Conservation (18.3): Cambridge (CIE) A Level Biology 9700 Exam Questions by Topic

22 questions · 74 marks · about 89 minutes. Answer in the spaces, then check the mark schemes at the end.

Question 1 · information from earlier in the question

2 The orca, *Orcinus orca*, has the largest distribution of all aquatic mammals and is found in nearly all seas and oceans. Orca are social mammals that usually live in groups. These groups can vary in size.

Fig. 2.1 shows an orca.



Fig. 2.1

There are a number of distinct types of orca. These distinct types of orca are classified as members of the same species. However, there is evidence that sympatric speciation is occurring.

Question 1 · Paper 4 · February/March 2025 (42) · Q2(c) · 2 marks

(c) In the future, the different types of orca may be classified as separate species. If so, some of these newly classified species will have very small population sizes.

Suggest **two** factors, **other** than population size, that should be monitored when assessing the conservation status of any newly classified species of orca.

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Question 2 · information from earlier in the question

(b) The International Union for Conservation of Nature (IUCN) Red List of Threatened Species is updated regularly.

Table 10.1 shows the numbers of endangered animal species counted every three years between 2007 and 2019.

Table 10.1

year	number of endangered species
2007	7851
2010	9618
2013	11212
2016	12630
2019	14234

Question 2 · Paper 4 · February/March 2023 (42) · Q10(b)(ii) · 4 marks

(ii) More species of fish were listed as endangered in 2019 than species of mammals.

Suggest reasons why more fish species than mammal species are endangered.

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Question 3 · information from earlier in the question

10 The African penguin, *Spheniscus demersus*, lives along the coast of South Africa.

Fig. 10.1 shows two African penguins.



Fig. 10.1

Question 3 · Paper 4 · May/June 2022 (42) · Q10(b) · 3 marks

(b) The International Union for the Conservation of Nature (IUCN) Red List of Threatened Species has categorised the African penguin as endangered and could become extinct.

Suggest reasons why the African penguin has become endangered and could become extinct.

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Question 4 · information from earlier in the question

2 Biodiversity can be assessed at three different levels. One of these is the genetic variation within each species.

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Question 4 · Paper 4 · October/November 2023 (41) · Q2(d)(i) · 3 marks

(d) Genetic variation is considered important in the conservation of species. Low genetic variation is assumed to decrease the chance of the long-term survival of a species.

(i) Give reasons why low genetic variation may decrease the long-term survival of a species.

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Question 5 · Paper 4 · May/June 2021 (42) · Q3(b)(i) · 2 marks

(b) An analysis in 2019 concluded that twice as many insect species have populations that are decreasing in size compared with chordate species. This analysis focused on developed countries that have large human populations.

(i) Outline **two** factors that may cause populations of insects to decrease in size in developed countries that have large human populations.

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Question 6 · Paper 4 · May/June 2024 (43) · Q9(b) · 4 marks

(b) Outline reasons for maintaining **plant** biodiversity.

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Question 7 · information from earlier in the question

2 **(a)** The grey wolf, *Canis lupus*, is a large predator. During the 20th century, the grey wolf in south-west Europe was hunted almost to extinction.

Fig. 2.1 shows a grey wolf.



Fig. 2.1

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Question 7 · Paper 4 · February/March 2021 (42) · Q2(a)(ii) · 3 marks

(ii) Suggest **and** explain the effects on the biodiversity of south-west Europe if the grey wolf becomes extinct.

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Question 8 · Paper 4 · May/June 2022 (41) · Q8(b) · 7 marks

(b) Extinction of animal and plant species reduces biodiversity.

Explain why it is important to maintain biodiversity.

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Question 9 · information from earlier in the question

9 The red ruffed lemur, *Varecia rubra*, is a mammal found only in the rainforests of the Masoala region in north east Madagascar.

Fig. 9.1 shows a red ruffed lemur.



Fig. 9.1

Question 9 · Paper 4 · October/November 2024 (42) · Q9(c)(i) · 3 marks

(c) Captive breeding programmes for endangered mammals such as the red ruffed lemur can vary in their success rate.

(i) Suggest problems that may affect the success of captive breeding programmes of mammals like the red ruffed lemur.

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Question 10 · Paper 4 · October/November 2024 (42) · Q9(c)(ii) · 1 mark

(ii) Occasionally, wild-caught red ruffed lemurs are introduced into captive breeding programmes.

Suggest why this is done.

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Question 11 · information from earlier in the question

1 The Sumatran tiger lives on the island of Sumatra, Indonesia.

Fig. 1.1 shows a Sumatran tiger.



