

0174-014/514 Level 3 Advanced Technical Extended Diploma in Forestry and Arboriculture (1080)

Level 3 Forestry and Arboriculture – Theory Exam (2) – March 2018

Q	Acceptable answer(s)	Guidance	Max mks	Ref
1	<ul style="list-style-type: none"> Horse Chestnut (1 mark) <i>Aesculus hippocastanum</i> (1 mark) 	1 mark for the correct common name and 1 mark for the correct botanical name.	2	351.1.1 AO1
2	<ul style="list-style-type: none"> Leaves: are compound (1 mark), have serrated edges (1 mark), arranged in pairs with an odd one at the end (1 mark). Buds: are black in colour (1 mark), alternate down the stem (1 mark), are arranged in pairs (1 mark). Twigs: flatten just before the buds (1 mark). Bark: is grey in colour (1 mark), is fissured when mature (1 mark), is smooth and a green-grey colour when young (1 mark). Flowers: are in small clusters (1 mark), are a purple colour (1 mark). Seeds/fruit: are long and narrow (1 mark). Form: is domed shaped (1 mark), is tall-reaching (1 mark). 	1 mark for each feature described up to a maximum of 2 marks	2	351.1.3 AO1
3	<ul style="list-style-type: none"> Standard (1 mark) Heavy standard (1 mark) Semi-mature (1 mark) 	1 mark for each type of nursery stock identified up to a maximum of 2 marks	2	351.2.1 AO1
4	<ul style="list-style-type: none"> Advantages: <ul style="list-style-type: none"> The trees are small in size and are therefore easier to carry a number of them to be planted. (1 mark) They are less expensive to buy because they are small in size and spend less time in the nursery before being purchased. (1 mark) They are less expensive to transport because of the high quantity being transported therefore the unit cost is lower. (1 mark) 	1 mark for each advantage up to a maximum of 2 marks Accept any other suitable answer provided	4	351.3.1 AO2

	<ul style="list-style-type: none"> ● Disadvantages: <ul style="list-style-type: none"> ○ They have a higher mortality rate than plugs because they are lifted at the roots at the nursery which can cause damage. (1 mark) ○ The plant stock can be easily damaged if incorrectly handled (1 mark) ○ The roots prone to desiccation if they are incorrectly stored with the roots exposed/in direct sunlight. (1 mark) ○ The stock has a low root to shoot ratio which can affect its initial growth rate and survival. (1 mark) 	<p>1 mark for each disadvantage up to a maximum of 2 marks</p> <p>Accept any other suitable answer provided</p>		
5	<p>a)</p> <ul style="list-style-type: none"> ● The history of the site such as a former building site as it could have chemicals within the soil. (1 mark) ● Soil compaction because if the soil is not aerated the roots will not be able to grow very easily. (1 mark) ● Input an irrigation system to provide water to the trees for establishment. (1 mark) <p>b)</p> <ul style="list-style-type: none"> ● Planting requirements <ul style="list-style-type: none"> ○ Drainage needs of soil type ○ Soil amelioration ○ The size, depth and shape of the pit ○ Mulching to suppress weeds ○ Removal of weeds prior to planting ● Support requirements <ul style="list-style-type: none"> ○ Exposure of site (wind) ○ Soil type and level of compaction ○ Presence of browsing animals / human vandals ○ Must be appropriate to size of tree ○ Appropriate for location (size / style) 	<p>1 mark for each pre-planting consideration up to a maximum of 2 marks</p> <p>1 mark for each requirement explained up to a maximum of 4 marks</p>	6	351.3.4 AO2
6	<ul style="list-style-type: none"> ● A management plan is required for inspection of the woodland on a repetitive basis to identify pests and diseases / cutting down trees. (1 mark) ● Health and safety management to the public is considered to ensure the habitat remains undisturbed. (1 mark) ● The promotion of natural regeneration to maintain the integrity of the site. (1 mark) ● Thinning of trees in the habitat is required to create space and increase light to the ground flora for tree growth. (1 mark) 	<p>1 mark for each explanation up to a maximum of 4 marks</p>	4	354.3.1 & 354.3.2 AO2

	<ul style="list-style-type: none"> • Clearance of trees in the habitat is required if they are causing obstruction to the public. (1 mark) • Clearance of invasive/unwanted species is required to maintain the integrity of the habitat. (1 mark) • Coppicing is required to maintain the longevity of the trees in the habitat. (1 mark) 			
7	<p>a)</p> <ul style="list-style-type: none"> • Wood anemone (1 mark) • Lords-and-ladies (1 mark) • Bluebell (1 mark) • Wood-sorrel (1 mark) <p>b)</p> <ul style="list-style-type: none"> • Ancient woodland (1 mark) • Ancient woodland (1 mark) • Coppice woodland (1 mark) • Ancient woodland (1 mark) 	<p>1 mark for each indicator species identified up to a maximum of 2 marks</p> <p>1 mark for each identified woodland with indicator species up to a maximum of 2 marks</p> <p>Accept any other suitable answer provided</p>	4	354.2.2 AO1
8	<p>Benefits may include:</p> <ul style="list-style-type: none"> • Minimal management is needed for the establishment because no intensive ground preparation is required. (1 mark) • Low labour costs initially because no planting is taking place. (1 mark) • Aesthetically natural because trees are laid in a grid pattern to maximise the use of the land. (1 mark) <p>Limitations may include:</p> <ul style="list-style-type: none"> • High labour costs when trees need respacing so as to utilise the ground effectively to avoid groupings of trees. (1 mark) • Low yields because minimal improved quality of the species is occurring. (1 mark) • Wind disseminated trees may be more widespread depending on spacing of parent seed trees. (1 mark) 	<p>1 mark for each benefit up to a maximum of 2 marks</p> <p>1 mark for each limitation up to a maximum of 2 marks</p>	4	354.3.1 AO2
9	<ul style="list-style-type: none"> • Limited availability to light leads to the tree not photosynthesising properly and being able to fight off pests. (1 mark) • Poor soil quality leads to reduced growth and ill health and stress on trees due to a lack of essential nutrients. (1 mark) 	<p>1 mark for each explanation up to a maximum of 4 marks</p> <p>Accept any other suitable answer provided</p>	4	355.1.5 AO2

