point
Steepness - ease and safety of use for proposed function
Stability / erosion – soil type
Need to terrace? Retaining walls? Steps?
Drainage
Views?
Possibility of a water feature?

Q5 For an ornamental garden with public access:

v) review the use of 'in situ' concrete as a suitable surface;
vi) list and describe the ingredients required to mix this on site;
vii) state a suitable mix ratio for the concrete;
viii) list the operations to be included in a risk assessment for the installation of the concrete.

This was not a popular question and of those who answered it, in most cases a lack of practical experience in mixing and using concrete was evident. In situ concrete as a paving surface was generally considered dull and utilitarian, without exploring the more decorative effects possible. There was a general lack of understanding of terminology of the materials; with cement and concrete often being used synonymously, and the specifications of sands, aggregates, gravel and ballast were often confused. However most of the candidates were able to quote a suitable mix ratio. Answers for part (iv) of the question tended to have a lack of logical sequence, the best answers approached this by adopting a standard risk assessment procedure as set out below. PPE should be a last resort after all other controls and precautions have been put in place to reduce the risk.

Marks were awarded in each section for, but were not limited to, the following:

i. Review to include explanations and, where appropriate, comparisons:
Aesthetics (surface colours and textures etc)
Design considerations (shape)
Slip resistance (safety)
Suitability for disabled and child use
Frost resistance
Durability
Algae resistance
Maintenance requirements

Cost (comparative)
Ease and speed of construction

ii. Ingredients to include Portland Cement (OPC), fine aggregate less than 5mm (washed sharp or concreting sand), coarse aggregate (stones) more than 5mm, (or "All-in" 20mm ballast), suitable additive(s), drinkable water

iii. Suitable ratio – 1:2:4 or 1:5 with an explanation

iv. Risk assessment to include processes, materials, tools and equipment used in mixing concrete and their associated hazards, people who it could affect, the assessed risk, controls in place , precautions to be put in place, the need to record and review

Q6 **a)** Describe **THREE** symptoms of bad drainage, which may be identified during a site appraisal.

Most candidates who answered this question could state three symptoms. Marks in this section were awarded for the following, with appropriate descriptions: visible standing water or hard, parched and cracked ground, grey discolouration with "rusty" streaks (gleying), smells associated with anaerobic respiration (rotten eggs), indicator plants (with examples), ferns and mosses.
In part b), although most answers included much of the required information in the labeling of the drawing, in many cases the actual drawing was of a poor standard. Marks were gained for including the following information: depth and width of excavated trench, type and dimensions of pipe, depth of invert level, spacing between pipe runs, type and dimensions of porous aggregate and any geotextile membrane, soil back-fill and appropriate topsoil depth.
Most candidates could state an appropriate fall for the drainage system (eg 1:100) but had difficulty in describing how this would be set out. Once again diagrams, where used, tended to be unclear, especially if 3 dimensional views were attempted.
Marks in this section were awarded for the following, with appropriate descriptions:
Identifying an outfall for the proposed drainage system, locating and setting a datum point from this outfall, measuring or indicating the distance (in this case given as 50m), calculating amount of fall, description and use of levelling equipment (ie Cowley, Quickset, laser beacon, water tube, spirit levels), description and setting up of profile boards to calculated fall, description and use of boning rods and travellers, procedures for excavating the trench.

b) Draw a labelled cross-section of a piped land drainage system for a clay soil, showing dimensions and installation details.

c) State a suitable drainage fall for this system and describe the equipment and how it would be used to set out over a distance of 50m.