

## 0174-002/502 Level 3 Advanced Technical Certificate in Horticulture

### Level 3 Horticulture – Theory Exam (1)

June 2018

1	State <b>four</b> differences between monocotyledons and dicotyledons. (4 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<ul style="list-style-type: none"> <li>• Monocotyledons have one seed leaf and dicotyledons have two seed leaves (1)</li> <li>• Monocotyledons have parallel leaf veins and dicotyledons have branching system (1)</li> <li>• Monocotyledons have flower parts of 3 and dicotyledons have flower parts of 4 or 5 (1)</li> <li>• Monocotyledons usually have fibrous root systems and dicotyledons usually have a tap root system (1)</li> </ul>	1 mark for each correct answer up to a maximum of 4 marks. Accept any other relevant answer provided.	<b>4</b>
2	a) Name <b>two</b> herbaceous perennials or woody shrubs using the binomial system. (2 marks) b) Explain why the binomial system is used in botanical identification. (4 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p>a)</p> <ul style="list-style-type: none"> <li>• <i>Solidago rugosa</i> 'Fireworks' (1)</li> <li>• <i>Miscanthus sinensis</i> 'Undine' (1)</li> <li>• <i>Photinia</i> × <i>fraseri</i> 'Red Robin' (1)</li> <li>• <i>Choisya ternata</i>(1)</li> </ul> <p>b)</p> <ul style="list-style-type: none"> <li>• The system gives vital information on the plant's relation to other species according to the different categories (1)</li> <li>• It can also give information on the characteristics, habit or appearance of the plant (1)</li> <li>• Bi-nomial names are controlled by international rules (1) <b>or</b> the scientific name/the botanical nomenclature is regulated by The International Code of Botanical Nomenclature (1)</li> </ul>	1 mark each up to a maximum of 2 marks. Accept any other relevant answer provided. Plants must be correctly named.  1 mark for each answer up to a maximum of 4 marks.	<b>6</b>

	<ul style="list-style-type: none"> <li>The purpose of a formal name is to have a single name that is accepted and used worldwide for a particular plant or plant group (1)</li> </ul>		
3	Explain how <b>two</b> environmental factors can affect a plant growing on an exposed site. (4 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<ul style="list-style-type: none"> <li>Wind can cause physical damage/wind rock (1) resulting in the loss of anchorage and water uptake ability (1) <b>or</b> increased water loss/transpiration (1)</li> <li>Frost can affect hardiness of plants (1) which could result in damage to cells (1)</li> <li>Heat/sun can damage leaves (1) which would have an impact on photosynthesis and increase water loss (1).</li> <li>Unfavourable soil conditions can cause soil to dry out (1) reducing water and nutrient availability (1)</li> </ul>	1 mark for each answer up to a maximum of 4 marks. Accept any other relevant answer provided.	4
4	Summarise the immediate aftercare for a newly planted tree until established. (4 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<ul style="list-style-type: none"> <li>Application of foliar fertilisers to ensure healthy development whilst the roots are developing (1)</li> <li>On-going irrigation/watering to soak the newly developing root zone and avoid drying out of the soil (1)</li> <li>Application of pesticides to reduce impact of pest on newly forming roots and leaves (1)</li> <li>Application of Mulch to retain water and suppress weed growth (1)</li> <li>Installation of tree guard and checking of tree ties to ensure the continual protection of the tree against damage by dogs, rabbits, deer, mowers (1)</li> <li>Tree stakes to support the tree until its anchor roots grow (1)</li> <li>Erect windbreaks that could reduce the effects of the wind on exposed sites (1)</li> </ul>	1 mark for each answer up to a maximum of 4 marks. Accept any other relevant answer provided.	
5	<p>Below is a list of common faults found in land based machinery:</p> <ol style="list-style-type: none"> <li>Blunt blades.</li> <li>Blocked air filter.</li> <li>Incorrect fuel mix.</li> <li>Incorrectly gapped spark plug.</li> </ol> <p>5a) Identify one sign of <b>each</b> fault. (4 marks)  5b) Suggest an appropriate remedial action for <b>each</b> fault. (4 marks)  5c) Describe <b>two</b> general maintenance operations for a lawn mower that could be undertaken to ensure smooth running. (2 marks)</p>		

