



RHS LEVEL 3 DIPLOMA IN HORTICULTURE WRITTEN EXAMINATION

10:00am Thursday 9th July 2009

MODULE F

Horticultural Environment & Ecology Resource Management in the Horticultural Enterprise

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 **F** 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 Define the term 'dominant' in relation to ecosystem structure.

2

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Q2 a) State the most likely source of sodium chloride as a pollutant.

b) Describe the plant damage due to this pollutant.

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Q3 Describe what is meant by the term 'rain shadow'.

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Q4 Give **FOUR** reasons in support of the recycling of plastic containers.

2

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Please see over/.....

ANSWER ALL QUESTIONS

MARKS

Q5 State the full titles of **EACH** of the examples, for safety legislation below:

- i) FEPA;
- ii) COPR;
- iii) COSHH;
- iv) PPE.

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Q6 Explain the purpose of plant passports.

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Q7 State **TWO** alternative methods of improving the efficiency of communication in the workplace.

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Please turn over/.....

ANSWER ALL QUESTIONS

MARKS

Q8 Identify **FOUR** responsibilities of the supervisor in the workplace.

2

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Q9 Define **EACH** of the following terms:

- i) tender;
- ii) quote;
- iii) specification;
- iv) contract.

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Q10 Describe **TWO** stock control systems used in horticulture.

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

10:00am Thursday 9th July 2009

MODULE F

**Horticultural Environment & Ecology
Resource Management in the Horticultural Enterprise**

Sections B & C - Structured Questions

IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module **F** 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 – Horticultural Environment & Ecology

Answer ONE question only from this section

		MARKS
Q11	a) Describe the characteristics, that plants from open plant communities have in common.	10
	b) Explain how such plants may cause problems in horticulture and review a range of possible solutions.	10
Q12	a) Describe, how the climate of a garden on the west coast of Scotland may differ from that of a garden on the east coast of England.	8
	b) List FOUR meteorological instruments and measurements that could be used to demonstrate the differences of the two gardens in a).	4
	c) Describe, with reference to the two gardens listed in a), the effect such differences in climate may have on the type of plants grown, and the horticultural practices to be undertaken, in the two locations.	8

Please see over/.....

Section C – Resource Management in the Horticultural Enterprise

Answer TWO questions from this section

MARKS

- Q13** Explain how **EACH** of the following legislations directly relate to horticultural practice/production:
- | | | |
|------|-----------------------------|---|
| i) | plant variety and seed act; | 5 |
| ii) | plant health; | 5 |
| iii) | food safety; | 5 |
| iv) | safe working practices. | 5 |
- Q14** a) Evaluate the advantages and limitations of Plant Breeder Rights (PBR) legislation to:
- | | | |
|------|--------------------|---|
| i) | the plant breeder; | |
| ii) | the propagator; | |
| iii) | the consumer. | 8 |
- b) Explain how the PBR is registered and administered. 6
- c) Identify **THREE** plants protected by a PBR. 6
- Q15** Describe the diversity of horticulture under **EACH** of the following headings:
- | | | |
|------|--------------------------------------|---|
| i) | amenity and decorative horticulture; | 5 |
| ii) | commercial crop production; | 5 |
| iii) | research and development; | 5 |
| iv) | professional, government. | 5 |
- Q16** Describe, with reference to **FOUR** horticultural examples, the importance of accurate record keeping. 20

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Thursday 9th July 2009

Module F

Horticultural Environment & Ecology

Resource Management in the Horticultural Enterprise

Candidates Registered	19		Total Candidates Passed	11	64.71%
Candidates Entered	17	89.48%	Passed with Commendation	2	11.77%
Candidates Absent	1	5.26%	Passed	9	52.94%
Candidates Deferred	1	5.26%	Failed	6	35.29%
Candidates Withdrawn	0				

Section A – Short Answer Questions

General Comment

A few candidates are still losing marks because of the illegibility of their writing.

Q1 Define the term 'dominant' in relation to ecosystem structure.