Fig. 1.1

Questions, mark schemes and examiners' report extracts © Cambridge University Press & Assessment.

Question 11 · Paper 4 · May/June 2018 (42) · Q1(b) · 3 marks

(b) Some zoos in Europe have captive breeding programmes for the Sumatran tiger, which breeds well in captivity. Once cubs have reached maturity they may be moved to other zoos. For example, as part of a coordinated breeding programme carried out in 2013, one tiger born in Chester Zoo in England was moved to France and another tiger born in the same zoo was moved to Germany. This type of coordinated breeding programme is essential for the survival of the Sumatran tiger.

Explain why it is important to the gene pool of Sumatran tigers to move tigers from one zoo to another.

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Question 12 · Paper 4 · May/June 2023 (42) · Q10(a) · 3 marks

10 (a) Many zoos around the world are involved in captive breeding programmes for endangered species.

Outline the role of zoos in the conservation of endangered species, **other than** captive breeding programmes.

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Question 13 · information from earlier in the question

7 The Sumatran tiger, *Panthera tigris sumatrae*, is classified as critically endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species™.

Fig. 7.1 shows a Sumatran tiger.



Fig. 7.1

Question 13 · Paper 4 · February/March 2025 (42) · Q7(a)(ii) · 3 marks

(ii) There are a number of different ways to help conserve Sumatran tigers. For example, some zoos have captive breeding programmes.

Outline ways in which Sumatran tigers may be conserved, **other** than captive breeding programmes.

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(c) Captive breeding programmes sometimes use IVF.

Table 7.1 shows some of the events that occur during an IVF procedure.

They are **not** listed in the correct order.

Table 7.1

letter	event
A	sperm added to oocyte
B	embryo formed
C	female given hormones to stimulate ovulation
D	zygote placed in culture medium
E	embryo placed in uterus of female
F	zygote formed
G	oocyte harvested with a fine needle

Complete Table 7.2 to show the correct order of the events.

One of the events has already been added in the correct position.

Table 7.2

correct order	letter
1	.....
2	.....
3	.....
4	**F**
5	.....
6	.....
7	.....

[4]

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(c) Sometimes assisted reproduction is used in captive breeding programmes for the eastern black rhinoceros.

Fig. 10.2 outlines the process of IVF that is used in these programmes.

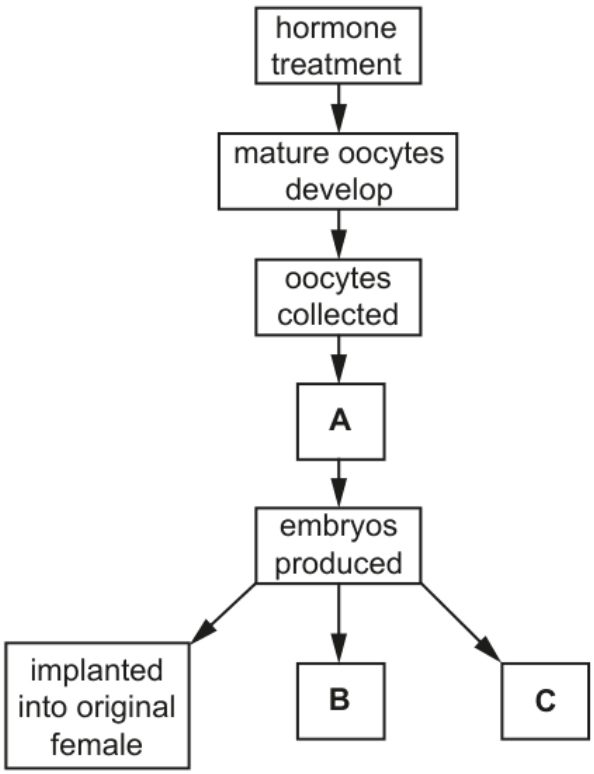


Fig. 10.2

Outline:

- the event **A** that occurs in the production of the embryos
- the **two** other possible outcomes, **B** and **C**, for the embryos that have been produced.

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Question 16 · information from earlier in the question

1 The Asiatic lion, *Panthera leo persica*, is found only in the Gir Forest National Park in the Gujarat region of western India.

Fig. 1.1 shows a female Asiatic lion.



Fig. 1.1

Question 16 · Paper 4 · October/November 2022 (42) · Q1(c) · 4 marks

(c) Some zoos use assisted reproduction techniques, such as IVF, in their captive breeding programmes for endangered species.

Describe how IVF can be used with an endangered species such as the Asiatic lion.

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Question 17 · information from earlier in the question

1 The wild Bactrian camel, *Camelus ferus*, lives only in the desert regions of Mongolia and northern China.

Fig. 1.1 shows a wild Bactrian camel.



