Candidate Number: .....

Candidate Name: .....

Centre Number/Name: .....

RHS (LEVEL 3) ADVANCED CERTIFICATE IN HORTICULTURE WRITTEN EXAMINATION

Tuesday 6th February 2007

IMPORTANT – Please read carefully before commencing.

i) The duration of the papers in Module **B** 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.

Module B

Plant Taxonomy, Morphology & Anatomy, Plant Physiology, Plant Health.

Section A – Short Answer Questions

ANSWER ALL QUESTIONS

MARKS

Q1 State the environmental factors, which encourage the development and spread of **EACH** of the following:

i) grey mould (*Botrytis cinerea*);
ii) two spotted spider mite (*Tetranychus urticae*);
iii) blackspot (*Diplocarpon rosae*);
iv) rose powdery mildew (*Sphaerotheca pannosa*). **2**

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Q2 Define **EACH** of the following terms used to describe herbicides and give **ONE** example of **EACH**:

i) contact;
ii) residual;
iii) translocated;
iv) selective. **2**

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Q3 Name **ONE** chemical and **ONE** cultural method of soil sterilization. State **ONE** disadvantage for **EACH**. **2**

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Please see over/…..

ANSWER ALL QUESTIONS

MARKS

Q4 Identify a possible cause for **EACH** of the following physiological disorders: **2**

i) bolting in brassica crops;
ii) inter-veinal chlorosis in tomatoes;
iii) oedema in ivy-leaved geraniums;
iv) poor fruit set in apple orchards.

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Q5 Explain the process of plasmolysis (ex-osmosis) in plants, and describe a horticultural situation where this process occurs. **2**

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Q6 Explain **FOUR** reasons for the opening and closing of stomata in plant leaves. **2**

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Q7 **NAME** the plant tropisms involved when seeds germinate and state the effect of **EACH**. **2**

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Please turn over/…..

ANSWER ALL QUESTIONS

MARKS

Q8 State the function of **EACH** of the following tissues in a dicotyledonous plant root:

i) endodermis;
ii) epidermis. **2**

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Q9 Explain the meaning of **EACH** of the following specific epithets:

i) *Piptanthus nepalensis;*
ii) *Hydrangea quercifolia;*
iii) *Thuja occidentalis;*
iv) *Hamamelis* x *intermedia* 'Jelena'. **2**

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Q10 **NAME FOUR** distinct parts of a typical bulb and state the function of **EACH**. **2**

RHS (LEVEL 3) ADVANCED CERTIFICATE IN HORTICULTURE
WRITTEN EXAMINATION

Tuesday 6th February 2007

IMPORTANT – Please read carefully before commencing.

i) The duration of the papers in Module **B** is **2 hours**.
ii) Answer **ONE** question **ONLY** from each **B**, **C** and **D** sections.
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.

Module B

Plant Taxonomy, Morphology & Anatomy,
Plant Physiology,
Plant Health.

Sections B, C & D

Structured Questions

Please turn over/…..

Section B – Plant Taxonomy, Morphology and Anatomy

Answer ONE question only from this section

MARKS

Q1 a) Describe the main categories of the taxonomic hierarchy using **NAMED** plant examples to illustrate the answer. **12**

b) Explain the reason why the scientific name of a plant may be changed using **NAMED** examples. **8**

Q2 a) Using a large clearly labelled diagram, describe the characteristics of a wind-pollinated flower. **12**

b) Describe the range of fruit structures that enable dispersal by wind; using **NAMED** examples and diagrams. **8**

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Please see over/…..

Section C – Plant Physiology

Answer ONE question only from this section

MARKS

Q3 a) Describe the biochemical process of photosynthesis. **10**

b) Explain how the rate of photosynthesis can be modified in **EACH** of the following:

i) modern greenhouse; **5**
ii) growing room. **5**

Q4 a) Describe the physical and chemical properties of water. **8**

b) Explain how water movement in the plant is related to **EACH** of the following:

i) root hairs; **3**
ii) xylem; **3**
iii) stomata; **3**
iv) osmosis. **3**

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Please turn over/…..

