Royal Horticultural Society

Sharing the best in Gardening

Including Examiners comments

R2104

UNDERSTANDING PLANT PROPAGATION

Level 2

Monday 5 February 2018

14:50 – 15:40

Written Examination

Candidate Number: .....

Candidate Name: .....

Centre Number/Name: .....

IMPORTANT – Please read carefully before commencing:

i) The duration of this paper is **50** minutes;

ii) **ALL** questions should be attempted;

iii) **EACH** question carries **10 marks**;

iv) Write your answers legibly in the lined space provided. It is **NOT** necessary that all lined space is used in answering the questions;

v) Use **METRIC** measurements only;

vi) Use black or blue ink only. Pencil can be used for drawing purposes only;

vii) Where plant names are required, they should include genus, species and where appropriate, cultivar;

viii) Where a question requires a specific number of answers; only the first answers given that meet the question requirement will be accepted, regardless of the number of answers offered;

ix) Please note, when the word '**distinct**' is used within a question, it means that the items have different characteristics or features.

ANSWER ALL QUESTIONS

MARKS

Q1 a) State **TWO** benefits **AND TWO** limitations of **EACH** of the following methods of plant propagation:

i) seed;
ii) vegetative.

by completing the table below.

	Seed	**Vegetative**
Benefit 1		
Benefit 2		
Limitation 1		
Limitation 2		

2

2

2

2

b) Name **TWO** plants that produce orthodox (dry) seeds.

2

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Total Mark

Please see over/…..

MARKS

Q2 a) State **TWO** methods of avoiding disease in germinating seedlings. **2**

b) Describe the pricking out of *Lactuca sativa* (lettuce) seedlings from a seed tray into prepared modules. **8**

Total Mark

Please turn over/…..

MARKS

Q3 Describe the sowing of *Begonia semperflorens* (Cultorum Group) under **EACH** of the following headings:

i) selection of growing media; **1**
ii) preparation of the tray for sowing; **5**
iii) sowing technique. **4**

i)……

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ii)……

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iii)……

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Total Mark

Please see over/…..

MARKS

Q4 a) Name **FOUR** environmental factors which affect the rooting of softwood cuttings. **2**

b) Describe how **TWO** of the factors named in a) can be controlled in the aerial environment in a propagator. **4**

c) Describe how **TWO** of the factors named in a) can be controlled in the rooting media in a propagator. **4**

Total Mark

Please turn over/…..

MARKS

Q5 Describe the propagation of *Pelargonium* species under **EACH** of the following headings:

i) selection of material; **3**
ii) preparation of cuttings; **4**
iii) growing media and insertion. **3**

i)……

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ii)……

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iii)……

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Total Mark

Please see over/…..

MARKS

Q6 a) Name **TWO** plants that can be propagated by leaf petiole cuttings. **2**

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b) For **ONE** of the plants named in a) describe the:

i) selection of cutting material; **3**
ii) preparation of cuttings. **3**

i)……

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ii)……

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c) State the aerial environmental conditions required for rooting the cuttings. **2**

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Total Mark

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The Royal Horticultural Society, Wisley, Woking, Surrey GU23 6QB.
Charity Registration Number: 222879/SC038262

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UNDERSTANDING PLANT PROPAGATION

Level 2

Monday 5 February 2018

Candidates Registered	**798**		**Total Candidates Passed**	**558**	**84.80%**
Candidates Entered	658	82.46%	Passed with Commendation	293	44.53%
Candidates Absent/Withdrawn	126	15.79%	Passed	265	40.27%
Candidates Deferred	14	1.75%	Failed	100	15.20%

Senior Examiner's Comments:

1 Candidates should be able to demonstrate a good range of plant knowledge and be able to give accurately named plant examples where appropriate. Common names and generic names are often too vague and cannot be rewarded in the positive manner that genus, species and where appropriate, variety/cultivar can. This is particularly important when answering questions relating to particular (named) plant(s). Marks can only be awarded for these narratives where the example(s) are correctly and fully identified.

2 Candidates must be able to display accurate knowledge of the technical terms and concepts detailed in the syllabus, in the context of horticulture and also be aware that wider interpretation will not be rewarded. The examination should be regarded as a possible introduction to higher level studies, which will only be open to those who are in possession of a clear understanding of the horticultural terms and concepts which are current.

