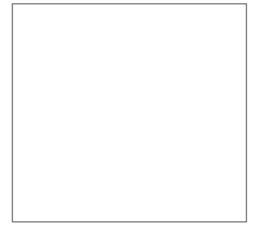




Including examiner comments



R2104

UNDERSTANDING PLANT PROPAGATION

Level 2

Monday 6 February 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** example of a plant producing **EACH** of the following types of seed:

- i) recalcitrant
- ii) orthodox

1
1

i)

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ii)

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b) State the storage conditions for the following types of seed.

- i) recalcitrant
- ii) orthodox

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2

i)

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ii)

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c) List **FOUR** environmental conditions required for seed germination.

4

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Total Mark

Please see over/.....

MARKS

Q3 a) State the meaning of the term vegetative propagation.

2

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b) Name **TWO** distinct ways vegetative propagation can take place by **EACH** of the following means:

- i) artificial
- ii) natural

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i).....
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ii).....
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c) State **FOUR** limitations of propagating plants by vegetative means.

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Total Mark

Please see over/....

MARKS

Q5 State a suitable method of vegetative propagation and facility for the following plants by completing the table below.

Plant	Method of vegetative propagation	Propagation facility
<i>Pelargonium zonale</i>		
<i>Fuchsia magellanica</i>		
<i>Cornus alba</i>		
<i>Buddleja davidii</i>		
<i>Chamaecyparis lawsoniana</i>		

2**2****2****2****2**

Total Mark

Please see over/.....

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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 6 February 2023

Candidates Registered		Total Candidates Passed	
Candidates Entered	305	Passed with Commendation	163
Candidates Absent/Withdrawn	TBA	Passed	98
Candidates Deferred	TBA	Failed	44

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** example of a plant producing **EACH** of the following types of seed:

- i) Recalcitrant
- ii) Orthodox

b) State the storage conditions for the following types of seed.

- i) Recalcitrant
- ii) Orthodox

c) List **FOUR** environmental conditions required for seed germination.

Q1a) Most candidates were able to name suitable plants producing specific types of seed and gained maximum marks. These included:

i) **recalcitrant**

Aesculus hippocastanum, Castanea sativa, Fagus sylvatica.

ii) **orthodox**

Lactuca sativa, Nigella damascena, Solanum lycopersicum.

Q1b) Candidates who clearly understood the storage conditions required by specific types of seed were awarded full marks. Suitable answers included:

i) **recalcitrant**

Recalcitrant seeds require cool and moist storage conditions but can only be stored for a short period of time. It is better if they are sown immediately.

ii) **orthodox**

Orthodox seeds require cool and dry storage conditions.

Q1c) The majority of candidates correctly named water/moisture, oxygen, suitable temperature correct light or dark as environmental conditions required for seed germination and were awarded full marks.

Q2

- a) Name **TWO** distinct plants that can be propagated by hardwood cuttings.
- b) Describe the method of taking of deciduous hardwood cuttings under **EACH** of the following headings:
- i) preparation- **NOT TO INCLUDE COLLECTION**
 - ii) insertion

Q2a) A range of suitable plants that can be produced by hardwood cuttings were named by candidates who achieved maximum marks. These included:

Cornus alba, Salix alba, Buddleja davidii, Sambucus nigra, Ribes nigrum.

Q2b) Maximum marks were gained by candidates who were able to describe the method of taking hardwood cuttings. Suitable answers included:

i) **preparation**

Hardwood cuttings are prepared by cutting the material to 150-300mm in length with a horizontal cut below a node at the base and a 45° angle cut above a node at the top to ensure polarity of the cutting. The cuts are made using clean, sharp secateurs. Some subjects can be wounded and treated with hormone rooting powder.

ii) **insertion**

Hardwood cuttings can be inserted in the open ground on a site which is free draining, weed and stone free. The cuttings are inserted into a 'V' shaped trench which has one vertical side to a depth of 100-200mm. The cuttings are inserted up to two thirds of their length. Grit can be placed in the bottom of the trench to aid drainage.

Alternatively, hardwood cuttings can be inserted into deep pots/'Long Tom's' containing a cutting media of 50% grit and 50% bark to a depth of two thirds of their length. The pots can be placed in a cold frame.

Q3

- a) State the meaning of the term vegetative propagation,
- b) Name **TWO** distinct methods of vegetative propagation by **EACH** of the following means:
- i) artificial
 - ii) natural
- c) State **FOUR** limitations of propagating plants by vegetative means.

Q3a) Most candidates provided good explanations of the term vegetative propagation and were awarded full marks. These included:

Vegetative (asexual) propagation is the production of new plants from portions of the roots, stems or leaves of the parent plant. It produces offspring which are genetically identical to the parent plant thus creating a clone.

