

**0173 Level 3 Technicals in Land and Wildlife Management**  
 0173-009/509 Level 3 Land and Wildlife - Theory Exam  
**March 2022 Mark Scheme**

Q no.	Acceptable answer(s)	Guidance	Max mks	Ref
Q1	<p><b>1 mark each for any of the following, to a maximum of 3 marks:</b></p> <ul style="list-style-type: none"> <li>• Sedimentary (1)</li> <li>• Igneous (1)</li> <li>• Metamorphic (1)</li> </ul>	Limestone / Granite / Quartz etc. will be accepted.	3	306 2.1 AO1
Q2	<p><b>1 mark each for any of the following, to a maximum of 3 marks:</b></p> <ul style="list-style-type: none"> <li>• Sunlight/light (1)</li> <li>• carbon dioxide (1)</li> <li>• water (1)</li> <li>• chlorophyll / chloroplast (1)</li> </ul> <p><b>Any other suitable answer</b></p>		3	306 3.1 AO1
Q3a & Q3b	<p>a) Sand (1) b) Clay (1)</p>		2	306 2.2 AO1
Q4	<p><b>1 mark each for any of the following, to a maximum of 2 marks:</b></p> <ul style="list-style-type: none"> <li>• Rain (1)</li> <li>• Sleet (1)</li> <li>• Snow (1)</li> <li>• Hail (1)</li> </ul>		2	306 1.2 AO1
Q5	<p><b>1 mark each for any of the following, to a maximum of 6 marks:</b></p> <p>A food chain is a model for just one producer/consumer at each trophic level (1)          so is showing one possible path that energy/nutrients could take as they move through the ecosystem (1) but energy/nutrients can move along more than one path (1) As producers are consumed by more than one consumer / primary consumers are consumed by more than one type of secondary consumer /organisms play more than one role in an ecosystem (1)</p> <p>A food web shows links between food chains / interconnected food chains (1) An ecosystem contains a community of organisms interacting as a system (1) So is</p>		6	306 3.2 AO2

	<p>more complex than can be shown by a food chain (1) The more complex food web/ food web with more interactions is more representative/ realistic (1)</p> <p>Any other suitable answer</p>			
<b>Q6</b>	<p><b>1 mark each for any of the following, to a maximum of 6 marks:</b></p> <p>Pressure of footfall on paths (1) Can expose the soil (1) Leading to increased erosion / gullyng (1) And/or damage/local extinction of plant species (1)</p> <p>Dropped litter/plastics can affect/kill wildlife (1) Disturbance to wildlife (/eg ground-nesting birds) (1) Can lead to a reduction in numbers of species (1)</p> <p>Change in plant/animal species/disturbance by walkers could affect the food chain (1)</p> <p><b>Any other suitable answer.</b></p>		<b>6</b>	<b>306 4.2 AO2</b>
<b>Q7</b>	<p><b>1 mark each for any of the following, to a maximum of 2 marks:</b></p> <ul style="list-style-type: none"> <li>• Water has a high specific heat capacity (1)</li> <li>• It requires a high degree of energy from the sun to raise temperature (1)</li> <li>• It can absorb a large amount of heat without experiencing a significant rise in temperature / it is a slow conductor of heat (1)</li> </ul> <p><b>Any other suitable answer</b></p>	<p><b>Also accept for bullet point 2:</b> It takes 4,200 J to raise the temperature of 1 kg of water by 1°C. (1)</p>	<b>2</b>	<b>306 1.2 AO2</b>
<b>Q8</b>	<p><b>1 mark each for any of the following, to a maximum of 4 marks:</b></p> <ul style="list-style-type: none"> <li>• Wet woodland (1)</li> <li>• Lowland communities (1)</li> <li>• Upland communities (1)</li> <li>• Scrub communities (1)</li> <li>• Beech woodland (1)</li> <li>• Yew woodland (1)</li> <li>• Oak-dominated / Oak-birch woodland (1)</li> <li>• Ash, Rowan woodland (1)</li> <li>• Ash, Field Maple woodland (1)</li> </ul> <p><b>Any other suitable answer i.e. correctly naming any of the 18 main woodland types or 7 scrub / under scrubs (listed in Guidance)</b></p>	<p><b>Accept answers such as:</b> <b>W12 Fagus sylvatica – Mercurialis perennis woodland / beech – dog’s mercury but not if just state W12 / W14 etc without description.</b> <b>Common names are acceptable.</b></p> <p><b>Full list of NVC woodland communities:</b></p> <ul style="list-style-type: none"> <li>• <b>W1 Salix cinerea– Galium palustre woodland</b></li> <li>• <b>W2 Salix cinerea– Betula pubescens–</b></li> </ul>	<b>4</b>	<b>307 1.2 AO1</b>

