Including examiner comments

R2104

UNDERSTANDING PLANT PROPAGATION

Level 2

Monday 19 June 2023

15:20 – 16:10

Written Examination

Candidate Number: .....

Candidate Name: .....

Centre 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 spaces 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. Ensure that all diagrams are labelled accurately with the line touching the named object;
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) Name **ONE** plant from each group that can be propagated by seed, by completing the table below.

Plant group	**Plant name**	
Vegetable crop		**1**
Hardy annual flower		**1**
Half-hardy annual flower		**1**
Tree		**1**

b) Describe how to sow grass seed under **EACH** of the following headings:

i) soil preparation (secondary cultivation)
ii) appropriate sowing technique **2**

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i)……

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ii)……

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Total Mark

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MARKS

Q2 a) Name **ONE** plant sown under protection from **EACH** of the following:

i) fine seed **1**
ii) medium-size seed **1**
iii) large-size seed. **1**

i) ……

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ii)……

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iii)……

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b) Describe how to sow medium–size seeds under **EACH** of the following headings:

i) preparing a container for sowing
ii) sowing method.

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i)……

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iii)……

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Total Mark

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MARKS

Q3 a) Name **FOUR** methods of natural vegetative propagation. **4**

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b) Name **THREE** methods of artificial vegetative propagation, giving **ONE NAMED** plant example for **EACH** by completing the table below:

Method of artificial propagation	**Plant Example**	
1		**2**
2		**2**
3		**2**

Total Mark

Please see over/….

MARKS

Q4 Describe the propagation of *Alchemilla mollis* by division under the following headings:

i) time of year **2**
ii) lifting **2**
iii) dividing **3**
iv) aftercare. **3**

i)……

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ii)……

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Total Mark

Please turn over/…..

MARKS

Q5 Describe the propagation of a **NAMED** plant by softwood cuttings under **EACH** of the following headings:

i) plant name **1**
ii) collection of cutting material **4**
iii) preparation of the cutting up to insertion. **5**

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ii)……

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Total Mark

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MARKS

Q6 Describe how to harvest and store the seed of *Phaseolus vulgaris* under **EACH** of the following headings:

i)	harvesting	**3**
ii)	preparation for storage	**4**
iii)	storage conditions and packaging.	**3**

i)……

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ii)……

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iii)……

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Total Mark

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

R2104

UNDERSTANDING PLANT PROPAGATION

Level 2

Monday 19 June 2023

Candidates Registered	**327**		**Total Candidates Passed**	261	85%
Candidates Entered	305	93%	Passed with Commendation	163	53%
Candidates Absent/Withdrawn	20	6%	Passed	98	32%
Candidates Deferred	2	1%	Failed	44	15%

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.

Q1 a) Name **ONE** plant from each group that can be propagated by seed, by completing the table below.

Plant group	**Plant name**
Vegetable crop	
Hardy annual flower	
Half-hardy annual flower	
Tree	

b) Describe how to sow grass seed under **EACH** of the following headings:

i) soil preparation (secondary cultivation)
ii) appropriate sowing technique

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Q1 a) Suitable examples of plants from specific groups that can be propagated by seed were provided by many candidates who were awarded full marks. These included:

Plant group	**Plant name**
Vegetable crop	*Daucus carota, Phaseolus vulgaris*
Hardy annual flower	*Nigella damascena, Centaurea cyanus*
Half-hardy annual flower	*Lobelia erinus, Tagetes patula*
Tree	*Quercus robur, Aesculus hippocastanum*

b) Candidates who clearly had a knowledge of how to sow grass seed gained maximum marks. Suitable answers included:

i) soil preparation (secondary cultivation)
The top few centimetres of the area should be lightly forked, roughly raked level and any large stones or weeds should be removed. Following consolidation by treading or use of a roller fertiliser can be applied broadcast. A fine tilth is then produced using a garden rake.

ii) appropriate sowing technique
Seed is usually weighed into two halves and sown at a rate of 25-35g/m2. It is evenly spread in two directions (90º to each other) using the limp wrist technique. After sowing the seed is lightly raked in.
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Q2 a) Name **ONE** plant sown under protection from **EACH** of the following:

i) fine seed
ii) medium-size seed
iii) large-size seed.

b) Describe how to sow medium–size seeds under **EACH** of the following headings:

i) preparing a container for sowing
ii) sowing method.