Section D – Plant Health

Answer ONE question only from this section

MARKS

Q5 a) Describe the life cycle of and damage caused by Vine Weevil. **8**

b) Describe a pest management strategy that uses biological agents and other cultural methods to control Vine Weevil. **12**

Q6 a) Describe how some pests, diseases and weeds become resistant to chemical control. **8**

b) Describe the procedure which should be observed in order to reduce the possibility of resistance of pests, diseases and weeds to chemical control. **8**

c) List the relevant product information that should be obtained when making an assessment for the safe and effective use of pesticides, indicating where this information may be found. **4**

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RHS LEVEL 3 ADVANCED CERTIFICATE IN HORTICULTURE
WRITTEN EXAMINATION

Tuesday 6th February 2007

Module B

Plant Taxonomy, Morphology & Anatomy
Plant Physiology
Plant Health

Examiners Report

Candidates Registered	246		Total Candidates Passed		
Candidates Entered	200	81.30%	Passed with Commendation	10	5%
Candidates Absent	31	12.60%	Passed	95	47.50%
Candidates Deferred	9	3.66%	Failed	95	47.50%
Candidates Withdrawn	6	2.44%			

General Comments in relation to Questions

Short Answers; they should be just that. However some responses were **very long** & did not fit well in the space provided, this was usually due to a **description** being given in plain language, rather than good use of **technical** horticultural terms. Additionally, answers should only relate to the question that has been set.

Structured questions do not require candidates to write in essay form. It is important that candidates answer questions in a style that is appropriate to the question asked. This requires an understanding of the phraseology used.

It is of vital importance that candidates understand the meaning of the key words used in examination questions and respond accordingly. In many instances full marks could not be awarded because candidates had not understood what was required and as a result did not provide an answer that met the question in full, and thus failed to gain the available marks.

Below is provided a definition of the key words used in questions which may help to clarify the requirement of questions.
State means ***to write down the facts briefly***
Describe means– ***to give an account of***
Explain means– ***to make the meaning clear – (****answers will normally need to include details of how, when, why and to relate horticultural practice to underlying scientific principles).*
Evaluate means - ***to judge the worth of (state the benefits and limitations of..)***
List means– ***to itemise***

Diagrams must be annotated if they are to be of any value. It is advisable (but not essential) to draw them in pencil as mistakes can easily be rectified. The use of colour is a luxury and should only be carried out when clear differentiation is required.

In some instances handwriting again proved to be difficult to decipher. Candidates should remember that if the examiner cannot read what has been written it will not be possible to award any marks.

Wherever possible, named examples should be given in answers as these indicate to the examiner that the candidate has a comprehensive understanding of the subject concerned.

Where a question is set in different sections, eg a,b,c or i,ii,iii, iv candidates are advised to set out their answers to follow the structure of the question, section by section.

Section A – Short Answer Questions

Q1 State the environmental factors, which encourage the development and spread of **EACH** of the following:

v) grey mould (*Botrytis cinerea*);
vi) two spotted spider mite (*Tetranychus urticae*);
vii) blackspot (*Diplocarpon rosae*);
viii) rose powdery mildew (*Sphaerotheca pannosa*).

i) Greymould disease - was correctly linked to high humidity conditions but some candidates failed to indicate that it occurs over a wide temperature range and that it is often linked with poor light (shaded) conditions. Air currents assisting in spore distribution was frequently overlooked.
ii) Two spotted spider mite – too many candidates were referring to “warm conditions” aiding spread when they should have said hot, dry and bright light (long day) conditions coupled with water stress being the key factors helping to spread the problem. However the Examiner did award marks when “warm conditions” were referred to.
iii) Blackspot – candidates frequently and correctly referred to high humidity aiding the spread of blackspot but failed to identify wet seasons and the importance of rain splash as a means of distributing fungal spores from leaf to leaf. Although it was not the primary aim of the question the Examiner made allowances for answers referring to the Clean Air Act which reduced atmospheric sulphur with increase in blackspot symptoms.
iv) Rose powdery mildew – marks were awarded for reference to hot dry conditions in the air but too many candidates failed to identify other environmental conditions of importance including air currents to distribute spores; dry soils causing plant tissue water stress and the importance of occasional humid conditions (however caused) to aid spore germination and initial development.

Q2 Define **EACH** of the following terms used to describe herbicides and give **ONE** example of **EACH**:

v) contact;
vi) residual;
vii) translocated;
viii) selective.