This relates to the plant species making the biggest contribution to the ecosystem, by way of sheer size and is the one that suppresses all others in the quest for resources of light, water and soil nutrients. This question was well answered by most candidates, marks being lost only by vagueness.

Q2 a) State the most likely source of sodium chloride as a pollutant.

b) Describe the plant damage due to this pollutant.

A significant number of candidates failed to recognise the chemical name of 'common salt' and offered answers relating to other common pollutants. Sea spray and coastal flooding identified the correct pollutant but in a very specific and limited situation. Road salt, widely applied on roads over winter is the major source of sodium chloride and is responsible for marginal browning on leaves and defoliation and even plant death in severe cases.

Q3 Describe what is meant by the term 'rain shadow'.

When moist, rain-bearing clouds meet high ground, prevailing winds force clouds to rise and cool down. As they do so, the cooler air condenses and so precipitation (rain) results, usually on the western slopes in the U.K. The eastern slopes thus receive little rain and this region is referred to as a rain shadow. In a domestic situation, the term is applied to areas in the sheltered side of high walls or under large trees which also direct rainfall away and create a much drier microclimate beneath. Brief descriptions of both situations were needed to obtain full marks.

Q4 Give **FOUR** reasons in support of the recycling of plastic containers.

Reasons ranged from the avoidance of littering to economic costs, reduced demand for scarce resources (oil), reduced Carbon dioxide and energy and overall support for the recycling industry etc. Some candidates failed to identify four reasons but generally, answers were good.

Q5 State the full titles of **EACH** of the examples, for safety legislation below:

- i) FEPA;
- ii) COPR;
- iii) COSHH;
- iv) PPE.

With sub questions like these, there is no room for mistakes and the marker has to give the full half mark or nothing at all. Therefore candidates should ensure that they get every word correct. Errors occurred particularly with the full titles of FEPA and COSHH. Candidates at this level should know these pieces of legislation very well.

Q6 Explain the purpose of plant passports.

The word 'purpose' seemed to have confused some candidates who went into some detail about the way that the scheme operates. This was not required. The purpose of the passports is to prevent or at least reduce the spread of particularly harmful pests and diseases in the E.U. Passports also allow traceability if problems arise.

Q7 State **TWO** alternative methods of improving the efficiency of communication in the workplace.

Candidates supplied good examples such as open door policies, regular team meetings, group discussed target setting, internal e-mail systems and action columns on minutes of meetings. Adequate detail was required to clarify how the communication would be improved.

Q8 Identify **FOUR** responsibilities of the supervisor in the workplace.

There was a wide selection of correct answers given to this question including health and safety responsibility, training, quality maintenance, record keeping and disciplinary matters. A few candidates lost marks because of very general answers or vagueness. Very specific and clear actions gained maximum marks.

Q9 Define **EACH** of the following terms:

- i) tender;
- ii) quote;
- iii) specification;
- iv) contract.

Very precise answers were required as each could be marked only at half a mark or nothing at all. Mistakes were made in all parts but generally these procedures were well understood. The weakest definitions were for tenders and contracts.

Q10 Describe **TWO** stock control systems used in horticulture.

The two most common systems described were the manual system involving physical checks recorded on paper, and the system utilising bar codes and computing technology to register stock movements at point of sale. Less popular suggestions were the Two bin system and the Just-in-time system but both have their uses. Explanations were required in order to gain maximum marks.

Sections B & C – Structured Questions

Section B – Horticultural Environment & Ecology

- Q11**
- a) Describe the characteristics, that plants from open plant communities have in common.
 - b) Explain how such plants may cause problems in horticulture and review a range of possible solutions.

