# 0174-012/512 Level 3 Advanced Technical Extended Diploma in Forestry and Arboriculture (1080)

Level 3 Forestry and Arboriculture – Theory Exam (1) – March 2018

| Q | Acceptable answer(s) | Guidance | Max mks | Ref |
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| **1** | a)<br>A - Stigma (1 mark)<br>B – Anther (1 mark)<br>C – Ovary (1 mark)<br><br>b)<br>A - Large flat structures which are often sticky or hairy to help trap and rehydrate pollen that arrives from other plants. (1 mark)<br><br>B - Stand taller than other parts of the flower to increase the chances of pollen being blown or carried away to other flowers. (1 mark)<br><br>C - Sits in the middle of the flower to protect the seeds when they are developing. (1 mark)<br>**Or**<br>May become a tasty fruit the animal will want to eat and thus spread the seed. (1 mark) | 1 mark for each part named up to a maximum of 3 marks<br><br>1 mark for each explanation up to a maximum of 3 marks | **6** | **307.1.1**<br>**AO1 (a)**<br>**AO2 (b)** |
| **2** | • It is "light independent" which means it happens without the need for light. (1 mark)<br>• The process uses ADP and ATP to provide energy to fix CO2 into carbohydrates. (1 mark)<br>• The process uses NADPH which provides electrons for the process. (1 mark)<br>• Glucose is produced and reduced NADP is oxidised. (1 mark)<br>• Occurs in the stroma of the leaf. (1 mark)<br>• Also known as the Calvin Benson cycle. | 1 mark for any of the explanations listed up to a maximum of 3 marks<br><br>Accept any other suitable answer provided | **3** | **307.1.2**<br>**AO2** |
| **3** | a)<br>• very small particles (1)<br>• slow to drain (1)<br>• good water holding capacity (1)<br>• good nutrient availability (1)<br>• can become compacted (1) or waterlogged (1).<br><br>b) | 1 mark for each characteristic up to a maximum of 3 marks<br><br>Accept any other suitable answer provided. | **6** | **307.3.1 & 307.3.3**<br>**AO1 (a)**<br>**AO2 (b)** |

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| | • Heavy texture is difficult for roots and shoots to grow in which can limit plant growth. (1 mark)<br>• Warms up slowly which often means slower onset of plant growth. (1 mark)<br>• Cools down slowly and sustains growth for longer. (1 mark)<br>• Poor draining but holds moisture to support growth during drought period. (1 mark)<br>• Excellent nutrient holding capacity which is vital for plant growth. (1 mark)<br>• Susceptible to water logging which can lead to anaerobic conditions for roots. (1 mark)<br>• Small particles are susceptible to compaction which can lead to poor drainage and aeration. (1 mark)<br>• Resistant to erosion by water and wind meaning less top soil is lost during inclement weather. (1 mark) | 1 mark for each explanation up to a maximum of 3 marks | | |
| **4** | 1. Assess which way it wants to roll so that you know which side of the hinge to remove. (1 mark)<br>2. Remove any obstructions (such as dog tooth / holding wood / exposed rear of hinge) to give you access to the hinge. (1 mark)<br>3. Letterbox cut if the stem is big enough to reduce the chances of trapping the saw when removing the hinge. (1 mark)<br>**OR**<br>To remove the hinge on the opposite side to the direction of roll. (1 mark)<br>4. Use a lever to roll the tree to give yourself more purchase and leverage. (1 mark)<br>5. If the tree will not roll, remove the entire hinge and use a pole to "walk" it back because sliding the tree backwards is the only option. (1 mark)<br>6. If the tree will not fall use a winch or other mechanical assistance because more power is sometimes needed to remove a tree if manual means are not sufficient. (1 mark) | 1 mark for each explanation up to a maximum of 6 marks | **6** | **350.1.2 AO2** |
| **5** | **Effects of poor sharpening could include the following:**<br>1. Inaccurate cutting<br>2. Not cutting straight<br>3. Inefficient cutting due to depth producing dust<br>4. Increased vibration/ kickback/white finger<br>5. Increased wear and tear on the saw<br>6. Increased chance of chain breaking<br>7. Increased fatigue for the operator | 1 mark for each answer up to a maximum of 2 marks.<br><br>Candidates will only achieve a mark for each effect provided<br><br>Accept any other suitable answer provided | **2** | **350.2.2 AO2** |