Fig. 1.1

Question 17 · Paper 4 · October/November 2022 (41) · Q1(c) · 4 marks

(c) Some zoos use assisted reproduction techniques, such as embryo transfer, in their captive breeding programmes for endangered species. Embryo transfer has resulted in domesticated dromedary camels giving birth to wild Bactrian camel calves.

Describe the procedure of embryo transfer in a mammal such as a camel.

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9 (a) The Asian common toad, *Duttaphrynus melanostictus*, arrived accidentally in eastern Madagascar in 2010 on a ship.

Fig. 9.1 shows an Asian common toad.

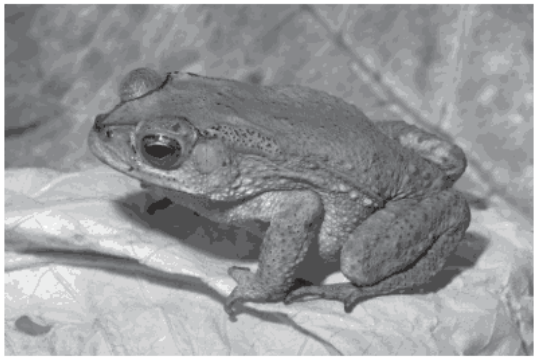


Fig. 9.1

The Asian common toad is now regarded as an invasive alien species because:

- it breeds fast in the warm, wet conditions of eastern Madagascar
- it can travel up to 2.5 km per year
- its skin contains poison, which is highly toxic to humans and predators.

Suggest ways in which the Asian common toad may affect the ecosystem of eastern Madagascar.

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(b) Himalayan balsam, *Impatiens glandulifera*, is an annual plant native to Pakistan, India and Nepal. It was first introduced into the United Kingdom (UK) in 1839 because of its attractive flowers. Individual plants can produce thousands of mature seeds. These can be dispersed for long distances when the capsules that contain the seeds burst.

Fig. 10.1 shows Himalayan balsam growing in a woodland.



Fig. 10.1

Himalayan balsam has now become established in the UK. It is listed as an invasive alien species and attempts are being made to eradicate (remove) the plant.

Not all alien plant species are considered to be invasive.

Suggest why Himalayan balsam has been listed as an invasive alien species in the UK.

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Question 20 · Paper 4 · February/March 2022 (42) · Q1(b) · 4 marks

(b) The hedgehogs on Alderney are an example of an invasive alien species.

Explain why it is sometimes important to control invasive alien species.

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Question 21 · Paper 4 · May/June 2024 (41) · Q8(a) · 3 marks

8 Bears are several species of mammal in the family Ursidae.

Climate change and loss of habitats due to human activity have reduced the size of some bear populations in recent years.

(a) The International Union for Conservation of Nature (IUCN) has a role in the conservation of species, such as species of bear.

Outline the role of the IUCN in the conservation of species.

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Question 22 · Paper 4 · May/June 2022 (43) · Q8(b) · 3 marks

(b) The trade in Malayan tapirs is regulated by the Convention on International Trade in Endangered Species (CITES).

Suggest ways by which CITES attempts to regulate the trade in wild fauna and flora.

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Mark schemes

Question 1 · Paper 4 · February/March 2025 (42) · Q2(c) · 2 marks

2(c)	*any **two** from:*	**2**
	1 habitat, size / destruction / disturbance / pollution **;**	
	2 hunting (by humans) **;**	
	3 reference to food source **;**	
	4 measure sea temperature **;**	
	5 genetic diversity / inbreeding **;**	
	6/7 AVP **; ;** e.g. geographical range / migration patterns / movements / disease / breeding frequency / mortality rate	

Question 2 · Paper 4 · February/March 2023 (42) · Q10(b)(ii) · 4 marks

10(b)(ii)	*any **four** from:*	**4**
	fish:	
	1 overfishing **;**	
	2 (on water / at sea) difficult to **enforce** protective, laws / regulations **or** **fewer** laws to protect fish **;**	
	3 trophy hunting **;**	
	4 climate change qualified **;** e.g. increased ocean temperatures / predatory species moving into new areas now water is warmer	
	5 pollution qualified **;** e.g. plastics in the sea / oil spills / eutrophication	
	6 there are more species of fish than there are species of mammals **;**	
	mammals:	
	7 more conservation projects for mammals / AW **; ora** for fish	
	8 laws in place, banning hunting / protecting mammals **;**	
	9 AVP **;**	

