



**Qualification title:** Level 3 Advanced Technical Certificate in Forestry and Arboriculture

Level 3 Advanced Technical Extended Diploma in Forestry and Arboriculture (1080)

**Exam:** 0174-012/512 Level 3 Horticulture – Theory Exam

**Version:** April 2017

**Exam date:** 26 April 2017

**Exam time:** 13:30

**Base mark:** 60

Question no.	Answer	Mark allocation
1.	<p><b>1 mark for each piece of legislation named; maximum 2 marks</b></p> <p>Any TWO from:</p> <ul style="list-style-type: none"><li>• Provision and Use of Work Equipment Regulations 1998 (PUWER)</li><li>• Health and Safety at Work Act 1974</li><li>• Management of Health and Safety at Work Regulations 1999</li><li>• Control of Substances Hazardous to Health Regulations 2002 (COSHH)</li><li>• Manual Handling Operations Regulations 1992</li><li>• Personal Protective Equipment (PPE) at Work Regulations 1992</li><li>• Environmental Protection Act 1990</li><li>• Wildlife and Countryside Act 1981</li><li>• Control of Noise at Work Regulations 2005</li><li>• Control of Vibration at Work Regulations 2005</li><li>• Lifting Operations and Lifting Equipment Regulations 1998</li></ul>	<b>2</b>

	Allow marks if year missed.	
2.	<p><b>1 mark for each explanation; maximum 2 marks</b></p> <ul style="list-style-type: none"> <li>• Correct procedures with oil and fuel</li> <li>• Correct oil and fuel storage</li> <li>• Using equipment that controls emissions</li> <li>• Avoiding areas of soil that are unstable or prone to erosion</li> <li>• Avoiding damage or disturbance to protected species</li> <li>• Disposing of waste in an appropriate manner</li> <li>• Avoid pollution of watercourses with fuels or other substances</li> </ul> <p>Any other relevant answer.</p>	2
3.	<p><b>1 mark for any of the following bullet points explained; maximum 3 marks</b></p> <p>Process:</p> <ul style="list-style-type: none"> <li>• Light levels</li> <li>• Temperature</li> <li>• Time of day/night</li> <li>• Season</li> <li>• Moisture availability</li> <li>• Pollution</li> <li>• Disease and pests</li> <li>• Leaf damage</li> </ul>	3
4.	<p><b>1 mark for each point made from the list below; maximum 3 marks</b></p> <p>Features:</p> <ul style="list-style-type: none"> <li>• Open pore structure (non-compacted, good drainage, well aerated)</li> <li>• Good levels of organic matter</li> <li>• Availability of macronutrients and micronutrients</li> <li>• Good numbers of invertebrate organisms</li> <li>• Appropriate pH and levels of organic matter</li> </ul> <p>Any other relevant answer.</p>	6

	<p><b>1 mark for each point made from the list below; maximum 3 marks</b></p> <p>Impact to physiological process:</p> <ul style="list-style-type: none"> <li>• Good gaseous exchange provides resources for photosynthesis</li> <li>• Availability of water through good infiltration provides resources for photosynthesis</li> <li>• Availability of essential nutrients (minerals) provides resources for photosynthesis and physiological processes</li> <li>• Root penetration for plant stability and to gain access to resources</li> </ul> <p>Any other relevant answer.</p>	
5.	<p><b>1 mark for each method described from the list below; maximum 3 marks</b></p> <ul style="list-style-type: none"> <li>• Amelioration</li> <li>• De-compaction to break up the soil structure</li> <li>• Cultivation</li> <li>• Soil protection and prevention of damage</li> <li>• Vertical mulching by creating trenches with an air spade which are then filled with organic matter</li> <li>• Surface mulching with organic matter (no deeper than 100mm)</li> <li>• Radial trenching by creating trenches with an air spade which are then filled with organic matter</li> <li>• Application of mycorrhizae</li> </ul> <p>Any other relevant answer.</p>	3
6.	<p><b>1 mark for each reason given from the list below; maximum 2 marks</b></p> <ul style="list-style-type: none"> <li>• Optimising performance by matching bar/chain length with the power of the saw</li> <li>• Minimising wear and tear on the saw and the operator</li> <li>• Safety. Keeping the chain speed within recommended limits</li> <li>• P U W E R requirement</li> </ul> <p>Any other relevant answer.</p>	2