Although there were many excellent answers to this question which received full marks too many candidates are giving loose, imprecise answers and in the case of residual herbicides fail to name good horticultural examples. Residual herbicide should relate (as with other groups) to those frequently used in growing crops such as fruit, vegetables, nursery stock, shrubs and rose borders etc.
Good examples would include:- lenacil, trifuralin, chlopropham, propachlor, simazine and many others. Many candidates were quoting sodium chlorate as a residual example which although not incorrect is not a good example to give because it is a total weedkiller and tends to "creep" readily in the soil rather than remain moderately fixed in the herbicide (residual) zone. It is intended for areas not to be used for growing crops. Residual herbicides used in growing crops or border situations do not harm those crops but effectively control a wide range of annual weed seedlings growing amongst them. Unfortunately some candidates were unable to differentiate between herbicides and other pesticides by giving examples incorrectly of insecticides and fungicides.

i) Contact – Candidates should have referred to contact with green parts of plants namely leaves and shoots rather than applications to plants which is too vague. Only a limited number of candidates made this distinction by referring to the leaves. Most candidates were aware of paraquat and also other examples were given. Few candidates indicated the use of contacts for controlling annual type weeds.
ii) Residual – candidates most frequently failed to be awarded marks here when they could not define the use of residual herbicides. Those gaining marks indicated that residual herbicides control (kill) germinating seedlings or seedlings which are at or progressing towards seed leaf stage. Candidates are incorrectly indicating that residuals control "weed seeds". Weed seeds if they remain dormant are unaffected by residuals! It is during the process of germination (burst seed coats) and emergence that they take up a lethal dose of residual herbicide; see above for reference to residual examples.
iii) Translocated – Again here as in "contacts" above candidates frequently gave vague or unclear answers by failing to identify accurately where these herbicides enter the plant and where they go to. Candidates gaining marks referred to point of entry as being the green foliage leaves primarily or green shoots after which herbicide is translocated via the vascular system down the stems to the root extremities. Candidates should indicate that translocated herbicides are intended for the control of tougher weeds namely perennial weeds.
iv) Selective – very few candidates failed to give a good answer to this part of the question. Most indicated their use in controlling broad leaved weeds in grass areas and selectively leaving the grass species undamaged. Good examples named by candidates indicated good basic knowledge and included 24D; MCPA; DICAMBA; MECOPROP; and TRICLOPYR.

Q3 Name **ONE** chemical and **ONE** cultural method of soil sterilization. State **ONE** disadvantage for **EACH**.

This question set was looking commercial (larger scale) rather than amateur (small scale) examples of soil sterilisation. A number of candidates were quoting examples such as 'Jeyes Fluid' and micro-waving which have little relevance to professional practise and therefore did not attract full marks. Candidates sometimes gave examples of insecticides and fungicides incorrectly and no marks were awarded.
Chemical sterilisation – those candidates able to quote products such as Dazomet (Basamid); Chloropicrin or other valid examples gained marks. The Examiner allowed answers referring to methyl bromide although it has been, or is currently being, withdrawn from use as a soil sterilant. Candidates giving examples of disadvantages such as chemical sterilants being expensive; toxic to users; requiring long periods to clear from the soil and references to soil temperatures gained marks.

Cultural sterilisation – candidates were expected to refer to steam sterilisation treatments of soil including the now rarely used "Hoddesdon pipe system" or the version still frequently used on some protected cropping nurseries of "sheet steaming". These and other valid methods of heating the soil were awarded marks.
Candidates who were able to link the above examples with disadvantages such as being very expensive, need specialist steam production unit, being laborious or only sterilising the soil to a limited depth gained full marks.

Q4 Identify a possible cause for **EACH** of the following physiological disorders:

v) bolting in brassica crops;
vi) inter-veinal chlorosis in tomatoes;
vii) oedema in ivy-leaved geraniums;
viii) poor fruit set in apple orchards.

Most candidates gave knowledgeable and accurate answers to this fout-part question. The parts causing most difficulty to candidates were part (i) bolting in brassica crops and part (iv) poor fruit set in orchards.

i) Bolting in brassica crops – many candidates gained marks by referring to dry, drought conditions as a cause of bolting but only a few were able to give answers which demonstrated a wider knowledge of this subject area; such answers referred to establishing crops too early (large plants) and these being subject to low temperatures which triggers flower bud initiation or using cultivars too early in the season which are sensitive to bolting i.e. low temperature sensitive.
ii) Inter-veinal chlorosis in tomatoes – this part was answered well with many candidates being awarded full marks. Valid answers referred to deficiencies of mineral nutrients including magnesium, iron and other trace elements, such as boron. Answers referring to deficiences of nitrogen or tomato mosaic virus did not receive marks since the former produces a general pale green colour over the leaf and the latter tends to create a mosaic pattern over the leaf rather than a specific inter-veinal chlorosis.
iii) Oedema in ivy-leaved geraniums – again this section was answered well and most candidates gained full marks by referring to over-watering and high humidity levels as being the primary cause of the problem.
iv) Poor fruit set in apple orchards – answers to this part indicated candidates had limited knowledge which was reflected in the lower marks awarded. Candidates indicating drought as a possible cause did not receive marks as

this situation is unlikely early in the year when crops are in flower. Candidates gaining marks were able to refer to possible causes such as:- the effects of low temperature or frost damage to flora parts; flowers damaged by insect pests e.g. blossom weevils; the removal of flower buds in winter by bullfinches or cultivars in their “off year” due to biennial cropping.