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| | For example:<br>Low depth gauges will result in: 4, 5, 6, 7.<br>High depth gauges will result in: 3, 5, 6, 7. | Additional comments:<br>Examples of poor sharpening could include the following:<br>• inconsistent length of cutters<br>• inconsistent height of depth gauges<br>• inaccurate sharpening angles | | |
| **6** | • Burning (1)<br>• Chipping (1)<br>• Habitat piles (1)<br>• Wind rows (1)<br>• Coppice cover (1)<br>• Dead hedging (1)<br>• Leave it spread out to decompose (1) | 1 mark for each method up to a maximum of 3 marks<br><br>Accept any other suitable answer provided | **3** | **350.3.3**<br>**AO1** |
| **7** | They are used to:<br>• grip wood (1 mark)<br>• prevent hands from getting trapped or hurt (1 mark)<br>• aid manual handling (1 mark)<br>• keep gloves clean (1 mark) | 1 mark for each advantage up to a maximum of 2 marks | **2** | **350.1.3**<br>**AO1** |
| **8** | a)<br>• Limited extension growth (1)<br>• Small leaf size (1)<br>• Thin crown or low leaf density (1)<br>• Poor leaf colour (1)<br>• Epicormic growth (1)<br>• Retrenchment (1)<br><br>b)<br>• Age – older trees are more susceptible to ill health because they hold more static mass (1 mark)<br>• Species – certain species are more susceptible to ill health because they have lower levels of antibacterial/antifungal chemicals. (1 mark)<br>• Environmental – coastal exposure due to wind/drought/road salt/water logging (1 mark)<br>• Stress – systemic pressure felt by the tree due to environmental, physical or mechanical factors (1 mark)<br>• Mechanical injury – creates entry points for pathogens. (1 mark)<br>• Primary infection – some pathogens are actively invasive and will weaken the trees defence mechanisms. (1 mark) | 1 mark for each sign provided, up to a maximum of 3 marks<br><br>Accept any other suitable answer provided<br><br>1 mark for each explanation up to a maximum of 3 marks | **6** | **352.1.1**<br>**AO1 (a)**<br>**AO2 (b)** |

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| **9** | a) A very fine drill that penetrates the wood (1 mark). The pressure required to push the drill through the wood is measured by the device (1 mark).<br><br>b)<br>**Benefits:**<br>• Detailed information about internal condition of wood. (1 mark)<br>• Portable. (1 mark)<br>• Can be used in the canopy. (1 mark)<br>• Can be up loaded into PC for inclusion in a report. Meaning the information is easy to access, move and use. (1 mark)<br>• Accurate and reliable. This equipment is now well recognised within the industry. (1 mark)<br><br>**Limitations:**<br>• Does not pick up on rot types which make the wood hard and brittle. (1 mark)<br>• Can be deflected by shakes or ring cracks. (1 mark)<br>• Invasive. It leaves a small hole in the tree. (1 mark)<br>• Takes experienced operator to interpret readings. (1 mark)<br>• Expensive which may be prohibitive depending on the client's budget. (1 mark)<br>• May need recalibration and servicing to ensure accuracy. (1 mark) | 1 mark for each function to a maximum of 2 marks<br><br>1 mark for each benefit up to a maximum of 2 marks<br><br>Accept any other suitable answer provided<br><br>1 mark for each limitation up to a maximum of 2 marks<br><br>Accept any other suitable answer provided | **6** | **352.4.1**<br>**AO1 (a)**<br>**AO2 (b)** |
| **10** | • Health and Safety at Work Act 1974 (1 mark)<br>• Personal Protective Equipment (PPE) (1 mark)<br>• Food and Environment Protection Act 1990 (as amended) (1 mark)<br>• Control of Substances Hazardous to Health (2002) (COSHH) (1 mark)<br>• Wildlife and Countryside Act 1981 (as amended) (1 mark)<br>• Pests Act 1954 (as amended) (1 mark)<br>• Plant Health Act 1967 (as amended) (1 mark) | 1 mark for each answer up to a maximum of 2 marks | **2** | **352.4.4**<br>**AO1** |
| **11** | a) Dutch elm disease / *Ophiostoma novo-ulmi* (1 mark). It affects the vascular system of the tree (1 mark) and limits water and nutrient uptake (1 mark).<br><br>b) It spreads when the elm bark beetle / *Scolitus scolitus* burrows to lay its eggs (1 mark) because it has the fungus on its mouth parts (1 mark). | 1 mark for each description up to a maximum of 3 marks<br><br>1 mark for each explanation up to a maximum of 3 marks | **6** | **352.1.3**<br>**AO2** |

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| | Control measures can be environmental or chemical (1 mark). | | | |
| **12** | **Indicative content:**<br>**PiCUS interpretation**<br>• t:r ratio<br>• Colours of the image and what they represent<br>• Density of wood<br>• Image is one-dimensional<br>**Biological and structural implications**<br>• Beech forms ripewood and can be susceptible to central rot.<br>• t:r ratio<br>• Water and nutrient uptake capacity<br>• Height of tree<br>• Size of canopy<br><br>**Management methods**<br>• Decision depends partly on targets / size of crown / value of tree for other reasons<br>• Felling methods (could include higher cuts, assisted fell, dismantle with a MEWP)<br>• Habitat value<br>• Considerations of target value/frequency of use<br><br>**Other considerations**<br>• Legislation<br>• Environmental considerations (pollution, damage to flora and fauna etc)<br>• Practical factors (such as certification, PPE, equipment)<br><br>**Band 1: 1-4 marks**<br>Basic discussion with limited range and depth with regards to implications for the tree or the factors to be considered when managing the situation. Few or no links made between factors to be considered. To access the higher marks in the band, appropriate use of some technical terms.<br><br>**Band 2: 5-8 marks**<br>Good discussion with adequate range and depth with regards to implications for the tree or the factors to be considered when managing the situation. Some good links made between factors to be considered. To access the higher marks in the band, appropriate use of a range of technical terms.<br><br>**Band 3: 9-12 marks** | | **12** | **307 & 352**<br>**AO4** |

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| | Detailed discussion with extensive range and depth with regards to implications for the tree or the factors to be considered when managing the situation. Consistent links made between factors to be considered. To access the higher marks in the band, appropriate and accurate use of a wide range of technical terms. | | | |