7.	<p><b>1 mark for each point made from the list below; maximum 2 marks</b></p> <ul style="list-style-type: none"> <li>• Put felling cuts higher on the stem - to find more sound wood for the hinge</li> <li>• Don't remove buttresses - to increase the amount of solid wood at the edges of the hinge</li> <li>• Use an assisted felling technique - to gain extra control</li> <li>• Leave a larger hinge - to maintain more control</li> </ul>	<b>2</b>										
8.	<p><b>1 mark for each impact explained per Abiotic factor below (max of 2); maximum 8 marks.</b></p> <table border="1"> <thead> <tr> <th>Abiotic factor/human influences</th> <th>Impact on tree health</th> </tr> </thead> <tbody> <tr> <td>Road salt</td> <td> <ul style="list-style-type: none"> <li>• Limitation on root function which leads to a lack of water and nutrient uptake</li> <li>• Foliar damage</li> <li>• Lack of resources for photosynthesis</li> <li>• Any other relevant answer</li> </ul> </td> </tr> <tr> <td>Lightning</td> <td> <ul style="list-style-type: none"> <li>• Structural damage to the vascular system.</li> <li>• Exposure to pest and diseases</li> <li>• Desiccation</li> <li>• Any other relevant answer</li> </ul> </td> </tr> <tr> <td>Mechanical damage</td> <td> <ul style="list-style-type: none"> <li>• Structural damage to the vascular system.</li> <li>• Exposure to pest and diseases</li> <li>• Desiccation</li> <li>• Any other relevant answer</li> </ul> </td> </tr> <tr> <td>Frost</td> <td> <ul style="list-style-type: none"> <li>• Leaf damage leading to a lack of available energy for growth</li> <li>• Structural issues/damage</li> <li>• Damage to flower parts</li> <li>• Any other relevant answer</li> </ul> </td> </tr> </tbody> </table>	Abiotic factor/human influences	Impact on tree health	Road salt	<ul style="list-style-type: none"> <li>• Limitation on root function which leads to a lack of water and nutrient uptake</li> <li>• Foliar damage</li> <li>• Lack of resources for photosynthesis</li> <li>• Any other relevant answer</li> </ul>	Lightning	<ul style="list-style-type: none"> <li>• Structural damage to the vascular system.</li> <li>• Exposure to pest and diseases</li> <li>• Desiccation</li> <li>• Any other relevant answer</li> </ul>	Mechanical damage	<ul style="list-style-type: none"> <li>• Structural damage to the vascular system.</li> <li>• Exposure to pest and diseases</li> <li>• Desiccation</li> <li>• Any other relevant answer</li> </ul>	Frost	<ul style="list-style-type: none"> <li>• Leaf damage leading to a lack of available energy for growth</li> <li>• Structural issues/damage</li> <li>• Damage to flower parts</li> <li>• Any other relevant answer</li> </ul>	<b>8</b>
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9.	<p><b>1 mark for each</b></p> <ul style="list-style-type: none"> <li>• an invertebrate pest</li> </ul>	<b>3</b>										