Q5 Explain the process of plasmolysis (ex-osmosis) in plants, and describe a horticultural situation where this process occurs.

Many candidates demonstrated a sound knowledge of this subject area and were able to explain the process of plasmolysis and supported it by giving good horticultural examples of how it might be caused. Candidates were expected to refer to a water potential gradient being set up whereby plant cells have a low soluble salt concentration compared to the relatively high concentrations present in the soil water solution. Candidates failing to gain marks here frequently confused for example the direction of flow of the water potential gradient or inadequately explained the process of plasmolysis. Candidates often quoted accurately the over use of artificial fertilisers as a cause of the problem but few were able to quote other causes such as protected soils not being “flooded” following a build-up of nutrients over one or two growing seasons. Candidates referring to planting non-coastal plants in coastal areas with high salt levels in the soil and causing plasmolysis were awarded marks.

Q6 Explain **FOUR** reasons for the opening and closing of stomata in plant leaves.

Candidates demonstrated sound knowledge in their answers to this question indicative of sound teaching and learning in this subject area. Most candidates gaining full marks for this question. Candidates not achieving full marks wither repeated similar answers or failed to give four reasons. Reasons for the opening or closing of stomata would include references to: stomata opening to allow gaseous exchange; movement of water molecules by transpiration; stomata generally open in daylight and allowing tissue cooling; stomata close usually in darkness or in response to rising absisic acid level in the leaves or because of excessive water loss and reduced uptake and other valid answers were allowed.

Q7 **NAME** the plant tropisms involved when seeds germinate and state the effect of **EACH**.

Candidates have demonstrated their ability to apply botanical knowledge to this specific area where plant tropisms occur. Most candidates gained full marks by accurate references to a range of tropisms. These included phototropism, geotropism, hydrotropism and the positive and negative responses of the radicle and plumule in the early stages of seedling development when they emerge from within the seed coat. Those not achieving full marks confused the seedlings responses and associated the named tropism with the wrong part of the seedling. It was expected that candidates would make a reference at least to phototropism and geotropism in their answers.

Q8 State the function of **EACH** of the following tissues in a dicotyledonous plant root:

iii) endodermis;
iv) epidermis.

Candidates answered the second part of this question more accurately than the first part revealing a lack of adequate knowledge as to the precise function of the endodermis with dicotyledonous plant roots.

i) Endodermis – there was confusion among some candidates when they referred to other anatomical parts in their answers, such as the exodermis and therefore failed to gain marks. Candidates gaining full marks were able to identify the presence of the casparian strip around endodermis and its function in directing water movement from the cortex tissue into the central stele via the Symplast and not the Apoplast route. References to the endodermis controlling or regulating the flow of water fro the cortex into the stele also attracted marks.
ii) Epidermis – this part was answered well by most candidates when they referred to its protective role in preventing he entry of pest or disease pathogens. Candidates gaining full marks also included in their answers references to the epidermis helping to retain moisture within the root system; that is it the site of root hair production or that it is the area of water and mineral nutrient uptake.

Q9 Explain the meaning of **EACH** of the following specific epithets:

v) Piptanthus nepalensis;
vi) Hydrangea quercifolia;
vii) Thuja occidentalis;
viii) *Hamamelis* x *intermedia* 'Jelena'.

This question identified the candidates ability to distinguish between species and genus and in one case a cultivar. Most candidates were able to distinguish between the species and genus but a number wrongly confused species with cultivar and some wrongly assumed the cultivar to be part of the specific epithet. Only a limited number of candidates successfully gained full marks and those who did correctly stated the answers to be:-

i) Piptanthus nepalensis – meaning originating or coming from Nepal
ii) Hydranga quercifolia – having leaves oak like in outline
iii) Thuja occidentalis – coming from the west or the Americas. Some candidates wrongly thought it referred to Eastern in origin.
iv) Hamamelis x intermedia 'Jelena' – reference should only have been made to x intermedia which means it is an interspecific hybrid (CROSS) between two distinct species in this case between H. mollis and H. japonica. The name x intermedia suggests it has features roughly intermediate between the two parent species.