	<ul style="list-style-type: none"> Limited water availability leads to stress on the tree and wilting leaves which would eventually fall off and cause die back. (1 mark) Competition for eg water, light, nutrients leads to higher mortality of seedlings/saplings and cause fungal growth. (1 mark) Wind exposure leads to desiccation of leaves and needles which leads to high evapotranspiration causing stress on the tree and susceptibility to fungal attack. (1 mark) Urban constraints leads to restricted root growth means it may not have access to sufficient nutrients making it more susceptible to stress and fungal attack. (1 mark) 			
10	<ul style="list-style-type: none"> Honey fungus (<i>Armillaria mellea</i>) - White rot (1 mark) Beefstake fungus (<i>Fistulina hepatica</i>) – Brown rot (1 mark) Giant polypore (<i>Meripilus giganteus</i>) – Soft, brown rot (1 mark) 	1 mark for each type of rot identified up to a maximum of 2 marks	2	355.2.1 AO1
11	<p>a) Non- invasive:</p> <ul style="list-style-type: none"> Visual Tree Assessment (VTA) (1 mark) Acoustic tomography (1 mark) Electrical resistance (1 mark) <p>Invasive:</p> <ul style="list-style-type: none"> Fractometer (1 mark) Resistograph (1 mark) Battery drill with small bit (1 mark) <p>b) <u>Invasive</u></p> <ul style="list-style-type: none"> Advantages <ul style="list-style-type: none"> A sample of wood can be taken and examined for physical strength or tested in a lab for the presence of disease. Lower cost than some non – invasive technologies so more accessible to clients with limited budgets. Gathering data is relatively straightforward so less need for highly trained operators. Disadvantages <ul style="list-style-type: none"> Opens a wound on the tree which can act as an entry point for infection. Invasive channel can help bacteria and fungi move through wood more quickly. 	<p>1 mark for 1 invasive method and 1 mark for 1 non-invasive method</p> <p>Accept any other recognised methods</p> <p>1 mark for 1 advantage and 1 mark for 1 disadvantage explained for invasive methods</p> <p>Accept any other reasonable advantage or disadvantage</p>	6	355.4.2 & 355.4.4 AO1(a) AO2(b)

	<ul style="list-style-type: none"> ▪ Data is often gathered only in one plane and one direction. Multiple wounds need to be made to get a better picture of the whole section to be inspected. <p><u>Non-Invasive</u></p> <ul style="list-style-type: none"> ○ Advantages <ul style="list-style-type: none"> ▪ No wounds on tree so less chance of infection. ▪ No channel for bacteria and fungi to move through. ▪ Give a better picture of the state of the whole section being inspected. ○ Disadvantages <ul style="list-style-type: none"> ▪ Costly equipment means clients can be put off if they have limited budgets. ▪ Not always accurate where certain decay types exist. Might not pick up on fungi that cause wood to harden as it dries (<i>K deusta</i>). ▪ Experienced operators required to gather and interpret data. 	<p>1 mark for 1 advantage and 1 mark for 1 disadvantage explained for non-invasive methods</p> <p>Accept any other reasonable advantage or disadvantage</p>		
<p>12</p>	<p>a)</p> <ul style="list-style-type: none"> • Storage and mobilisation of energy reserves • physical defences (e.g. thorns, bark, leaf adaptations) • chemical defences (e.g. resins, gums, tannins) • <i>Compartmentalisation</i> of Decay in Trees (CODIT) • wound wood and adaptive growth (e.g. wound occlusion) <p>b)</p> <ul style="list-style-type: none"> • Remove weight of branch with a series of cuts, compression first. This will help to avoid tearing the bark on the parts of the tree to be retained. • Avoid cutting through collar tissue. This will avoid damaging the stem tissues and limit the movement of decay in the tree. • Cuts should be made outside branch collar. This will avoid damaging the stem tissues and limit the movement of decay in the tree. • Cuts should be made as a mirror image of the branch bark ridge (if visible). The BBR is a visual guide to aid accurate target pruning which is a means of avoiding damage to the stem tissues. • Avoid leaving a branch stub. This can prohibit the reaction zone from initiating and provides 	<p>1 mark for each defence process up to a maximum of 3 marks</p> <p>1 mark for each explanation up to a maximum of 5 marks</p>	<p>8</p>	<p>355.3.1 & 355.3.2 AO1(a) AO2(b)</p>

	a food base for fungi which may colonise the wound.			
13	<p>Indicative content</p> <ul style="list-style-type: none"> • Data collection • Woodland structure • Requirement to identify trees by scientific names • Identification features • Stock types • Suitable machinery • Conditioners and ameliorants • Protection • Support • Aftercare • Environmental conditions • Decay • Detection methods • Management • Methods of assessment • Management of weak tree structures <p>Band 1: 1-4 marks Basic discussion with limited range and depth in relation to the survey and management of a woodland. 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>Band 2: 5-8 marks Adequate discussion with good range and depth in relation to the survey and management of a woodland. Good links made to the scenario. Discussion is well developed and balanced. 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>Band 3: 9-12 marks Comprehensive discussion with extensive range of considerations for the survey and management of a woodland. Clear links to the scenario have been made. Detailed justification for their choice of actions. Specialist terms were used correctly and appropriately.</p>		12	351 & 354 & 355 AO4