

19. Organisms and their environment

19.4 Populations

Paper 3 and 4

Marking Scheme

Q1.

(a)	any two from: scales ; gills ; swim bladder ; fins ; lateral line ; AVP ;	2	
(b)	(a group of organisms of) one / same, species ; living in the same area, at the same time ;	2	
(c)(i)		3	one mark for each correct line
(c)(ii)	any one from: more fish died than were born / AW ; (because of) disease ; pollution ; competition for / lack of, (named) resources or described ;; predation / hunting / (over)fishing ; introduction of new species ; AVP ;;	3	e.g. lack of, space / breeding sites / mates / oxygen e.g. destruction of habitats / natural disaster (described) / consequence of climate change e.g. raised water temperatures / drought / emigration

Q2.

(a)	<table><thead><tr><th>term</th><th>description</th></tr></thead><tbody><tr><td></td><td>a group of organisms that can reproduce to produce fertile offspring</td></tr><tr><td rowspan="2">community</td><td>all of the populations of different species in an ecosystem</td></tr><tr><td>an organism that gets its energy by feeding on other organisms</td></tr><tr><td rowspan="3">population</td><td>group of organisms of one species, living in the same area, at the same time</td></tr><tr><td>the position of an organism in a food chain, food web or ecological pyramid</td></tr><tr><td>unit containing the different species of organisms and their environment, interacting together</td></tr></tbody></table>	term	description		a group of organisms that can reproduce to produce fertile offspring	community	all of the populations of different species in an ecosystem	an organism that gets its energy by feeding on other organisms	population	group of organisms of one species, living in the same area, at the same time	the position of an organism in a food chain, food web or ecological pyramid	unit containing the different species of organisms and their environment, interacting together	2	R each additional line
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(b)(i)	A lag B exponential C stationary D death ;;	2	all correct = 2 marks any 1 correct = 1 mark											
(b)(ii)	1000 ; 2.5 ; C ; D ; (named) nutrients / oxygen ;	5												

Q3.

(a)(i)	2004 ;	1	
(a)(ii)	60 (%) ;;	2	MP1 evidence of correct number from graph 1500 and 600 or 900 MP2 correct value calculated ecf for MP2 from wrong MP1

Q4.

(a)	species ; area ; time ;	3	
(b)(i)	89 (million) ;	1	A 88 / 90
(b)(ii)	1970 ;	1	
(c)	<i>any three from:</i> increased food supply ; decreased deaths ; decreased predation ; decreased disease ; increased births ; AVP ;;	3	
(d)	<i>any four from:</i> 1 loss of biodiversity / extinction (of other species) / AW ; <i>because of :</i> 2 habitat destruction ; 3 deforestation ; 4 (increased) predation / hunting / fishing ; 5 (new) disease ; 6 introduced species / migration ; 7 competition for / depletion of, (named) resources ; 8 (named) pollution / increase in waste produced ; 9 global warming / climate change / enhanced greenhouse effect ; 10 AVP ;	4	

Q5.

(d)	<i>any two from:</i> disease ; reduced reproduction / AW ; predation / hunting / poaching ; climate change / drought / floods / extreme weather / temperature change / natural disasters / war ; loss of habitat / deforestation ; pollution ;	2	
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Q6.

(b)	increased, food supply / plants ; less predation / less hunting / AW ; less disease / AW ; more births / fewer deaths ;	2	
(c)	damage / destroy, (marine) habitats ; extinction of species ; reference to pollution (of sea) ; global warming / ref. to increase in sea temperature ; rise in sea levels / melting of ice-caps ; overfishing / disruption of food chain ;	3	

Q7.

(a)	population is constant then increases ; change occurs at 1700 ; rapid / exponential, increase (from 1800) ; data quote ;	3	
(b)	increased food production ; increased medical, facilities / care ; better, sanitation / clean water / sewage facilities ; increased hygiene ; increased (health) education ;	3	
(c)	disease ; war ; (named) natural disaster ; famine ; migration ; AVP ;	2	

Q8.

(a)(i)	all of the populations of different species in an ecosystem ;	1	
(b)(i)	<p><i>these descriptions refer to the changes in 2013, but accept ora for 1969</i></p> <p>A <i>Meyer's goshawk</i> - range extends, downwards / to lower altitude ;</p> <p>B <i>Mackinlay's cuckoo-dove</i> - range extends, upwards / to higher altitude ;</p> <p>C <i>Island thrush</i> - range does not extend downwards as much / AW ;</p> <p>D <i>Island leaf warbler</i> - no / little, change in range ;</p>	4	<p><i>accept limits of the ranges instead of descriptions if units (m) used at least once</i></p> <p>A range is larger</p> <p>A range is (much) smaller ;</p>
(c)	<p><i>any three from:</i></p> <p>difficulty finding a mate ;</p> <p>inbreeding ;</p> <p>reduced fitness ;</p> <p>decrease in genetic variation (within each population) / loss of alleles ;</p> <p>increase in, genetic / inherited, diseases ;</p> <p>more vulnerable to (pathogenic / infectious) disease (spreading) ;</p> <p>unable / less able, to adapt to change in environment ;</p> <p>at increased risk of extinction (as populations are so small) ;</p> <p>e.g. by natural catastrophes / introduced species / AW ;</p> <p>rarity linked to, egg stealing / poaching ;</p> <p>AVP ;</p>	3	

Q9.

(a)	<u>community / communities</u> ; <u>environment(s)</u> ;	2	
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Q10.

7(b)(i)	sigmoid(al) ;	1	
7(b)(ii)	lag ;	1	
7(b)(iii)	<p><i>one from:</i></p> <p>build-up of (named), toxins / waste / carbon dioxide ;</p> <p>(change in) pH ;</p> <p>high temperature ;</p> <p>overcrowding ;</p> <p>disease / virus attack ;</p>	1	