3 The introductory rubric given on the first page of each question paper should be read carefully by candidates. At each examination there are a significant number of candidates who ignore or misread the instructions given and consequently may not perform as well as they could have done.

4 Candidates should pace themselves during each paper. The most successful candidates allow sufficient time to read the question thoroughly before answering it and also take time to read through their answers. They should take care to write as legibly as possible, so that the examiner is in no doubt about what is intended.

5 Candidates need to interpret key words within questions, particularly those such as ‘state’, ‘list’ and ‘describe’. Questions requiring descriptions or explanations obviously require a more detailed answer than those requiring a list.

6 It is important to ensure that responses to questions are to the point. Candidates should bear in mind that small sketches might be used to convey information more succinctly than words.

7 Successful candidates ensure that their answers are focused and to the point. It is disappointing when they cannot be rewarded for their efforts because the answer is irrelevant to the particular question. Candidates should take note of the mark allocation for specific sections and allocate their time and efforts accordingly.

8 Diagrams can enhance an answer and where appropriate can replace detailed descriptions. They should be large, clear and well annotated, ensuring that labels are properly attached to the features they describe. Diagrams should preferably be in pencil. Colour may be used successfully but only where it is relevant to the answer.

9 In each examination it is clear that some candidates are ill prepared to answer papers of the type set. It is essential that candidates have the opportunity to practice questions. Ideally some papers should be answered in a time constrained situation. Appropriate feedback must, in any case be provided.

MARKS

Q1 *a) State **TWO** benefits **AND TWO** limitations of **EACH** of the following methods of plant propagation:*

i) seed;
ii) vegetative.

by completing the table below.

	Seed	***Vegetative***	
Benefit 1			***2***
Benefit 2			***2***
Limitation 1			***2***
Limitation 2			***2***

*b) Name **TWO** plants that produce orthodox (dry) seeds.* ***2***

Q1a) Most candidates were able to state a range of benefits and limitations of specific methods of plant propagation and gained maximum marks. Suitable answers included;

i) **Seed – Benefits**

Produces variation from which new cultivars can be developed
Only method of propagation for some species
May obtain large numbers of seed from each plant
Easily stored

Seed – Limitations

Some plants may not produce viable seed
Some seed are difficult to germinate
Lack of uniformity of seedlings
Longer time to maturity of plants

ii) **Vegetative – Benefits**

Retains characteristics of parent plant
Avoids seed dormancy problems
Shorter time to maturity of plants
Only possible method of propagation for some plants

Vegetative – Limitations

Limited availability of material
Lack of variation
Transmission of diseases (viruses) can occur
Need for high level skills for some methods of propagation, e.g. grafting

Q1b) The majority of candidates named suitable plants which produce orthodox (dry) seeds and were awarded full marks. Acceptable answers included;

Daucus carota, Phaseolus vulgaris, Lobelia erinus, Nigella damascena, Lolium perenne.

		MARKS
Q2 *a)*	*State **TWO** methods of avoiding disease in germinating seedlings.*	***2***
b)	*Describe the pricking out of Lactuca sativa (lettuce) seedlings from a seed tray into prepared modules.*	***8***

Q2a) Candidates stated a range of suitable methods to avoid disease in germinating seeds and achieved full marks. These included;

- Use of clean, fresh seed
- Use of sterilised growing media
- Use of clean, sterilised containers
- Watering with water from a mains supply
- Sowing seeds thinly and uniformly

Q2b) To achieve maximum marks candidates were required to provide detailed descriptions of the pricking out of *Lactuca sativa* (Lettuce). Suitable answers included;

- Loosen seedling in the seed tray
- Tease apart seedling with two seed leaves
- Select undamaged seedling which are healthy
- Grade the seedling
- Handle the seedling by the seed leaves
- Handle the seedling with care at all times
- Make a hole with a dibber to receive the seedling, large enough to accommodate the root and stem
- Place seedling in hole so seed leaves sit just above level of growing media
- Gently firm around the seedling with a dibber

MARKS

Q3 *Describe the sowing of Begonia semperflorens (Cultorum Group) under **EACH** of the following headings:*

i)	*selection of growing media;*	***1***
ii)	*preparation of the tray for sowing;*	***5***
iii)	*sowing technique.*	***4***

Q3a) Many candidates described the sowing of *Begonia semperflorens* (Cultorum Group) well and were awarded full marks. The best answers included;

i) **Selection of Growing Media** - Sterile seed compost/all purpose compost or JI Seed Compost.

