

Variety of Life - Mark Scheme

Q1.

Question Number	Answer	Additional guidance	Mark
(a)(i)	idea of secretion of waxy substance ;	ACCEPT presence of oil / lipid	(1)

Question Number	Answer	Additional guidance	Mark
(a)(ii)	<ol style="list-style-type: none"> 1. active at night / inactive in day <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 2. idea of spreading wax over skin <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 3. idea of hunting in trees rather than on the ground ; 		(1)

Question Number	Answer	Additional guidance	Mark
(a)(iii)	<ol style="list-style-type: none"> 1. idea of avoiding predation 2. idea of conserving 	The answer to 6(a)(iii) must be awarded related to 6(a)(ii)	

	<p>water in dry habitat</p> <p>3. avoiding high temperatures during the day</p> <p>4. idea of finding prey more easily at night ;</p>	2. ACCEPT reduce dehydration	(1)
Question Number	Answer	Additional guidance	Mark
(b)	<p>1. idea that it eats insects {at night / in trees} ;</p> <p>2. {within the community / ecosystem /habitat / environment / eq } / hot, dry areas with trees ;</p>		(2)

Question Number	Answer	Additional guidance	Mark
(c)	<p>*QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence.</p> <p>1. idea of selection pressure / change in environment / hot and dry habitat ;</p> <p>2. reference to { competition / predation } ;</p> <p>3. mutation (in frog) ;</p> <p>4. idea of advantageous allele e.g. allele for waxy secretions ;</p> <p>5. idea that individuals with advantageous { alleles / characteristics / eq } survive and breed ;</p> <p>6. idea of (advantageous) { allele / mutation } being passed on (to future generations) ;</p> <p>7. idea of increased frequency of advantageous alleles in the population ;</p>	<p>*QWC - Emphasis is logical sequence</p> <p>7. ACCEPT more individuals with this adaptation in the population /</p>	(5)

Q2.

Question Number	Acceptable Answer	Additional Guidance	Mark
(i)	<ul style="list-style-type: none"> species found only in one geographical location 		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
(ii)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none"> the variety of species (in an ecosystem / community / habitat) (1) the variety of alleles in a { gene pool / population / species } (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
(iii)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> record the number of species of lemur and the (1) 		(3)

Question Number	Acceptable Answer	Additional Guidance	Mark
	number of individuals of each species <ul style="list-style-type: none"> calculate the diversity index (for each location) (1) so the higher the index, the greater the biodiversity (1) DNA profiling / gel electrophoresis / molecular phylogeny / proteomics (1) 		

Q3.

Question Number	Answer	Additional Guidance	Mark
	<ul style="list-style-type: none"> correct values calculated for p and q (1) correct calculation of proportion of heterozygotes (1) correct calculation of number of heterozygotes in the population (1) 	<u>Example of calculation</u> $p = 0.99 \quad q = 0.01$ $2pq = 2 \times (0.99 \times 0.01) = 0.0198$ $0.0198 \times 17\,020\,000 = 336\,996$ carriers Correct answer with no working gains full marks	(3)

Q4.

Question Number	Acceptable Answer	Additional guidance	Mark
(b)(i)	<ul style="list-style-type: none"> $N(N-1) = 3540$ (1) $\sum n(n-1) = 704$ (1) $= 3540 \div 704 = 5.028 / 5.03$ (1) 		(3)

Question Number	Acceptable Answer	Additional guidance	Mark
(b)(ii)	An answer that makes reference to the following: <ul style="list-style-type: none"> middle shore has higher diversity (1) even though there are fewer individuals (1) 	Allow converse argument.	(2)

Q5.

Question Number	Acceptable Answer	Additional Guidance	Mark
	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none"> • communicating theory to scientific community (1) • peer review (1) • checking of evidence to ensure its validity (1) 	<p>Allow reference to scientific journals and conferences</p>	<p>(3)</p>

Q6.