Q10 **NAME FOUR** distinct parts of a typical bulb and state the function of **EACH**.

Overall answers to this question lacked detail and accuracy in naming parts of a typical bulb. There was often confusion in identifying the right name for the part being referred to. Only a low number of candidates were awarded full marks for this question. It was expected that candidates would refer to a dormant bulb but marks were awarded based upon identifying four distinct parts and stating the function of each. Candidates were expected to include in their answers a selection from:
Swollen stem base – produces leaves, axillary buds etc.
Base plate – site of origin for adventitious (fibrous) roots.
Fleshy Scale leaves – storage site for sugars and carbohydrates.
Dry outer tunicated bud – protects fleshy parts from drying out and pest and disease invasion.
Embryo flower bud – new seasons flowers for seed reproduction.
Embryo leaf – new season leaves for photosynthesis will also become fleshy scale leaves for storage purposes.
Other accurately identified parts and functions gained marks.

Structured Questions
Section B - Plant Taxonomy, Morphology & Anatomy

Q1 **a)** Describe the main categories of the taxonomic hierarchy using **NAMED** plant examples to illustrate the answer.

The first part of the question concerned the description of the main categories of the taxonomic hierarchy with the aid of named plant examples. The best approach to answering this question would have been to start with the species since this is central to the hierarchy. Many students did not show that they understood the species to be a group of morphologically similar plants that can interbreed to give fertile offspring. However there was much confusion between the species and the specific epithet. Thus for instance vulgaris was said to be one species of the genus Aquilegia. This particularly occurred when a table was used to show categories and examples. It must be remembered that the population of interbreeding plants is called Aquilegia vulgaris. In a table this could be given as A. vulgaris but not the specific epithet on its own.

The higher categories would have been best described by working upwards from the species eg. A genus is a group of closely related species and a family is a natural grouping of genera usually defined by reproductive characters. However, most students started at kingdom and worked downwards experiencing some difficulty as they tried to define a category by reference to the one above. Many candidates described an example of a category rather than the category itself eg. Describing the characteristics of spermatophytes rather than defining division (or phylum) as indicating different major groups of plants with major structural/reproductive differences eg. Spermatophyta.
Categories below the species level were in general described better than above with good understanding shown of subspecies, variety, forma and cultivar. However, often the category was omitted from the named example eg. Cedrus libani atlantica instead of Cedrus libani ssp. atlantica.

b) Explain the reason why the scientific name of a plant may be changed using **NAMED** examples.

The second part of the question that asked students to give the reasons why the scientific name of a plant may be changed was not usually done well. Usually only one or two reasons were given without correct examples. The commonest answer gave new taxonomic research as a reason although most students mentioned DNA rather than traditional revisions of genera etc. The commonest example used was Chrysanthemum but answers were imprecise as to the genera it had been spit into eg. Dendranthema, Leucanthemum etc. The application of the priority rule was usually well understood but examples were particularly sparse. Hosta (1812) and Funkia (1817) was correctly given by one or two.
The effect of new discoveries in the wild (Xanthocyparis and Chamaecyparis nootkatensis), errors of identification (Bacopa and Sutera), and the non-acceptance of translations of cultivar names (Sedum 'Autumn Joy' and Sdeum 'Herbstfreude') were usually omitted in answers.

Q2 **a)** Using a large clearly labelled diagram, describe the characteristics of a wind-pollinated flower.

In the first part of the question, candidates were expected to describe characteristics of a wind-pollinated flower. Most diagrams produced were of insect-pollinated flowers, although there were a few excellent grass flower drawings. The overall quality of drawings does seem to have improved. Even when an insect-pollinated flower had been drawn, students did go on to describe some of the characteristics of a wind-pollinated one. It was generally understood that stamens had long filaments, the anthers were loosely attached to the filament and that a lot of smooth pollen is produced. Similarly, it was generally known that the stigma has a large surface area (feathery) and that the stamens and stigma protrude outside the flower. The lack of colour, and reduced size of the perianth was usually described more vaguely as 'small flowers' or 'inconspicuous flowers'. There was much expression of the form 'wind-pollinated flowers have no need of bright colours or nectar' without stating what they actually do have.

b) Describe the range of fruit structures that enable dispersal by wind; using **NAMED** examples and diagrams.
The second part of the question requested a description of the range of fruit structures that enable dispersal by the wind. The commonest examples used were Acer samaras and Taraxacum achenes (cypselas) although the technical fruit terms were not used by the majority. Most did not describe the samara as having a winged pericarp nor the cypsela as having a pappus (calyx) of hairs. Many diagrams of the double samara of Acer showed two wings and only one seed chamber. Many candidates also mentioned the censer mechanism of Papaver capsules although the mechanism (wind shaking the capsule so that the seeds are ejected out of holes) was hardly ever described well.