		<p><b>Phragmites australis woodland</b></p> <ul style="list-style-type: none"> <li>• <b>W3 Salix pentandra– Carex rostrata woodland</b></li> <li>• <b>W4 Betula pubescens– Molinia caerulea woodland</b></li> <li>• <b>W5 Alnus glutinosa– Carex paniculata woodland</b></li> <li>• <b>W6 Alnus glutinosa– Urtica dioica woodland</b></li> <li>• <b>W7 Alnus glutinosa– Fraxinus excelsior– Lysimachia nemorum woodland</b></li> <li>• <b>W8 Fraxinus excelsior– Acer campestre– Mercurialis perennis woodland</b></li> <li>• <b>W9 Fraxinus excelsior– Sorbus aucuparia– Mercurialis perennis woodland</b></li> <li>• <b>W10 Quercus robur– Pteridium aquilinum– Rubus fruticosus woodland</b></li> <li>• <b>W11 Quercus petraea– Betula pubescens– Oxalis acetosella woodland</b></li> </ul>		
--	--	--	--	--

		<ul style="list-style-type: none"> <li>• <b>W12 Fagus sylvatica– Mercurialis perennis woodland</b></li> <li>• <b>W13 Taxus baccata woodland</b></li> <li>• <b>W14 Fagus sylvatica– Rubus fruticosus woodland</b></li> <li>• <b>W15 Fagus sylvatica– Deschampsia flexuosa woodland</b></li> <li>• <b>W16 Quercus spp.–Betula spp.– Deschampsia flexuosa woodland</b></li> <li>• <b>W17 Quercus petraea– Betula pubescens– Dicranum majus woodland</b></li> <li>• <b>W18 Pinus sylvestris– Hylocomium splendens woodland</b></li> <li>• <b>W19 Juniperus communis ssp. communis– Oxalis acetosella woodland</b></li> <li>• <b>W20 Salix lapponum– Luzula sylvatica scrub</b></li> <li>• <b>W21 Crataegus monogyna– Hedera helix scrub</b></li> <li>• <b>W22 Prunus spinosa– Rubus</b></li> </ul>		
--	--	--	--	--