ii) **Preparation of the Tray for Sowing** – Ensure all lumps in the compost are broken down before overfilling a clean sterile seed tray with seed compost. The compost is tamped down and levelled off using a striking off board before the compost is firmed. A thin layer of fine compost is sieved over the surface of the compost and re-firmed. The prepared tray can be watered before or after sowing the seed.

iii) **Sowing Technique** – Prior to sowing the seed is mixed with dry silver sand to enable more uniform sowing. The seeds are sown broadcast, thinly to the correct density by either using the tapping method from the hand or packet or the pinching method from the hand. The seeds are usually left uncovered but could be covered with a fine layer of vermiculite.

MARKS

Q4 *a) Name **FOUR** environmental factors which affect the rooting of softwood cuttings.* ***2***

*b) Describe how **TWO** of the factors named in a) can be controlled in the aerial environment in a propagator.* ***4***

*c) Describe how **TWO** of the factors named in a) can be controlled in the rooting media in a propagator.* ***4***

Q4a) Candidates who named any of the following environmental factors gained maximum marks. These included;

- Relative humidity/atmosphere
- Temperature
- Light
- Air
- Moisture in media

Q4b) Candidates who were able to describe the control of the environmental factors named in a propagator were awarded maximum marks. Acceptable answers included;

- Additional light can be provided by supplementary lighting
- Light can be reduced by using shading
- Temperature can be reduced by ventilation of the atmosphere
- Temperature can be increased by the use of heating cables
- Temperature can be raised or lowered by the use of a thermostat
- Humidity can be increased by the use of a mist unit, fogging unit or a closed case

Q4c) Good descriptions of how environmental factors can be controlled in the rooting media in a propagator were provided by some candidates who gained full marks. These included;

- Moisture can be controlled by the use of moisture retentive growing media
- Moisture can be controlled by the use of peat, coir or foam in the growing media
- Moisture can be controlled by the use of grit, perlite, vermiculite or bark in the growing media
- Basal heat can be provided by electric cables or hot water pipes in the base of the propagator

MARKS

Q5 *Describe the propagation of Pelargonium species under **EACH** of the following headings:*

i) selection of material; ***3***
ii) preparation of cuttings; ***4***
iii) growing media and insertion. ***3***

Q5a) Marks were awarded to candidates who provided good descriptions of the propagation of *Pelargonium* species. The best answers included;

i) **Selection of Material**
Cutting material is collected early in the morning when it is most turgid. It should be juvenile from this seasons' growth, firm, non- woody, non-flowering, true to type and pest and disease free. The material is removed just above a node on the stock plant.

ii) **Preparation of Cuttings**
Cuttings of approximately 10cm in length are prepared by cutting just below a node and removing the bottom third of foliage. Any flower buds and stipules are also removed.

iii) **Growing Media and Insertion**
A 50:50 mix of grit/perlite/vermiculite: bark is suitable for pelargoniums which are inserted into module pots using a dibber. The bottom third of the cutting is inserted so that the basal leaves are above the level of the growing media.

MARKS

Q6 *a) Name **TWO** plants that can be propagated by leaf petiole cuttings.* ***2***

*b) For **ONE** of the plants named in a) describe the:*

i) selection of cutting material; ***3***
ii) preparation of cuttings. ***3***

c) State the aerial environmental conditions required for rooting the cuttings. ***2***

Q6a) The majority of candidates named plants that can be propagated by leaf petiole cuttings and gained full marks. These were; *Saintpaulia ionantha* and *Peperomia caperata.*

Q6b) Many candidates described specific aspects of the propagation of leaf petiole cuttings accurately and were awarded full marks. These included;

i) **Selection of Cutting Material**
Cuttings can be taken at any time of the year by selecting medium sized leaves which are true to type and pest and disease free. The leaf is removed back to its base using a sharp knife to maintain the shape of the plant.

ii) **Preparation of Cuttings**
Cuttings are prepared by making a horizontal cut across the petiole so that it is 25mm in length. Cuttings must be handled with care to avoid damage and should be protected from desiccation. Rooting hormone is not required.

Q6c) Candidates who stated that the aerial environmental conditions required for rooting leaf petiole cuttings are high humidity with a temperature of 18 - 21ºC gained full marks. Shading can be provided to reduce the temperature and overhead watering is detrimental to the cuttings.

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