Qualification: 0173-013/513 - Level 3 Technicals in Land and Wildlife Management – Theory Exam
March 2019

<table>
<tr><td rowspan="3">1</td><td colspan="3">Name three stages of the hydrological cycle.</td></tr>
<tr><td>Acceptable answer(s)</td><td>Guidance</td><td>Max mks</td></tr>
<tr><td>Any three from the below:
Evaporation
evpotranspiration
Runoff
Transpiration
Condensation
Precipitation
Percolation
Surface run off
Ground water store
Ground water flow
Infiltration
Transportation
Interception</td><td></td><td>3</td></tr>
<tr><td rowspan="3">2</td><td colspan="3">Describe two stages in the formation of sedimentary rocks.</td></tr>
<tr><td>Acceptable answer(s)</td><td>Guidance</td><td>Max mks</td></tr>
<tr><td>Weathering (1) – erosion of mineral particles (1)
Transportation (1) – waterborne movement of mineral particles (1)
Deposition (1) – build-up of mineral particles after deposition, usually by water. (1)
Compression (1) – pressure from minerals above causing rock formation (1)</td><td>To achieve full 4 marks candidates need to identify any two of the stages and provide a description for each.

Any other relevant answers.</td><td>4</td></tr>
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3	Explain **two** causes of bankside erosion.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• Water run off (1 mark) causing channel formation or movement of particles (1 mark) • Undercutting by current (1 mark) which causes bank collapse (1 mark) • Trampling/land use (1 mark), which causes physical removal of top soil (1 mark) • Undercutting by fish or other animals (1 mark) which causes bank collapse (1 mark) • Wave action (1 mark), it takes away the soil at impact point (1 mark).	**Any two of the following, one mark for the cause and one mark for the effects.** **Accept any other relevant answers.**	4
4	Describe where and how aerobic and anaerobic respiration takes place within a pond.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	Aerobic respiration takes place within the water body (1) / by organisms using dissolved oxygen (1 mark) Anaerobic respiration takes place within the silt layer (1) / by bacteria that have no requirement for oxygen (1 mark).	**Two marks per each description.** **Accept any other relevant answers.**	4
5a	Name **one** apex predator within a freshwater ecosystem.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	Any one of the following, up to one marks: • Heron • Cormorant • Osprey • Otter	**Any other relevant answers.**	1

5b	Name **two** trophic levels within **one** aquatic food chain, using a named example for each trophic level.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• Primary producer (1)– algae (1) • Primary consumer – herbivore/pond snails/freshwater shrimp/water hoglouse (1) • Secondary consumer (1) – carnivore/omnivore (1) • Tertiary consumer (1) – apex predator/Heron/Cormorant/Osprey/Otter (1) • Detritivores/decomposer (1) – bacteria/fungus/tubifex/worms (1)	**One mark for the trophic level and one mark for the example, up to maximum of two marks per trophic level. Maximum 4 marks over all.**	4
6	State **three** ways how a fish uses it fins.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• Propulsion • Balance • Braking • Steering • Tasting • Roll • Pitch • Direction • Yaw	**1 mark for any two of the above, up to a maximum of 3 marks.**	3
7	Describe how **two** characteristics found on a teleost fish scale from a temperate environment can determine events within its life history.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	Banding of summer/winter growth rings (1) can determine fish age (1) Size of growth ring (1) shows growth rate / nutritional availability (1) Size of growth ring (1) demonstrates environmental conditions of the season (1) Disruption in growth rings (1) demonstrates damage / regrowth (1)	**To gain full 4 marks candidates need to identify any two characteristics and provide a description for each.** **Any other relevant answers.**	4

8	Describe the main function of **one** physiological system found in fish.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• circulatory (1) – movement of nutrients and oxygen around the body (1) • digestive (1) – absorption of nutrients from food (1) • endocrine (1) – production of hormones (1) • reproductive (1) – propagation of offspring (1) • immune (1) – white blood cells and the ability to fight off infection (1) • nervous systems (1)– reaction to stimuli (1) • osmoregulation (1) – balance of water and salts in a fish (1) • respiration (1) – chemical breakdown of nutrients (1) • Excretion (1) – removal of waste products (1)	**1 mark for the system and 1 mark for the description, up to a maximum of 2 marks.**	2
9	State **two** causes that lead to abnormal behaviour in fish.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• presence of predators • ill health • stress, • diseases, • parasites • water quality	**1 mark for each cause, up to 2 marks.**	2
10	Explain why a rearing diet for juvenile fish would have a higher protein content than a maintenance diet for adult fish.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	Juvenile fish are still developing their muscles and bones (1 mark) so protein is very important in these development processes so as a higher requirement in their diet (1 mark). Adult fish grow at a much slower rate than juvenile fish (1 mark).		3

11	For a named viral infection, describe **three** of the clinical symptoms displayed by an infected fish.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	Possible examples: 1) Koi Herpes Virus (1) – necrosis of the gill tissue (1), sunken eyes (1), haemorrhagic skin lesions (1). 2) Spring Viraemia of Carp (1) – Darkened body with pale gills (1), swollen vent (1), inability to perform osmoregulation (1). 3) Infections Pancreatic Necrosis (1) - swollen abdomen or eyes (1), darkening of the skin (1), faecal casts trailing from the vent (1).	**1 mark for a named viral infection, 1 mark for each symptom listed below or any other appropriate answer, to maximum of 3 marks for symptoms.** **Accept any other valid viral infection and its symptoms.**	4
12	Give **two** methods of managing fungal infections in a fishery.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• Biosecurity • Hygiene • Husbandry • Therapeutics eg Medication	**Any two, up to two marks:**	2
13	Describe **two** nutritional health issues that could cause vertebral deformity in fish.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• Deficiency in Vitamin A (1 mark) • Deficiency in Vitamin C (1 mark) • Deficiency in Phosphorus (1 mark)	**Any two of the following,1 mark for each for full description, up to 2 marks.**	2
14	Name **three** health problems in fish caused by environmental conditions.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• hyperplasia/lamellar fusion • gas bubble disease • brown blood disease • acidosis • alkalosis	**Any 3 of the following, up to 3 marks.**	3

15	Give the full names of **three** non-government national organisations that are involved in fish welfare.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	• Ornamental and Aquatic Trade Association • Salmon and Trout Association • Institute of Fisheries Management • Angling Trust	**1 mark for each up, to a maximum of 3 marks.**	3
16	A stillwater sport fishery has undergone a period of excessive rainfall. Discuss what factors could influence the fish health and behaviour and how these factors may be managed.		
	Acceptable answer(s)	**Guidance**	**Max mks**
	Indicative content: - Flooding - Increased turbidity - Re-distribution of stock - Introduction of pollutants - Increased erosion - Introduction of new diseases - Change in water chemistry - Increase in stress on stock - Reduction in angler pressure - Change in normal fish behaviour	**Basic Discussion - 1-4 marks** There is no link between factors and the influences they may have on the sport fishery or its inhabitants. There is no indication to the effective management of these influences. There is no specialist or technical terminology used. Answer may be disorganised and ambiguous. **Some discussion - 5-8 marks** There are some links between factors and the influences they may have on the sport fishery or its inhabitants. Attempts have been made to discuss the effective management of these influences. Some specialist or technical terminology has been used, although not always appropriately. The information is presented mostly in a structured format. **Detailed discussion - 9-12 marks** Detailed discussion links linking factors and the influences they may have on the sport fishery or its inhabitants. A detailed discussion as to the effective management of these influences has been provided. Specialist or technical terminology has been used appropriately and	12

		throughout. The information is well presented in a structured format.	