Question 3 · Paper 4 · May/June 2022 (42) · Q10(b) · 3 marks

10(b)	*any **three** from:*	**3**
	1 loss of habitat / example **;**	
	2 climate change **;**	
	3 predation **;**	
	4 competition for, food / resources / breeding sites / example **;**	
	5 new disease **;**	
	6 pollution / example **;**	
	7 numbers get so low that population can't recover / AW **;**	

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Question 4 · Paper 4 · October/November 2023 (41) · Q2(d)(i) · 3 marks

2(d)(i)	*any **three** from:* 1 less able / not able, to, adapt / evolve ; 2 little variation for selection to act on ; 3 few(er) (potentially), useful / beneficial, alleles ; 4 all / most, (could be) killed by same, disease / selection pressure ; 5 if due to small population size this decreases species survival chance ;	**3**

Question 5 · Paper 4 · May/June 2021 (42) · Q3(b)(i) · 2 marks

3(b)(i)	*any **two** from:* **1** habitat loss / habitat fragmentation / urbanisation / building / deforestation ; **2** insecticides / pesticides / farming / agriculture / fertilizers ; **I** pollution **3** new / increase in, predators / diseases / parasites ; **4** food shortage / increased competition (for food) ;	**2**

Question 6 · Paper 4 · May/June 2024 (43) · Q9(b) · 4 marks

9(b)	*any **four** from:* 1 may have future use ; 2 aesthetic / ethical / cultural, reasons ; 3 medical uses / example ; 4 ecotourism ; 5 *idea of* maintaining stability in, ecosystems / food chains / food webs ; 6 resource material ; e.g. wood for building / fibres for clothes / food (for humans) / agriculture 7 maintain / increase, gene pool / genetic diversity ; 8 *ref. to* soil stability / desertification ;	**4**

Question 7 · Paper 4 · February/March 2021 (42) · Q2(a)(ii) · 3 marks

2(a)(ii)	*any **three** from:* 1 decrease in biodiversity ; 2 prey of grey wolf / herbivores, (may) increase in number ; 3 (leads to) overgrazing ; **A** herbivores would decrease plant populations 4 change in, ecosystem / habitat / food web ; 5 change in genetic variation ; 6 over many years ;	**3**

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Question 8 · Paper 4 · May/June 2022 (41) · Q8(b) · 7 marks

8(b)	*any* ***seven*** *from:* **1** (named) food ; **2** (named) medicines ; **3** wood / fibres / paper / rubber ; **4** genetic diversity for future use ; **5** science / technology / research ; **6** education ; **7** aesthetic / wellbeing ; **8** (eco)tourism / attract visitors ; **9** ethical / moral / stewardship ; **10** local cultural significance ; **11** maintain / protect / stability of, food chains / food webs ; **12** pollination / ecosystem services ; **13** protect against, soil erosion / coastal erosion / flooding ; **14** soil formation ; **15** (named) mineral, cycles / recycling **OR** *ref. to* stage in cycle of named element ; **16** climate stability ;	**7**

Question 9 · Paper 4 · October/November 2024 (42) · Q9(c)(i) · 3 marks

9(c)(i)	*any* ***three*** *from:* 1 stress (in captivity) ; 2 reproductive cycle disrupted ; 3 may reject mate / refuse to breed / do not have correct (courtship) behaviour ; 4 lack of suitable mates ; 5 enclosure too small / not natural environment ; 6 expensive ; 7 AVP ; e.g. inbreeding	**3**

Question 10 · Paper 4 · October/November 2024 (42) · Q9(c)(ii) · 1 mark

9(c)(ii)	increase / maintain, **genetic** diversity / heterozygosity / hybrid vigour / gene pool **OR** reduce, inbreeding depression / homozygosity ;	**1**

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Question 11 · Paper 4 · May/June 2018 (42) · Q1(b) · 3 marks

1(b)	*any 3 of:* 1 maintains or increases, gene pool / genetic diversity / genetic variation ; 2 maintains or increases, heterozygosity ; 3 hybrid vigour ; 4 reduces / prevents, inbreeding depression ; 5 reduce chances of harmful recessive alleles coming together ;	**3**

Question 12 · Paper 4 · May/June 2023 (42) · Q10(a) · 3 marks

10(a)	*any **three** from:* 1 safe location **or** protected from, predators / hunters / poachers ; 2 research qualified ; e.g. disease control / into diet / behaviour 3 raise funds ; 4 work with local, communities / governments or conservation projects ; 5 education / raise awareness ; 6 medical / veterinary / health, (care) ;	**3**