		<p>fruticosus scrub</p> <ul style="list-style-type: none"> <li>• W23 Ulex europaeus– Rubus fruticosus scrub</li> <li>• W24 Rubus fruticosus– Holcus lanatus underscrub</li> <li>• W25 Pteridium aquilinum– Rubus fruticosus underscrub</li> </ul>		
Q9	<p><b>1 mark each for any of the following, to a maximum of 2 marks:</b></p> <ul style="list-style-type: none"> <li>• Written report (1)</li> <li>• Graphs (1)</li> <li>• Pie chart (1)</li> <li>• Statistics / statistical tables (1)</li> <li>• Maps (1)</li> </ul> <p><b>Any other suitable answer</b></p>		2	307 2.1 AO1
Q10	<p><b>1 mark each for any of the following, to a maximum of 3 marks:</b></p> <ul style="list-style-type: none"> <li>• Ecotones in woodlands are the areas at woodland edges / ride edges / areas of vegetation transition (1)</li> <li>• Will create structural diversity (1) habitat for a greater range of species than single – structure woodland (1), Increase light levels to woodland rides / edges (1), which will allow light – demanding plant species to grow (1)</li> </ul> <p><b>Any other suitable answer</b></p>		3	307 4.1 AO2
Q11	<ul style="list-style-type: none"> <li>• Woodland name (1) referring to recent events / land use / to the wood being planted / eg 'The Plantation (1)</li> <li>• Boundary shape (1) regular / linear and aligning with neighbouring non-wooded land use / suggesting previous land use was same as neighbouring (1)</li> <li>• Out-grown hedges within the woodland (1) suggesting previous livestock grazing / farming use (1)</li> <li>• Lack of presence of indicator species(1) which only colonise very slowly/ are only present in areas with a very long history of woodland cover (1)</li> <li>• Lack of charcoal hearths / saw pits / woodbanks (1) which indicate long / historic use of the area as woodland (1)</li> </ul>	<p><b>Max 3 marks for feature and 3 marks for reason/explanation.</b></p> <p><b>Allow 'no ancient / veteran trees' with appropriate explanation – but not 'no mature' trees</b></p>	6	307 1.3 AO2

Q12	<p><b>1 mark each for any of the following, to a maximum of 3 marks:</b></p> <ul style="list-style-type: none"> <li>• Evolutionary age communities (1)</li> <li>• Primary productivity (1)</li> <li>• Community structure and competition (1)</li> <li>• Fecundity (1)</li> <li>• Natality (1)</li> <li>• Mortality (1)</li> <li>• Immigration (1)</li> <li>• Emigration (1)</li> <li>• Breeding strategy (1)</li> <li>• Competition for environmental resources (1)</li> <li>• Predation (1)</li> <li>• Disease (1)</li> </ul>		3	318 2.1 AO1
Q13	<p><b>1 mark each for any of the following, to a maximum of 4 marks:</b></p> <ul style="list-style-type: none"> <li>• Survey method must take into account survey objectives / whether individual species count or habitat level survey (1)</li> <li>• Incorrect method will may lead to incorrect /statistically unsound results (1)</li> <li>• Size of quadrat to be used needs to be suited to size of flora being surveyed / size of quadrat suitable for algae would not be suitable for surveying long grass (1)</li> <li>• some techniques completely unsuitable for certain flora (with example – eg quadrats unsuitable for large shrubs / trees) (1)</li> <li>• systematic sampling is suited to investigating patterns in vegetation cover / random sampling provides more opportunity for all areas having an equal chance of being surveyed (1)</li> <li>• Linear methods / transect would provide better averages for linear features / across ecotones than non-linear methods (1)</li> </ul> <p><b>Any other suitable answer</b></p>		4	318 3.1 AO2
Q14	<p><b>1 mark each for any of the following, to a maximum of 2 marks:</b></p> <ul style="list-style-type: none"> <li>• higher investment made by females than males in gametes / fewer eggs produced by females than sperm produced by males (1)</li> <li>• Careful selection of mate by females can improve likelihood of offspring survival (1) and</li> <li>• Linked to parental care investment higher in females/ it is more usual for females to provide all or most parental care (1)</li> </ul> <p>Or: In species where males are more involved in parental care there is little difference in selectivity between male and female when choosing a mate (1)</p>		2	318 1.2 AO2
Q15	<b>Marking</b>		12	AO4