Aims of the Question

- a) Candidates were required to summarise common characteristics that plants of open communities (those that have not reached a climax situation and are thus not closed to the immigration of new species) possess. Generally light is needed for seed germination and the growing plants are themselves light demanding. There are essentially two groups. Firstly, those which are annuals with a short life cycle, flowering quickly. A large amount of seed is produced which is wind-dispersed. Plants exhibit staggered dormancy and a great phenotypic plasticity. Secondly, there are those in which the life cycle is long (perennial) and persistent. They possess structures such as rhizomes and stolons and reproduction is commonly vegetative.
- b) Horticultural situations are prone to invasions by these plants (which we call weeds) by the nature of practices, which create an open structure to the garden community. These plants occupy an area very quickly and out-compete desired plants e.g. ornamental annuals, which get stressed and often flower when small and/or for a short time. Practices such as digging encourages seed germination and cultivations encourage spread. Solutions to the problem are those directed at 'weeds': such as the use of herbicides (named); adopting a no-dig policy; mulching (suggestion) to reduce light for germination; growing plants closer together to exclude light and thus reduce the incidence of weeds; using ground cover plants to occupy the space and reduce light to the soil.

Observations on Answers

- a) Candidates were not required to define what an open community is or to compare open with closed communities. Simply, candidates should look closely at the question and just provide a sufficient range of common characteristics to gain the full 10 marks. 'Open' here has little to do with 'open spaces', as may be found in deserts, so an account of the xerophytic features of 'cacti' is not relevant.
- b) Again, candidates should look closely at the question before attempting an answer. Here, we are simply talking about undesirable plants in the border or the vegetable bed, i.e. 'Weeds', the problems they cause (mainly through effective competition) and how they may be controlled. Just because this is set in an environmental context it does not mean that it is different from normal horticultural practices, so there should have been little difficulty. Weeds do not have 'predators', they have pests (herbivores), just like cultivated plants.

- Q12**
- a) Describe, how the climate of a garden on the west coast of Scotland may differ from that of a garden on the east coast of England.
 - b) List **FOUR** meteorological instruments and measurements that could be used to demonstrate the differences of the two gardens in a).
 - c) Describe, with reference to the two gardens listed in a), the effect such differences in climate may have on the type of plants grown, and the horticultural practices to be undertaken, in the two locations.

Aims of the Question

- a) A **comparison** between the two areas was required. In comparison to the east coast the west coast has: higher rainfall; fewer hours on sunshine over the year; a smaller annual temperature range; less frost (warmer winters); lower maximum temperatures; greater relative humidity; longer days in the summer (shorter in the winter); a shorter growing season; higher maximum wind speed.
- b) Four from: rain gauge to measure rainfall; a solarimeter to measure sunshine hours; max-min thermometers/thermistors to measure daily temperature changes; anemometer to measure wind speed; hygrometer to measure reactive humidity.
- c) It is important to bear in-mind the climatic differences in order to accurately give some information on practices carried out and types of plant which may be grown in the two regions. In the west it is wetter therefore there is a greater need for drainage; plants favouring moister conditions can be cultivated (e.g. *Meconopsis x sheldonii*); there is a greater problem of nutrient leaching. In the east it is drier, irrigation may be required; incorporation of humus to hold water; mulching to reduce evaporation from the soil; plants of drier growing conditions favoured, e.g. *Festuca glauca*. In the west there is less sunshine and the ripening of wood of some shrubs may be difficult. There is less frost and thus plants of milder climates may be grown, e.g. *Luma sp.* The season is also shorter so late-flowering plants, such as *Chrysanthemum sp.*, may be less successful. There is also the possibility of high winds so shelter belts may be required and plants may need staking. In the east it is colder in the winter and frost protection is important, such as wrapping perennials.

Observations on Answers

- a) The focus here is on the differences in climate between the two areas. Detailed accounts of weather patterns, the influence of the Gulf Stream or Siberian winds are not required. An account of the 'geology' of the areas has little to do with climate. Avoid vague statements and words, such as 'mild' without a further explanation. There was some confusion over the amount of sunlight received in each of the two areas. In the summer the Scottish garden will have longer days but in the winter these will be shorter compared to those on the east coast of England. Overall the number of hours of sunlight in Scotland will be less than those received in England and the growing season will be shorter. There was also confusion between light received and temperature. In the summer temperatures will be higher on the east coast, but in winter it will be colder, therefore the temperature range will be greater on the east coast than on the west coast of Scotland. Bringing the effects of altitude into the

discussion only confuses the situation and should be avoided.