Section C – Plant Physiology

Q3 **a)** Describe the biochemical process of photosynthesis.

The examiner was looking for modern (post 1980) information which was correct, clearly described and if diagrams were present, these were large and labelled. Part A of the question produced many very good answers which showed that candidates had a very good understanding of photosynthesis. Candidates who were able to explain the sequence of biochemical processes gained higher marks. The majority of candidates recorded and correctly explained the significance of the light and dark stages of photosynthesis, which was essential for the answer to this question.

b) Explain how the rate of photosynthesis can be modified in **EACH** of the following:

iii) modern greenhouse;
iv) growing room.

Part B proved to be difficult for candidates. Answers were, in the majority, very general and did not fully answer the question, especially with the use of growing rooms.
Candidates who fully explained important modifications gained higher marks ie.

Light – Intensity and quality technical detail was required ie. Wavelength (choice of lamp) and LUX ratings. Not many candidates recorded any information about the duration of light, which is most important, especially in growing rooms.

Carbon Dioxide – the answer should have recorded the amount to apply, when to apply and how it is supplied.

The concept of a growing room with complete control of the growing environment was not fully understood by many candidates.

Q4 **a)** Describe the physical and chemical properties of water.

Answers in the majority, were very good and showed a good understanding of the concept of water movement in plants by most candidates. Candidates who explained clearly the physical and chemical properties of water gained higher marks. Some candidates did not record answers on the chemical properties of water.

b) Explain how water movement in the plant is related to **EACH** of the following:

v) root hairs;
vi) xylem;
vii) stomata;
viii) osmosis.

Part B produced some variable answers. Candidates must ensure that diagrams are large and correctly labelled.
Information on root hairs was, in the majority, correct and well explained.
The information on the xylem required answers to explain how water is moved

within the plant. Candidates who explained how water is moved within the xylem, gained higher marks.

Good answers were recorded on how the stomata affects water movement. Candidates were able to relate the action of the stomata to water movement in plants.

The concept of osmosis was not fully understood by many candidates, who explained how osmosis affects water flow into and within the pant gained higher marks.

Diagrams do need to be very clear and must show the direction of water flow. Many candidates provided general statements i.e. the movement of water from a low to a high concentration, but did not explain if the concentration was water or salts.

Section D – Plant Health

Q5 **a)** Describe the life cycle of and damage caused by Vine Weevil.

The majority of candidates were able to describe the types of damage caused by the larvae and adult Vine weevil, and give examples of the types of plants that are particularly susceptible both out side and protected crops. A full and accurate description of it's biology including the timing of it's reproductive cycle was required to gain higher marks.

b) Describe a pest management strategy that uses biological agents and other cultural methods to control Vine Weevil.

Candidates listed cultural methods for reducing the impact of Vine Weevil some more practical than others. The use of parasitic nematodes is an important method of controlling Vine Weevil, where candidates not only listed nematodes as a control but went on to describe an affective method and timing of application the examiner was able to award higher marks.

Q6 **a)** Describe how some pests, diseases and weeds become resistant to chemical control.
Resistance to chemical pesticides was generally well explained, candidates who gave examples of where and how this has occurred gained higher marks.

b) Describe the procedure which should be observed in order to reduce the possibility of resistance of pests, diseases and weeds to chemical control.

As practising horticulturalists it is very important to understand and apply measures to reduce the possibility of pesticide resistance. Some candidates showed a good understanding of this, describing integrated systems of pest

control, the importance of accurate timing and application methods of pesticides, rotation of chemicals, and measuring effectiveness.

c) List the relevant product information that should be obtained when making an assessment for the safe and effective use of pesticides, indicating where this information may be found.

Candidates were expected to identify the product label as being a source of information and list the legal and guidance information contained in it. Further information should be obtained from the product data sheet in order that the correct procedures can be carried out before spraying.