Question 13 · Paper 4 · February/March 2025 (42) · Q7(a)(ii) · 3 marks

7(a)(ii)	*any **three** from:* 1 ban, hunting / poaching / trade ; 2 enforcement / strict penalties ; 3 national parks / protected reserves / habitat protection / AW ; 4 tracking devices / monitoring ; 5 raise awareness / education ; 6 AVP ; e.g. veterinary care	**3**

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Question 14 · Paper 4 · February/March 2025 (42) · Q7(c) · 4 marks

7(c) — 4

correct order	letter
1	C
2	G
3	A
4	F
5	D
6	B
7	E

CGA in correct order **; ignore** intervening letters
CGA above **F ;**

DBE in correct order **;ignore** intervening letters
DBE below **F ;**

Question 15 · Paper 4 · May/June 2023 (42) · Q10(c) · 3 marks

10(c) — 3

A – fertilisation occurs / sperm or semen added ;

B and **C** – surrogacy / described ;
cryopreservation / described ;

Question 16 · Paper 4 · October/November 2022 (42) · Q1(c) · 4 marks

1(c) — 4

*any **four** from:*

1 female given, hormone / FSH / gonadotropins ;
2 *ref. to* superovulation / AW ;
3 (secondary) oocytes / ova, harvested / AW ; **Ignore** eggs
4 detail of harvest ; e.g. use of fine needle / using ultrasound
5 sperm / semen, added to (secondary) oocytes / ova ;
6 cultured / AW, for several days / until embryo or blastocyst stage ; **Ignore** number of cells
7 embryo / blastocyst, placed in uterus ;

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Question 17 · Paper 4 · October/November 2022 (41) · Q1(c) · 4 marks

1(c)	*any **four** from:*	**4**
	1 mating / IVF / (super-ovulate female plus) AI ;	
	2 remove embryo (from, mated / artificially inseminated, female) ;	
	3 check / select, healthy / normal / best, embryos ;	
	4 may freeze embryos for, storage / later use ;	
	5 implant embryos in (different female) uterus ;	
	6 ref. surrogate (mother) ;	
	7 ref. (named female reproductive) hormone(s) ;	
	8 AVP ;	

Question 18 · Paper 4 · May/June 2024 (42) · Q9(a) · 4 marks

9(a)	*any **four** from:*	**4**
	1 not predated / predators killed (as toxic) ;	
	2 eats / decreases numbers, of, native / local, species ;	
	3 disrupts, food web / food chain / ecosystem ;	
	4 can spread to other areas / numbers increase rapidly ;	
	5 reduces biodiversity ;	
	6 can cause extinction (in, native / local, species) ;	
	7 competes (with native species) for, space / breeding areas / food / water / resources ;	
	8 introduces / new, disease ;	

Question 19 · Paper 4 · October/November 2023 (42) · Q10(b) · 4 marks

10(b)	*any **four** from:*	**4**
	1 *idea of* negative impact on, the environment / ecosystems / habitat / food webs / food chain ; 2 decreases biodiversity ; 3 large / fast, increase in number ; 4 competition for (named) resources ; 5 *ref. to* new disease ; 6 may be toxic **or** few animals able to eat it ; 7 attracts pollinators (away from native species) ;	

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Question 20 · Paper 4 · February/March 2022 (42) · Q1(b) · 4 marks

1(b)	*any **four** from:* *accept local for native throughout* *because alien species:* 1 compete with native species ; 2 for, food / same niche / light / resources **or** reduce food source of native species ; 3 feed on / predators of, native species ; 4 can cause extinction in native species ; 5 can breed more successfully than native species ; 6 often have no, natural predator / grazers ; 7 may disrupt, habitats / ecosystems / food webs / food chains ; **ignore** environment 8 cause reduction in biodiversity ; 9 may introduce disease ;	**4**

Question 21 · Paper 4 · May/June 2024 (41) · Q8(a) · 3 marks

8(a)	*any **three** from:* **1** assess / categorise / rank, species, threat level / conservation status ; **2** *ref. to* Red List (of Threatened Species) **3** influence / advise, countries / governments / policy makers ; **4** educate / raise awareness ; **5** promote sustainable, use / management, of (natural) resources ;	**3**

Question 22 · Paper 4 · May/June 2022 (43) · Q8(b) · 3 marks

8(b)	*any **three** from:* 1 trade ban (if species is in danger of extinction) ; 2 if species is not (yet) at risk of extinction permit required ; 3 *ref. to* border controls / checks ; **A** fines / punishment if caught 4 (provide countries with) lists of species that are, rare / endangered ; 5 encourages governments, to join CITES / to abide by CITES regulations ; 6 AVP ; e.g. every few years they have a conference with their members	**3**

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