	Acceptable answer(s)	Guidance	Max mks
	<p>a)</p> <ul style="list-style-type: none"> <li>Blunt blades: poor turf cut (1), ripped grass blades (1), grass susceptible to fungal attack (1)</li> <li>Blocked air filter: Black smoke from exhaust (1), engine cuts out (1)</li> <li>Incorrect fuel mix: Misfiring (1), engine loses power (1), engine idles poorly (1)</li> <li>Incorrectly gapped spark plug: Engine not starting (1), inconsistent ignition and irregular idle (1), loss of power (1), high fuel consumption (1)</li> </ul> <p>b)</p> <ul style="list-style-type: none"> <li>Blunt blades: remove from machine and sharpen blades with metal file (1)</li> <li>Blocked air filter: Check and clean filter or replace if necessary (1)</li> <li>Incorrect fuel mix: drain system and replace with correctly mixed fuel (1)</li> <li>Incorrectly gapped spark plug: select appropriate gap tool and adjust where necessary (1)</li> </ul> <p>c)</p> <ul style="list-style-type: none"> <li>Check levels of oil and fuel (1)</li> <li>Keep spark plugs and filters clean and check regularly (1)</li> <li>Have blades sharpened regularly or replaced (1)</li> <li>Clean blades and remove buildup of debris on moving parts of the machine (1)</li> </ul>	<p>1 mark for each sign identified for each fault up to a maximum of 4 marks. Accept any other relevant answer provided.</p> <p>1 mark for each appropriate remedial action up to a maximum of 4 marks. Accept any other relevant answer provided.</p> <p>1 mark for each general maintenance operation up to a maximum of 2 marks. Accept any other relevant answer provided.</p>	10
6	<p>a) Describe the difference between the life cycle of ephemeral and annual weeds. (1 mark)</p> <p>b) Give an example of each type of weed using binomial system. (2 marks)</p> <p>c) Describe <b>two</b> different methods used to control the development of ephemeral weeds from newly cultivated soil. (2 marks)</p>		
	Acceptable answer(s)	Guidance	Max mks
	<p>a) Ephemeral weeds complete more than one life cycle per year while annual weeds complete only one life cycle per year (1)</p> <p>b)</p> <p>Ephemeral weeds:</p> <ul style="list-style-type: none"> <li><i>Cardamine hirsute</i> (1)</li> <li><i>Senecio vulgaris</i> (1)</li> </ul> <p>Annual weeds:</p> <ul style="list-style-type: none"> <li><i>Poa annua</i> (1)</li> <li><i>Chenopodium album</i> (1)</li> </ul>	<p>Accept any other relevant answer provided.</p> <p>1 mark for each weed up to a maximum of 2 marks. Do not accept <b>two</b> examples of ephemeral or annual weed only.</p>	5

	<p>c)</p> <ul style="list-style-type: none"> <li>Controlled by mechanical removal by hoeing or digging out the weed repeatedly (1)</li> <li>Stale seedbed technique/delayed sowing to allow flush of weed seed germination, which is then sprayed or hoed off (1)</li> <li>Chemical control with contact herbicide to kill off weed (1)</li> <li>Mulching to cut out the light and to prevent seed germination (1)</li> </ul>		
7	<p>a) Name two fungal plant diseases. (2 marks)</p> <p>b) State a potential host plant genus for <b>each</b> disease. (2 marks)</p>		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<p>a)</p> <ul style="list-style-type: none"> <li>Powdery mildew (1)</li> <li>Botrytis (1)</li> <li>Red thread (1)</li> </ul> <p>b)</p> <ul style="list-style-type: none"> <li>Botrytis on Geranium plants (1)</li> <li>Powdery mildew on Phlox seedlings (1)</li> <li>Red thread on rye grass and fescues (1)</li> </ul>	<p>1 mark for each plant disease up to a maximum of 2 marks. Accept any other relevant answer provided.</p> <p>1 mark for each host up to a maximum of 2 marks.</p> <p><b>Note:</b> Common names are acceptable for the plant and disease.</p>	4
8	Explain how cultural control methods could minimise plant disorders. (3 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<ul style="list-style-type: none"> <li>Increased ventilation can reduce temperature and prevent heat related disorders (such as wilting) (1)</li> <li>Light control can help increase photosynthesis and all year round growth of turf (1)</li> <li>Increased drainage can prevent water logging (1)</li> <li>Control of irrigation to plants can reduce stress (1)</li> <li>Adjustment of pH can prevent nutrient disorders (1)</li> </ul>	1 mark for each answer up to a maximum of 3 marks. Accept any other relevant answer provided.	3
9	State <b>two</b> features required of a pesticide store. (2 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>

