Question			Answer	Marks	Guidance
1	(a)	(i)	**class** ☐ **family** ☐ **genus** ☐ **kingdom** ☐ **order** ☐ ☐ **species** ☐	1	**ignore** ticks
		(ii)	it is the international basis of naming species / it shows or is based on relationships / removes confusion with colloquial names / universal name in all languages (1)	1	**allow** allows scientists all over world to know name of animal or plant **allow** can group them based on relatives **allow** idea that similar species can be in same genus
	(b)		(its hooks allow anchorage / flattened body for crawling under stones) so are **well suited** (1) **for limited habitats** such as fast water hiding under stones (1)	2	**allow** adapted to survive in specific habitat/environment (2)

Question			Answer	Marks	Guidance
	(c)		**[Level 3]** Identifies presence or absence of more than one named indicator species and makes a clear conclusion about the level of pollution in all three sites. Quality of written communication does not impede communication of the science at this level. **(5–6 marks)** **[Level 2]** Identifies presence or absence of at least one named indicator species and links it to level of pollution at two sites. Quality of written communication partly impedes communication of the science at this level. **(3–4 marks)** **[Level 1]** Identifies the level of pollution at one site. Quality of written communication impedes communication of the science at this level. **(1–2 marks)** **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. **(0 marks)**	6	**This question is targeted at grades up to A.** **Indicative scientific points at level 1, 2 and 3 may include:** consider following point with reference: • mayfly larvae only live in unpolluted water (high in oxygen content) • rat-tail maggots can survive very high pollution / low oxygen content • **allow** there are mayfly in unpolluted areas so downstream of factory must be polluted • **allow** higher level responses to Biochemical Oxygen Demand (BOD) being very high in polluted water • **ignore** factory poisons the stream. **Indicative scientific points at level 1 may include:** **example** rat-tail maggot found at factory site because of high level of pollution **Use L1, L2, L3 annotations in scoris; do not use ticks.**
			Total	**10**	

Question			Answer	Marks	Guidance
2	(a)		idea that CO_2 from the atmosphere is used up during **photosynthesis** **or** CO_2 returned to atmosphere when biofuel is **burnt** (1) **but** idea that CO_2 used up in **photosynthesis** is **balanced** by CO_2 returned to atmosphere when **burnt** (2)	2	**ignore** carbon neutral
	(b)		otherwise it could explode / so it does not explode (1)	1	**allow** it will explode at 10% **allow** will not burn at very low levels
	(c)		less energy content / less energy efficient / releases less energy (1)	1	**allow** idea of land that normally used for crops is lost to biofuels / habitat destruction **ignore** uses lots of land **allow** idea that production could be too slow in cold climates **ignore** less efficient
			Total	**4**	

Question			Answer	Marks	Guidance
3	(a)		(a group of organisms) capable of interbreeding / mating produces offspring (1) **but** (interbreed to) have fertile offspring (2)	2	**allow** can mate / can reproduce / have offspring **allow additional marking point:** organisms which share the same gene pool / share the same genetic information (1)
	(b)		class ☐ family ☐ genus ✓ order ☐ species ✓	2	each incorrect tick above 2 loses 1 mark down to zero
	(c)		**any two from:** (avoid predation) by distraction / scare off predators (1) attract their food source / act as bait (so they catch more food) (1) attract mates (to increase chance of reproducing) (1)	2	**allow** green oval structures may act as 'flares' that predators chase rather than attack the worms **allow** may be poisonous / toxic (to predators) **ignore** simply 'escape from predators' (in earlier part of question) **ignore** use structure to help them see (idea that it acts as a torch)

Question			Answer	Marks	Guidance
	(d)		**any three from:** (in ancestral population) some worms had green oval structures / some worms did not have green oval structures (1) green oval structures allowed worms to live in deep water / worms living in deep water developed green oval structures (1) idea of isolation between worms in deep and shallow water / isolation between worms with and without green oval structures (1) idea of independent evolution between two groups (1)	3	**ignore** simply 'worms show variation' **allow** clear AW for green oval structures eg 'can glow' generic explanation with no reference to green oval structures = max (2) ie ideas of isolation and independent evolution **allow** adapt differently
			Total	**9**	

Question	Answer	Marks	Guidance
4 a i	fungi (1) 7 (%) (1)	2	 **allow** any correct rounding of 7.0376432 no ECF
ii	some species have been given more than one name / counted more than once (1)	1	**allow** some have gone extinct (since being discovered) **allow** new species have evolved/mutated/appeared (faster than expected)
b	**any two from these ideas** birds are easier to spot / beetles are more difficult to spot (1) more people watch/are interested in birds than beetles (1) birds migrate / move around more (1) beetle species are similar and only recently have people realised they are different species (1) there are more niches for beetles (1) beetles are older than birds and have had time to evolve into more species (1) identification/collection techniques (for beetles) have improved (1)	2	**ignore** descriptions of differences between the graphs with no explanation e.g. there are fewer bird species than beetle species **allow** birds are bigger than beetles **allow** people have been recording birds for longer / idea that birds already known in 1750 **allow** beetles may live in places with few people

Question	Answer	Marks	Guidance
c i	**any two from these ideas** (no) (no marks) a correlation does not prove causation (1) need more evidence (to prove) / could be other factors (causing extinction) (1) there is not a (complete) match between the two graphs (1) it could just be that we are better at recording extinctions now compared with 200 years ago (1)	2	yes = 0 marks **allow** there have always been extinctions so any match could be a coincidence **allow** human population is increasing exponentially but extinction is not / **allow** not much increase in extinctions in first 100 years although there is an increase in human population **allow additional mark point** the graph may be from a biased source (1)
ii	idea that this will help support the website's aim / stop extinctions (1) idea of making the two lines look as similar as possible / look like there is a correlation (1)	2	**ignore** simply 'biased' **ignore** simply there is a correlation **allow additional marking point** to fit them both on the same graph / easier to compare / if used same scale or axis then difficult to plot both lines (accurately) / idea that the (range of) numbers are very different (1)
iii	(increasing human population leads to extinction because of) habitat destruction / pollution / climate change / hunting (1)	1	
	Total	**10**	