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Q2 a) A range of plants that can be sown under protection were named by candidates who gained full marks. Acceptable answers included:

i) **fine seed** – e.g. *Begonia semperflorens, Lobelia erinus*
ii) **medium-size seed** – e.g. *Lactuca sativa, Solanum lycopersicum*
iii) large-size seed – e.g. *Cucurbita pepo, Phaseolus vulgaris*

b) Detailed descriptions of how to sow medium-size seeds were provided by many candidates who achieved maximum marks. Suitable answers included:

i) preparing a container for sowing
Select a full/half seed tray or pan which is undamaged, either new or clean. Overfill the container with either JI seed compost or a loam-less equivalent which has been broken up. Strike off the compost level with the top of the container with a striking off board and firm the surface evenly with a firming board. The container can be pre-watered prior to sowing using clean/mains water.

ii) sowing method
Sow the seed evenly and thinly over the surface of the container by sprinkling the seed using either the 'pinch' method or from the palm of the hand. The seed should be covered to a depth of 10mm using sieved seed compost or vermiculite.
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Q3 a) Name **FOUR** methods of natural vegetative propagation.

b) Name **THREE** methods of artificial vegetative propagation, giving **ONE NAMED** plant example for **EACH** by completing the table below:

Method of artificial propagation	Plant Example
1	
2	
3	

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Q3 a) The majority of candidates were able to name appropriate methods of natural vegetative propagation and were awarded full marks. These included:

Bulbs, corms, stem tubers, root tubers, rhizomes, stolons, runners, natural layering.

b) Maximum marks were gained by candidates who were able to name methods of artificial vegetative propagation for specific plants. Acceptable answers included:

Method of artificial propagation	**Plant example**
1. Softwood stem cutting	*Pelargonium zonale, Fuchsia magellanica*
2. Semi-ripe stem cutting	*Salvia rosmarinus, Viburnum x bodnantense*
3. Hardwood stem cutting	*Cornus alba, Buddleja davidii*

Candidates were also awarded marks for any of the following methods of artificial vegetative propagation.

Division e.g. *Hosta fortunei,* Leaf petiole cutting e.g. *Peperomia caperata,* Leaf lamina cutting e.g. *Begonia rex,* Leaf bud cutting e.g. *Clematis montana,* root cutting e.g. *Primula denticulata.*
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Q4 Describe the propagation of *Alchemilla mollis* by division under the following headings:

i) time of year
ii) lifting
iii) dividing
iv) aftercare.

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Q4 The best candidates were able to provide detailed descriptions of the propagation of *Alchemilla mollis* and achieved full marks. These included:

i) time of year
Alchemilla mollis is either propagated from September to October or March to April.

ii) lifting
Plants should be true to type and healthy. Plants are carefully lifted using a spade or fork and clumps are placed in a container, on a plastic sheet or into a plastic bag. It is important to check for the presence of perennial weeds and root pests e.g. vine weevil.

iii) dividing
The plant material is placed on a level surface and divided using, either two forks back-to-back or by cutting the plant into sections with a sharp spade or knife. The divisions should contain three growth buds if being replanted in the ground or one growth bud if it is to be containerised. The old centre of the plant is discarded.

iv) aftercare
Once planted it is important to ensure that the divisions are firmed in well and watered regularly as required. Weeds must be controlled e.g. by hand and a suitable mulch e.g. leaf mould applied around the base of each plant to a depth of 10cm.
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Q5 Describe the propagation of a **NAMED** plant by softwood cuttings under **EACH** of the following headings:

i) plant name
ii) collection of cutting material
iii) preparation of the cutting up to insertion.

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Q5 Candidates who had a good understanding of the propagation of plants by softwood cuttings were awarded maximum marks. Suitable answers included:

i) plant name
Pelargonium zonale, Fuchsia magellanica.

ii) collection of cutting material
Cutting material that is true to type, healthy and ideally non-flowering is selected. If this is not possible then flower buds are removed when preparing the cuttings. Cutting material is removed just above a node using clean, sharp secateurs and placed in a clean plastic bag to keep the cuttings turgid.

iii) preparation of the cutting up to insertion
The cuttings are cut just below a node to a length of 50-100mm depending on plant species. The lower third of the leaves are removed to enable insertion of the cuttings. Any flower buds present or stipules are also removed and the base of the cutting can be treated with a mild hormone rooting powder if required.
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Q6 Describe how to harvest and store the seed of *Phaseolus vulgaris* under **EACH** of the following headings:

i) harvesting
ii) preparation for storage
iii) storage conditions and packaging.

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Q6 Most candidates provided detailed descriptions of how to harvest and store the seed of *Phaseolus vulgaris* and gained full marks. Acceptable answers included:

i) harvesting
Mature pods are selected which show swollen seed. They should be true to type and pest and disease free e.g. Halo Blight, a bacterial disease which can infect the seed. Halo Blight can re-occur the following year on plants raised from infected seed. Seed should be harvested on a dry day.

ii) preparation for storage
The pods and seeds are laid out in a light, dry place to continue the drying process. Good sized uniform seed which are free from damage or crinkling are removed from the chaff. It is important to ensure that the seeds are completely dry before being stored.

iii) storage conditions and packaging
Phaseolus vulgaris seed should be stored in paper or canvas bags in a dark place out of direct sunlight. A dry atmosphere is important at a temperature of 5-7ºC. A refrigerator is not suitable as it can be too humid. Silica gel can be used but is not essential.
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