	<p><b>Band 3 (9-12 marks)</b>  A focussed and detailed discussion which shows thorough consideration of a wide range of relevant information required for the management plan, how this can be gathered and how it can then be used to inform management. Demonstrates good breadth and depth of knowledge and understanding of the survey and management techniques which could be used to achieve the landowner's objectives. Discussion is substantiated and supported with examples. There is detailed discussion of the relevant benefits and limitations of the proposed management techniques with strong linkages to the woodland type, management objectives, resource requirements and potential difficulties in achieving these objectives within this specific scenario. <b>To access the higher marks in the band, the overall discussion is coherent and structured, with fully developed, relevant and supported recommendations and strong, appropriate use of specialist terminology.</b></p> <p><b>Band 2 (5-8 marks)</b>  A relevant discussion which clearly shows some consideration of a range of relevant information required for the management plan, how this can be gathered and how it can then be used to inform management. Demonstrates reasonable breadth and depth of knowledge with reasonable understanding of the survey and management techniques which could be used to achieve the landowner's objectives. Some areas may be covered in more detail than others. Within this knowledge there is some evidence of discussion around benefits and limitations of the proposed management techniques which demonstrates some linkages to woodland type, management objectives, resource requirements and potential difficulties in achieving these objectives within this specific scenario. <b>To access the higher marks in the band the discussion will be presented in a clear format much of which is mostly detailed, contains some justifications and most of the usage of terminology is appropriate.</b></p> <p><b>Band 1 (1-4 marks)</b>  A brief discussion which shows little or no consideration of relevant information required for the management plan, how this can be gathered and how it can then be used to inform management. Demonstrates basic knowledge and understanding of the survey and management techniques which could be used to achieve the landowner's objectives. The response is brief, under developed, lacks clarity and is not entirely relevant and/or accurate. There is little or no discussion around benefits and limitations of the proposed management techniques and weak or non-existent linkages to woodland type, management objectives, resource requirements and potential difficulties in achieving these objectives within this specific scenario. The overall discussion is unstructured and incoherent. <b>To access the higher marks in the band the discussion will be mainly</b></p>		<p><b>306</b>  1.1,  2.3,  3.2,  4.1,  4.3</p> <p><b>307</b>  1.2,  1.3,  2.1,  2.2,  2.3,  3.1,  3.2,  4.1</p> <p><b>318</b>  2.1,  2.2,  3.1,  4.1</p>
--	---	--	--

	<p><b>relevant, accurate and include some relevant justifications.</b></p>			
	<p><b>Indicative content</b></p> <p><b>Unit 306 principles of physical and biological environmental processes</b>  <b>1.1, 2.3, 3.2, 4.1, 4.3</b>  Effect of geographic location – soils / climate / weather  Food chains and food webs – opportunities for increasing biodiversity / links to existing native and invasive non-native flora – <b>link to Units 307 / 318 surveys</b>  Environmental processes and land cover – native broadleaf woodland / native flora and effect of non-native invasive rhododendron species  Succession / species destruction – effects of rhododendron / management techniques to increase biodiversity / remove invasive rhododendron species – replanting / natural regeneration of tree species / natural succession</p> <p><b>Unit 307 woodland habitat management</b>  <b>1.2,1.3,2.1,2.2,2.3,3.1,3.2,4.1</b>  Woodland types / historic features / woodland surveys– links to 306 effect of geographic location/ soils / climate on native woodland type; also recognition of bluebells and anemones as ancient woodland indicators – link to possible other historic features – suggestions re surveys to be undertaken to verify.  Ecological structure/ ecological importance / woodland habitats - link to management objective of increasing biodiversity – woodland type / species / age class / flora/ fauna /habitat types / spread of rhododendron.  Interpretation of results – ecological importance  Management techniques / equipment and resources / recommend improvement to the management of woodland habitats – use of information gathered to inform management – range of techniques to increase biodiversity, with justifications.  Resources required / timing / time of year / follow-up, health and safety considerations</p> <p><b>Unit 318 ecological concepts and application</b>  <b>2.1,2.2,3.1,4.1</b>  Principles of metapopulation theory / habitat fragmentation – effects of rhododendron, comment on size / shape of wood/ location in the landscape and implication for management objective of enhancing biodiversity  Plan to survey flora / plan to survey fauna – as in 307 above re ecological structure / ecological importance / woodland habitats</p>			