	<ul style="list-style-type: none"> <li>• a tree decay fungus</li> <li>• a bacteria</li> </ul>	
10.	<p><b>1 mark for type of environmental impact stated made; maximum 3 marks</b></p> <ul style="list-style-type: none"> <li>• noise</li> <li>• dust</li> <li>• exhaust gas pollution</li> <li>• possible fuel and oil pollution</li> <li>• physical damage</li> <li>• habitat damage</li> <li>• damage to ground and soil</li> </ul> <p>Any other relevant answer.</p>	3
11.	<p><b>1 mark for each method and example from the list below: maximum 4 marks</b></p> <ul style="list-style-type: none"> <li>• Cultural (eg Good housekeeping in the nursery / glasshouse)</li> <li>• Chemical (eg Use of insecticides / fungicides in the production chain)</li> <li>• Biological (eg Use of nematodes in the production process)</li> <li>• Targeted intervention: timely and appropriate control measures within the life cycle of biotic pathogens. (eg destruction of OPM egg masses / pheromone traps for OPM males)</li> </ul>	4
12.	<p><b>Irrigation (1 mark for any of the following)</b></p> <ul style="list-style-type: none"> <li>• Availability of resources (water / nutrients)</li> </ul> <p><b>Feeding (1 mark for any of the following)</b></p> <ul style="list-style-type: none"> <li>• Availability of resources (water / nutrients)</li> </ul> <p><b>Tree shelters (1 mark for any of the following)</b></p> <ul style="list-style-type: none"> <li>• Protection to allow tree to establish</li> <li>• Prevent browsing mammals</li> </ul> <p>Any other relevant answers.</p>	3
13.	<b>Band 1 (1-4 marks)</b>	<b>12</b>

	<p>Basic discussion with a limited range and depth of considerations of sanitation felling for disease control in a woodland, but few links made to the scenario. Discussion is not well developed or balanced. Limited justification of their choice of actions. There will be few or no specialist terms.</p> <p><b>Band 2 (5-8 marks)</b> Adequate discussion of good range and depth of considerations of sanitation felling for disease control in a woodland with good links to the scenario. Good justification of their choice of actions. There will be some use of specialist terms, although they may not always be used appropriately.</p> <p><b>Band 3 (9-12 marks)</b> Comprehensive discussion with extensive range of considerations of sanitation felling for disease control in a woodland. Clear links to the scenario have been made. Detailed justification of their choice of actions. Specialist terms will be used correctly and appropriately.</p> <p>Indicative content:</p> <ul style="list-style-type: none"> <li>• Legislation (eg HASAWA, CROW, PUWER etc)</li> <li>• Environmental (eg Damage to flora and fauna. Damage to habitats. Pollution of watercourses.)</li> <li>• Practical (eg Method statements and risk assessments for felling and waste. Equipment and labour required.)</li> <li>• Economic (eg cost of labour and equipment)</li> </ul>	
14.	<p><b>1 mark for each of the following; maximum 3 marks</b></p> <ul style="list-style-type: none"> <li>• Roots</li> <li>• Shoots</li> <li>• Cambium</li> </ul>	3
15.	<p><b>1 mark for each reason explained from the list below; maximum 2 marks</b></p> <ul style="list-style-type: none"> <li>• Faulty spark plug (damaged, gap too big or small): no ignition in the engine</li> <li>• HT lead faulty: no ignition in the engine</li> </ul>	2

	<ul style="list-style-type: none"> <li>• Faulty carburettor: no or incorrect fuel mix passed into the engine</li> <li>• No fuel: no fuel in the engine</li> <li>• Fuel filter blocked: no fuel in the engine</li> <li>• Fuel pipe damaged: no fuel in the engine</li> <li>• Incorrect fuel mix: combustion will not occur</li> <li>• Starter recoil faulty: no drive to the ignition system</li> </ul> <p>Any other relevant answer.</p>	
<b>16.</b>	<p><b>1 mark for each impact described for a stated pathogen; maximum of 2 marks</b></p> <ul style="list-style-type: none"> <li>• Fungi: Foliar/structural/root damage</li> <li>• Bacteria: vascular dysfunction/canker</li> <li>• Vertebrate: Browsing/ fraying/stripping</li> <li>• Invertebrate: Foliar/transfer disease/boring</li> </ul> <p>Any other relevant answers.</p>	<b>2</b>