Q3b) The best candidates named a range of ways vegetative propagation can take place by specific means. These included:

- i) **artificial**
Division, budding and grafting, micro propagation, stem cuttings, air layering.
- ii) **natural**
Offsets, bulbils/cormlets, rhizomes, runners and stolons, leaf-borne plantlets.

Q3c) Candidates who had a good knowledge of the limitations of propagating plants by vegetative means gained full marks. Suitable answers included:

- limited availability of propagation material
- lack of genetic variation
- transmission of pests and diseases on propagation material
- requirement for different and often complex methods of propagation
- differing and sometimes more complex skills required when compared with propagating from seed
- occasional need for more complex facilities e.g. mist unit or heated grafting bench.

Q4

Describe how to sow parsnips under **EACH** of the following headings:

- i) seedbed preparation
- ii) one named method of sowing
- iii) aftercare

Q4) Detailed descriptions of how to sow parsnips were provided by many candidates who achieved maximum marks. Acceptable answers included:

i) **seedbed preparation**

Primary cultivation i.e. digging, forking and stone removal is carried out prior to secondary cultivation. This involves raking the site roughly level, consolidating the soil by treading to remove any large air pockets, applying a base fertiliser broadcast if required before creating a final tilth to a depth of 10mm by raking.

ii) **ONE method of sowing**

Parsnips can be sown in a drill which is made against a line or board to a depth of 13mm using the back of a garden rake or the corner of a swan neck hoe. The seed is sown thinly and evenly along the drill and covered by pulling the soil back over the seed. Rows are spaced at 300mm apart.

Alternatively, seeds can be station sown to a depth of 13mm, sowing 3-4 seeds in a drill every 100-150mm. Rows are spaced at 300mm apart.

iii) **aftercare**

Weeds are removed and seedlings are thinned to 100mm apart. Irrigation is important if the weather is dry and netting can be put in place to prevent carrot fly.

Q5

State a suitable method of vegetative propagation and facility for **EACH** of the following plants by completing the table below.

Plant	Method of vegetative propagation	Propagation facility
<i>Pelargonium zonale</i>		
<i>Fuchsia magellanica</i>		
<i>Cornus alba</i>		
<i>Buddleija davidii</i>		
<i>Chamaecyparis lawsoniana</i>		

Q5) Suitable methods of propagation and propagation facilities for specific plants were provided by many candidates who were awarded full marks. These included:

Plant	Method of vegetative propagation	Propagation facility
<i>Pelargonium zonale</i>	Softwood stem cutting.	'Open' greenhouse bench.
<i>Fuchsia magellanica</i>	Softwood stem cutting.	Mist or fogging unit. Closed case.
<i>Cornus alba</i>	Hardwood stem cutting. Softwood stem cutting. Simple layering.	Open ground or cold frame. Mist or fogging unit. Open ground.
<i>Buddleija davidii</i>	Softwood or semi-ripe stem cutting. Hardwood cutting.	Mist or fogging unit. Open ground or cold frame.
<i>Chamaecyparis lawsoniana</i>	Semi-ripe stem cutting, with or without a heel.	Mist or fogging unit. Closed case. Cold frame.

Q6

a) Name **ONE** plant propagated by **EACH** of the following methods:

- i) Vertical root cutting
- ii) Horizontal root cutting

b) Describe the propagation method of vertical root cuttings under the following headings:

- i) Collection
- ii) Preparation and insertion
- iii) Suitable propagation facility

Q6a) Most candidates were able to name plants propagated by specific types of root cutting and achieved maximum marks. Suitable answers included:

- i) **vertical root cutting**

Rhus typhina, Acanthus mollis, Anemone x hybrida.

- ii) **horizontal root cutting**

Primula denticulata, Phlox paniculata, Papaver orientale.

Q6b) Good descriptions of the propagation of vertical root cuttings were provided by the best candidates who gained full marks. Acceptable answers included:

- i) **collection**

Cuttings are taken between November and February. Lift the plant carefully, using a fork to prevent breaking the roots. Wash any soil away from the roots. Select material that is mature, healthy, pest and disease free and true to type. Do not remove more than one third of the roots if the mother plant is to be retained.

Roots from trees can be carefully exposed and a section can be removed for propagation.

- ii) **preparation and insertion**

Roots that are at least pencil thick are selected and cut into lengths of approximately 100mm using a sharp clean blade with a 45° angle cut at the distal end (furthest away/bottom) and a horizontal cut at the proximal end (closest/top).

Cuttings are fully inserted into a rooting media of 50% bark and 50% perlite where the top of the cutting is level with the rooting media. The cuttings are then covered with a 100mm depth of coarse grit.

- iii) Vertical root cuttings can be inserted into prepared cold frames or directly outdoors.