- b) A simple account of four instruments and the environmental factors they measure was all that was required. A Stephenson's screen does not measure anything, it is simply a 'housing' for many of the instruments. There was some muddling of the measurement of day length and light intensity.
- c) Consider only the differences in climate described in a) and formulate the answer around these. Simply say what would need to be done to encourage effective cultivation of plants in each of the two areas. Some candidates brought salinity effects into the answer, as both areas were described as coastal. However, this is a similarity and not a difference, so was not required. Marks were given for appropriate plant examples which could be grown in either of the areas (up to 1 mark for each area). A history of the cultivation of suggested species was not required and just wasted time.

Recommendations.

It is clear that some candidates are still not reading each question carefully in order to fully understand its requirements. Just because many of the well-understood and accepted horticultural practices were set in an environmental context does not mean that it is in anyway different from garden practice or theory. Candidates should understand that a garden is an 'environmental situation' where the laws and rules of the environment apply.

There was a marked reduction in the 'writing out of the question' on scripts but there is still often the tendency to write several sentences of 'introduction' which does not contribute to the answer and just wastes time.

Candidates should ensure that they clearly link parts of the answer and do not just make statements without clarification. There is still the tendency to use one-line answers or list points. This clearly is insufficient as the candidate is unable to 'describe or discuss' as points are not brought together and there is no clear flow to the answer.

Where plant examples are given, the full scientific names should be used.

Section C – Resource Management in the Horticultural Enterprise

Q13 Explain how **EACH** of the following legislations directly relate to horticultural practice/production:

- i) plant variety and seed act;
- ii) plant health;
- iii) food safety;
- iv) safe working practices.

This was a popular question with candidates. Those who were able to show a full technical understanding of the four areas in the question were able to score high marks.

However, many candidates were let down by producing answers that were lacking in the technical content required at this level.

Some candidates failed to score the maximum marks available by producing answers that were opinionated, rather than factual.

Prospective candidates would be encouraged to be familiar with the content relating to horticultural practices on the both the DEFRA and HSE websites prior to sitting an examination at this level.

Whilst many candidates were able to demonstrate a reasonable knowledge of the Plant Variety & Seed Act, and understood the legislation relating to Safe Working Practices, few candidates were able to relate section (iii) of the question to horticultural practice/production showing a lack of research and reading in this important area.

Q14 a) Evaluate the advantages and limitations of Plant Breeder Rights (PBR) legislation to:

- i) the plant breeder;
- ii) the propagator;
- iii) the consumer.

b) Explain how the PBR is registered and administered.

c) Identify **THREE** plants protected by a PBR.

This was not a popular question, it required a detailed knowledge of Plant Breeders Rights Legislation.

The general concept of Plant Breeders Rights Legislation was understood; however most candidates did not state the full advantages and the limitations of the legislation.

Prospective candidates would be encouraged to thoroughly research such schemes and to be familiar with the plants that are protected by Plant Breeders Rights, (these are listed by organisations such as PROVAR.)

Q15 Describe the diversity of horticulture under **EACH** of the following headings:

- i) amenity and decorative horticulture;
- ii) commercial crop production;
- iii) research and development;
- iv) professional, government.

This was a popular question with many candidates scoring high marks on section (i) and (ii).

However many candidates struggled to demonstrate a basic understanding of horticultural research and development as requested in section (iii).

In preparation for a level 3 examination, it is expected that candidates would be familiar with the roles of key industry bodies such as the HDC.

At level 3 candidates would also be expected to have an overview of current research and development topics, which are often reported in trade journals such as 'Horticulture Week'.

A similar lack of detailed knowledge was evident in section (iv).

Candidates are advised to read widely, consult trade journals and carry out information searches on the internet to avail themselves of the required, detailed, factual knowledge relating to the horticultural industry.

Q16 Describe, with reference to **FOUR** horticultural examples, the importance of accurate record keeping.

Candidates who produced detailed factual answers, showing a high level of understanding of the industry and professional practice relating to record keeping achieved high marks in this question.

The importance of background reading of current trade journals and websites is stressed, to ensure that answers are factual rather than matters of opinion or conjecture.

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