	<ul style="list-style-type: none"> <li>• Locked and secure (1)</li> <li>• Labelled correctly (1)</li> <li>• Well ventilated (1)</li> <li>• Off the ground (1)</li> </ul>	1 mark for each feature up to a maximum of 2 marks. Accept any other relevant answer provided.	2
10	Describe how physical controls can be used to control each of the following: a) Fusarium patch. b) Fibre blight. c) Carrot fly. d) Slugs. (4 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	a) Fusarium patch can be controlled by removing morning dew with a switch (1) b) Fire blight can be controlled by pruning of affected branches well below any sign of infection (1) <b>or</b> removal and burning of infected trees to stop spread of disease (1) c) Carrot fly can be controlled by a barrier as it is low-flying (1) <b>or</b> insect-proof netting (1) d) Slugs can be controlled by installing copper bands (1) <b>or</b> slug traps that kill the slug (1)	1 mark for each control up to a maximum of 4 marks. Accept any other relevant answer provided.	4
11	Explain a type of herbicide that would be <b>most</b> effective in controlling perennial weeds. (2 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<ul style="list-style-type: none"> <li>• translocated herbicides (1) which are used to kill plants with well-developed perennial root systems underground (1)</li> <li>• systemic herbicide (1) which is taken in through the leaves to affect the entire plant (1)</li> </ul>	1 mark for each answer up to a maximum of 2 marks. Sports Turf candidates may refer to total and selective herbicides instead of systemic and translocated herbicides.	2
12	Discuss ways of minimising possible environmental impacts of using land-based machinery when establishing and maintaining green spaces in a park in a residential area. (12 marks)		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>Max mks</b>
	<b>Indicative content</b> <ul style="list-style-type: none"> <li>• Legislation - Control of Substances Hazardous to Health Regulations 2002 (COSHH), Environmental Protection Act 1990, Wildlife and Countryside Act 1981, Control of Noise at Work Regulations 2005.</li> <li>• Oil/fuel/other chemical spillage and storage</li> <li>• Emissions</li> </ul>		12

- Soil stability and erosion
- Protected species
- Waste disposal
- Watercourses and drainage systems
- Noise pollution
- Initial ecological survey
- Size and weight of machinery
- Power source
- Suitable machines for the scale of the site

**Band 1: 1-4 marks**

A basic understanding of the topic with limited discussion of the environmental impacts of using land based machinery in a green space in a residential area. Answer is mainly descriptive. Few or no specialist terms are used. There is some evidence of interrelationship between different factors. To access the higher marks in the band discussion is supported with limited examples.

**Band 2: 5-8 marks**

A good understanding of the topic with a developed discussion of the environmental impacts of using land based machinery in a green space in a residential area but it may be lacking in some detail. There will be some use of specialist terms, although they may not always be used correctly. To access the higher marks in the band, discussion indicates a breadth of understanding of the links between minimising environmental impacts on both wildlife and residents.

**Band 3: 9-12 marks**

A thorough understanding of the topic with a fully developed discussion of the environmental impacts of using land based machinery in a green space in a residential area. Specialist terms are used correctly and appropriately. Answer is logical and well-structured. To access the higher marks in the band, discussion indicates a breadth and depth of understanding of the links between minimising environmental impacts on both wildlife and residents.