



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

**Wednesday 9th February 2011
2:00pm – 4:00pm**

MODULE J

**Establishment & Maintenance of Decorative Ornamental Turf,
Plant Selection, Establishment & Maintenance,
Hardy Ornamental Nursery Stock**

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 **J** 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 State the timing for the annual application of **FOUR NAMED** nutrients to a fine lawn. **2**

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Q2 Describe the conditions required to carry out effective chemical control of moss in lawns. **2**

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Q3 State the ideal environmental conditions required for growth of a **NAMED** disease in lawns. **2**

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Q4 List **TWO** woody plants of different genera displaying **TWO NAMED** types of ornamental interest at different times of the year. **2**

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Please see over/.....

		MARKS
Q5	List FOUR hardy herbaceous perennials suitable for a shady position.	2
	
	
	
	
	
Q6	Describe FOUR ways of supporting an annual climber using a NAMED example.	2
	
	
	
	
	
Q7	Describe TWO NAMED bulbs for autumn display.	2
	
	
	
	
	
Q8	State TWO advantages and TWO disadvantages of a mist unit.	2
	
	
	
	
	

Please turn over/.....

MARKS

Q9 List **FOUR** requirements for a growing-on area for container grown plants. **2**

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Q10 State **FOUR** grading criteria in the production of hardy ornamental nursery stock (HONS). **2**

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Plant Selection, Establishment & Maintenance,
Hardy Ornamental Nursery Stock**

Sections B, C & D - Structured Questions

IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module J is **2 hours**.
- ii) Answer **ONE** question only from **EACH** of the sections **B, C** and **D**.
- 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 – Establishment & Maintenance of Decorative Ornamental Turf

Answer **ONE** question only from this section

		MARKS
Q11	a) State TWO advantages and TWO disadvantages of establishing lawns from: i) seed; ii) turf.	4
	b) List and describe the various stages in preparing an area of soil on which a lawn is to be established.	12
	c) State an appropriate seed mixture, suitable for a coarse amenity lawn area.	4
Q12	a) Describe, with the aid of a clearly labelled diagram, the height of cut adjustment for EACH of the following: i) cylinder mowers; ii) rotary mowers.	4
	b) Evaluate turf machinery suitable to cut EACH of the following: i) fine grass cut to 6mm; ii) coarse grass cut to 15mm.	6
	c) Review TWO distinctly different methods for EACH of the following: i) scarification; ii) aeration.	10

Please see over/.....

Section C – Plant Selection, Establishment & Maintenance

Answer **ONE** question only from this section

MARKS

Q13 a) Describe **TWO NAMED** plants for **EACH** of the categories listed below:

- | | | |
|------|--------------|----------|
| i) | deep water; | 4 |
| ii) | marginals; | 4 |
| iii) | oxygenators. | 4 |

b) Describe a year-round maintenance programme for a typical garden pond containing fish, a pump and a range of plants. **8**

Q14 a) Describe the pruning of a **NAMED** formal hedge under **EACH** of the following headings:

- | | | |
|------|--------------|----------|
| i) | formative; | 3 |
| ii) | maintenance; | 3 |
| iii) | renovation. | 3 |

b) Describe the pruning regime to obtain optimum flowering display from **EACH** of the following groups, giving a **NAMED** example:

- | | | |
|------|---|----------|
| i) | plants flowering on previous season's growth; | 3 |
| ii) | plants flowering on current season's growth; | 3 |
| iii) | hedges; | 3 |
| iv) | climbers. | 2 |

Please turn over/.....

Section D – Hardy Ornamental Nursery Stock

Answer **ONE** question only from this section

		MARKS
Q15	Liners can be produced from seed. For a NAMED plant, usually grown from seed:	
a)	Describe the collection, extraction and storage of the seed.	5
b)	Explain what is meant by EACH of the following terms: i) required plant population; ii) seed sowing rate; iii) seed count; iv) seed viability; v) field factor.	5
c)	Compare and evaluate seed sowing by machine versus hand for an outdoor seed bed.	5
d)	Describe the preparation of an outdoor seed bed for liners.	5
Q16	a) Describe the production of a NAMED container grown shrub under EACH of the following: i) preparation of plant material prior to potting; ii) containerisation; iii) growing on; iv) preparation for sale.	4 4 4 4
	b) i) Explain the importance of air filled porosity (AFP) in containerised production.	2
	ii) For the shrub named in a), list FOUR bulky ingredients that can be used to create a suitable compost.	2

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MODULE J

Establishment & Maintenance of Decorative Ornamental Turf Plant Selection, Establishment & Maintenance Hardy Ornamental Nursery Stock

Candidates Registered	48		Total Candidates Passed	29	90.63%
Candidates Entered	32	66.67%	Passed with Commendation	10	31.25%
Candidates Absent	7	14.59%	Passed	19	59.38%
Candidates Deferred	6	12.5%	Failed	3	9.38%
Candidates Withdrawn	3	6.25%			

Section A – Short Answer Questions

Q1 State the timing for the annual application of **FOUR NAMED** nutrients to a fine lawn.