Question Number	Answer	Additional Guidance	Mark
(a)(i)	<ol style="list-style-type: none"> 1. (successful interbreeding) produces offspring; 2. (same species produce) fertile (offspring); 3. credit reason why offspring of different species might be infertile ; 	<p>Accept converse throughout</p> <p>Ignore viable</p> <p>eg genetic incompatibility, different number of chromosomes, poor quality gametes , low number of gametes</p>	<p>(3)</p>

Question Number	Answer	Additional Guidance	Mark
(a)(ii)	<ol style="list-style-type: none"> 1. reference to reproductive isolation ; 2. different breeding times; 3. do not recognise {courtship displays / songs / eq} ; 4. physically incompatible eg genitalia ; 		<p>(3)</p>

Question Number	Answer	Additional Guidance	Mark
(b)	<ol style="list-style-type: none"> 1. idea that the two species share the same habitat ; 2. idea that the two species experience the same environmental conditions ; 3. (therefore) the same selection pressures ; 4. idea that they are both well-adapted (to their environment) ; 5. idea that no mutations have happened that {improve / change} their {phenotypes / survival}; 6. {no / few} changes in allele frequency / gene pool is stable ; 7. idea that there has been very little change in environment (over the years) ; 	<p>Accept similar</p> <p>NB this needs to be in the context of both species being subjected to the same selection pressures</p> <p>Accept similar</p>	<p>(3)</p>

Q7.

Question Number	Answer	Additional Guidance	Mark
(a)	<ol style="list-style-type: none"> idea that as the {distance from the front edge of the glacier / time} increases, the {complexity / biodiversity / size / eq} of the organisms increases ; reference to (primary) succession ; idea that {algae / lichens / pioneer species} are (the first) organisms to colonise bare rock / eq; idea that {algae / lichen / pioneer species} improve conditions for plants ; idea of competition (limiting species present) ; 	<ol style="list-style-type: none"> ACCEPT idea that climax community only reached at distance from glacier edge NOT secondary succession including e.g. change rock into soil / increase humus content of soil / increase water content e.g. newer species outcompete previous species 	(3)

Question Number	Answer	Additional Guidance	Mark
(b)(i)	<ol style="list-style-type: none"> the {role / interaction / eq} of an { <i>Epilobium latifolium</i> / organism / species} within its { ecosystem / habitat / environment } ; (<i>Epilobium latifolium</i>) is a producer ; idea that <i>Epilobium latifolium</i> provides {food / energy} for other organisms (herbivores / primary consumers / decomposers) ; idea that <i>Epilobium latifolium</i> improves soil e.g. holds soil structure together, increases nutrients ; idea that <i>Epilobium latifolium</i> provides {shelter / (micro) habitat} for organisms ; 	<ol style="list-style-type: none"> IGNORE community NOT prey IGNORE food in soil ACCEPT adds organic matter, humus ACCEPT named organism e.g. insects 	(3)

Question Number	Answer	Additional Guidance	Mark
(b)(ii)	<ol style="list-style-type: none"> idea of using a transect (from front edge of glacier); credit method of sampling (along transect) ; credit appropriate method of selecting sample sites (along transect) ; description of estimate of abundance e.g. number of plants, percentage cover ; idea of using more than one transect ; credit appropriate method of recording quantitative data ; 	<ol style="list-style-type: none"> e.g. clumps touching transect, quadrat (on transect), number of plants along perpendicular e.g. set distance, regular, systematic, flip-flop quadrats NOT random IGNORE references to repeating investigation e.g. tally chart, table, graph 	(4)

Question Number	Answer	Additional Guidance	Mark
(b)(iii)	<ol style="list-style-type: none"> credit appropriate named abiotic factor; credit appropriate method of measurement of factor ; credit appropriate description of where reading should be taken ; idea of taking several readings and getting an average / eq ; 	<ol style="list-style-type: none"> e.g. light, soil pH, water content, mineral content, temperature, salinity, wind IGNORE CO₂, O₂, rainfall, humidity 2.CE applied e.g. light {probe / sensor / meter / data logger}, {water gauge / drying out soil samples} 3. CE applied e.g. reading taken at height of plant, soil sample around roots, quadrat 	(3)