That nitrogenous fertilisers are usually applied in the early months of summer and no later than mid July gained reward. Phosphorus for root development in early autumn and potassium to 'ripen', strengthen, the grass before the onset of winter was generally well recognised. The fourth nutrient often named was iron and correctly identified as being present in the moss killer, lawn sand that is applied in spring.

Q2 Describe the conditions required to carry out effective chemical control of moss in lawns.

Marks were gained for recognising that the grass should be in active growth in springtime. Lawn sand applications containing fine sand, ferrous sulphate and ammonium sulphate are best applied to dry sward but one where the grass is moist at the roots. Reward was also given for stating the breeze should be light and rain forecast to fall within a few days, otherwise irrigation should be applied within a few days of application.

- Q3** State the ideal environmental conditions required for growth of a **NAMED** disease in lawns.

Red thread disease (*Corticium fuciforme*), fusarium patch and snow mould (*Mitochondrium nivale*) were the most often used examples. That red thread is mostly seen during dewy weather in the warmth of late summer, on starved turf low in nitrogen was well understood, as was the fact that fusarium and snow mould are generally on turf with high levels of nitrogen and develop during cool temperatures in damp, dank conditions. In both cases the presence of thatch along with poor drainage was often correctly quoted as exacerbating the problems.

- Q4** List **TWO** woody plants of different genera displaying **TWO NAMED** types of ornamental interest at different times of the year.

A wide variety of correctly named plants were chosen to illustrate this answer, however full marks could not be given where only one attribute was cited.

- Q5** List **FOUR** hardy herbaceous perennials suitable for a shady position.

Correct choice of herbaceous perennials preferring shade gained marks while shrubby subjects, even if they preferred shade could not be rewarded.

- Q6** Describe **FOUR** ways of supporting an annual climber using a **NAMED** example.

Lathyrus odoratus was the most often and correctly named example although other annuals that can be grown on canes, on brushwood, to cover trellis or climb up netting of nylon or wire mesh were also given credit. There was leeway given to candidates who named perennial plants that in Britain are normally grown as annuals. Growing annuals through trees was not rewarded as it is unlikely they would tolerate the extreme conditions found there, especially the heavy shade.

- Q7** Describe **TWO NAMED** bulbs for autumn display.

Candidates were rewarded for full descriptions of named, mostly flowering, bulbs. Answers with named examples but without description were not sufficient to gain marks.

- Q8** State **TWO** advantages and **TWO** disadvantages of a mist unit.

It was generally recognised that mist units are used as an aid to propagation. Better answers explained that the reduction in temperature of the leaves reduces transpiration as does the high humidity created. The cuttings are kept turgid by the mist in a controlled environment. Some answers correctly noted that the use of a mist unit allows more light to the leaves of cuttings (than conventional closed cases) increasing photosynthesis and speeding rooting.

Disadvantages can include leaching of nutrients and chlorophyll from the leaves, the possible build up of fungal diseases, the initial cost of installation, and the furring of the nozzles and the electronic leaf that controls the system unless any hard water supply is first treated.

Q9 List **FOUR** requirements for a growing-on area for container grown plants.

Marks were given for statements that included access to a plentiful clean water supply, shelter from the wind and away from frost pockets. A need for a level site was rewarded, although gently sloping sites are often preferable to facilitate collection of run-off from irrigation water to enable recycling and to prevent fertiliser contaminated water entering local water courses. South-west and west facing sites and full sunlight were mentioned as was the need for access and space for on-site traffic movement and for other horticultural operations. The best answers qualified the requirements that they listed rather than using a word list.

Q10 State **FOUR** grading criteria in the production of hardy ornamental nursery stock (HONS).

The need for clean, pest and disease free stock, true to type and graded into batches of similar size and quality was understood as was the necessity for weed-free pots, not pot-bound, and plants with adequate root systems. Surprisingly there was no reference to containerised plants being well established before shipping.

Sections B, C & D – Structured Questions

Section B – Establishment & Maintenance of Decorative Ornamental Turf

- Q11** a) State **TWO** advantages and **TWO** disadvantages of establishing lawns from:
- i) seed;
 - ii) turf.
- b) List and describe the various stages in preparing an area of soil on which a lawn is to be established.
- c) State an appropriate seed mixture, suitable for a coarse amenity lawn area.

The first part of the question expected students to give advantages and limitations of establishing a lawn from seed or turf while the second part expected candidates to set out the sequence of operations for preparing the soil in advance of establishing a lawn. It should be clearly indicated whether a statement is regarded as an advantage or a disadvantage. In the second part operations should be fully described, a bare list or brief statement would not be sufficient. It should be noted that the operations of sowing and turving will not gain any marks.

In the third part, the seed mixture should include for instance *Lolium perenne*, *Poa pratensis*, *Festuca rubra* and *Agrostis tenuis* but any suitable mixture with correct proportions was allowed.

Most marks in this question were obtained by candidates who demonstrated not only sound knowledge but an ability to set out the answer in logical order with justification for their choice of operations relating to the size of the area e.g. different equipment and differing treatments. Attention to health and safety was also evident for working in a public environment.

- Q12** a) Describe, with the aid of a clearly labelled diagram, the height of cut adjustment for **EACH** of the following:
- i) cylinder mowers;
 - ii) rotary mowers.
- b) Evaluate turf machinery suitable to cut **EACH** of the following:
- i) fine grass cut to 6mm;
 - ii) coarse grass cut to 15mm.
- c) Review **TWO** distinctly different methods for **EACH** of the following:
- i) scarification;
 - ii) aeration.

The first part of the question expected candidates to know how to adjust the height of cut for both cylinder and rotary mowers. A large, clear diagram should have been included in each case.

The second part of the question expected candidates to be able to choose, with reasons, the most appropriate mower for two situations.

The final part of the question expected comparisons between two different methods for each of scarification and aeration. Thus for scarification hand scarifying could be compared with a rotary scarifier and for aeration, using a fork could be compared with hollow tines. It was important, however, that the advantages and limitations of each method in different situations is brought out.

Section C – Plant Selection, Establishment & Maintenance

Q13 a) Describe **TWO NAMED** plants for **EACH** of the categories listed below:

- i) deep water;
- ii) marginals;
- iii) oxygenators.

b) Describe a year-round maintenance programme for a typical garden pond containing fish, a pump and a range of plants.

This was a question requiring a knowledge of a range of aquatic plant types, plus typical year round pond maintenance. Botanical names plus a description of the main ornamental features were required for part a. For example, *Aponogeton distachyos*: oblong floating leaves, white fragrant flowers, black anthers, spread of 60cm. Many candidates showed a good knowledge of this group of plants. Marks were lost through use of common names and inaccurate descriptions. The second part of the question required information on seasonal activities relating to the features mentioned. Suitable activities described included planting/dividing, cutting back/controlling vegetation, dealing with ice, topping up water, pump maintenance, feeding fish, dealing with blanket weed. Where year-round maintenance activities are asked for the best approach is to broadly categorise them into the four seasons. Candidates opting to describe practices month by month included much repetition.

- Q14** a) Describe the pruning of a **NAMED** formal hedge under **EACH** of the following headings:
- i) formative;
 - ii) maintenance;
 - iii) renovation.
- b) Describe the pruning regime to obtain optimum flowering display from **EACH** of the following groups, giving a **NAMED** example:
- i) plants flowering on previous season's growth;
 - ii) plants flowering on current season's growth;
 - iii) hedges;
 - iv) climbers.

A challenging pruning question relating to a wide range of ornamentals.

For section a) specific pruning detail was required for an appropriate formal hedge.

For example, *Taxus baccata*: formative, trim laterals, leave leader; maintenance, trim as necessary up to 3 times per year, A-shaped profile; renovation, carry out over 2-3 years, prune hard one side in the first year, repeat activity on the other side in second year. Candidates scoring well in this section also included detail on time of year for the activities, tools / machinery, supplementary feeding/mulching (especially relevant to renovation).

For section b), pruning detail was required relating to four separate categories.

Candidates who scored well in this section gave accurate pruning detail alongside an appropriate flowering selection. For example i) *Forsythia*, ii) *Buddleja*, iii) *Lavandula*, iv) *Clematis*. Those achieving less for this section frequently suggested poor flowering examples e.g. *Ligustrum* & *Hedera* for the hedging & climbing sections. Both examples fit the category but are grown for their foliage not flowering qualities.

Section D – Hardy Ornamental Nursery Stock

- Q15** Liners can be produced from seed. For a **NAMED** plant, usually grown from seed:
- a) Describe the collection, extraction and storage of the seed.
 - b) Explain what is meant by **EACH** of the following terms:
 - i) required plant population;
 - ii) seed sowing rate;
 - iii) seed count;
 - iv) seed viability;
 - v) field factor.
 - c) Compare and evaluate seed sowing by machine versus hand for an outdoor seed bed.
 - d) Describe the preparation of an outdoor seed bed for liners.

This was generally a well answered question. Most students demonstrated an understanding of the collection, extraction and appropriate storage of seed. There was some confusion over the terms in part b).

The best answers for parts c) and d) came from those students who had an understanding of commercial techniques. Some students would have gained more marks by concentration on bed preparation rather than the siting of a seed bed in section d).

- Q16** a) Describe the production of a **NAMED** container grown shrub under **EACH** of the following:
- i) preparation of plant material prior to potting;
 - ii) containerisation;
 - iii) growing on;
 - iv) preparation for sale.
- b) i) Explain the importance of air filled porosity (AFP) in containerised production.
- ii) For the shrub named in a), list **FOUR** bulky ingredients that can be used to create a suitable compost.

Whilst some students provided good answers many students failed to interpret section 16a, i) correctly.

'Preparation of plant material prior to potting' was not about preparation of **cuttings** but about the actual activities immediately prior to potting up or on of rooted plants. Such students were unable then to gain maximum marks. This failure to correctly interpret this part often then affected answers to the following sections.

Many students demonstrated a lack of understanding of common commercial practice and therefore struggled to gain good marks.

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