3.3 Conservation and regeneration

Name: _____ Class: _____ Date: _____ **Total: 28 marks**

KEY WORDS conservation • captive breeding • protected area • corridor • keystone species • rewilding • flagship species

Objective

Build the skills to answer exam questions on **conservation** and **regeneration** : reasons to conserve, species-based and habitat-based approaches, **protected-area** design and **rewilding** .

You must be able to:

- give reasons to conserve biodiversity: ecological, economic, ethical and aesthetic
- evaluate species-based conservation, e.g. captive breeding and CITES
- evaluate habitat-based conservation and the design of protected areas
- explain rewilding and restoration, and the role of keystone species

1 Key knowledge and worked examples

■ Conservation and regeneration

Why conserve? Ecosystem services (pollination, clean water, flood control), resources (food, medicines), economic value (tourism), and ethical and cultural reasons (a right to exist, spiritual value, beauty).

approach	examples	strengths	limitations
species-based	captive breeding and release; zoos; seed banks; **CITES** (1973, controls the trade in endangered species)	saves single species from extinction; raises public interest (flagship species)	expensive; ignores the habitat; released animals may not survive
habitat-based	national parks, marine protected areas, nature reserves	protects whole communities, including unknown species	needs money, enforcement and the support of local people

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Protected-area design

- **large** is better than small: bigger populations, more habitats, less edge;
- **round** shapes have less edge than long thin ones;
- **corridors** link reserves, so animals can move and breed between them;
- one large reserve or several small ones (SLOSS): several small ones spread risk (disease, fire) and may hold different habitats.

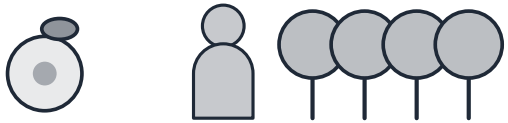
A **keystone species** has a large effect on its ecosystem compared with its numbers. After wolves returned to Yellowstone (1995), elk changed where they grazed, and trees by rivers began to recover in some places.

Rewilding restores natural processes, often by bringing back missing species and then managing less; **restoration** repairs a damaged ecosystem, e.g. replanting mangroves.

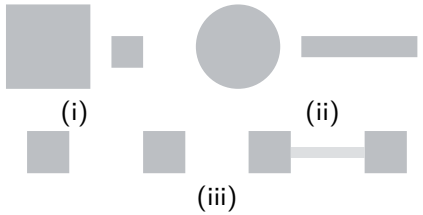
Answer shapes: evaluate with both strengths and limitations, then judge for the named case.

2 Practice

2.1 State **two** reasons for conserving biodiversity, one economic and one ethical. [2]



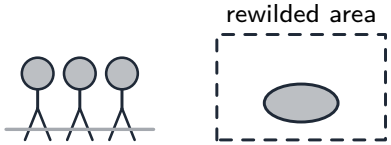
2.2 Use the principles of reserve design to choose the better reserve in each pair, with a reason: (i) one 100 km^2 reserve or one 10 km^2 reserve; (ii) a round reserve or a long thin one of the same area; (iii) two reserves with or without a corridor. [3]



2.3 Explain why wolves in Yellowstone are called a keystone species. [3]



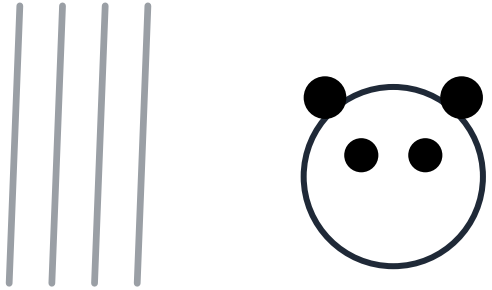
2.4 Distinguish between restoration and rewilding, with **one** example of each. [3]



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3 Exam-style questions

3.1 The giant panda was moved from Endangered to Vulnerable on the IUCN Red List in 2016.



(a) Identify **one** species-based and **one** habitat-based measure that may have helped. [2]

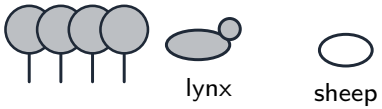
(b) Explain why the panda is used as a flagship species. [2]

3.2 A government plans a new marine protected area (MPA) where fishing is banned.



Evaluate the use of an MPA to conserve a coral reef. [5]

3.3 A charity wants to bring lynx back to a forest region where they were hunted to extinction 300 years ago.



(a) Suggest **two** ecological benefits of the reintroduction. [2]

(b) Discuss the arguments of **two** groups of stakeholders. [4]

(c) State **two** factors that would make the reintroduction more likely to succeed. [2]

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Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

economic: e.g. pollination of crops, tourism income, new medicines; ethical: e.g. every species has a right to exist / duty to future generations

2.2

(i) 100 km^2: larger populations and more habitats; (ii) round: less edge for the same area; (iii) with a corridor: animals can move, find mates and recolonize

2.3

few wolves have a large effect on the whole ecosystem; they reduce elk numbers and change where elk graze; so trees and shrubs by rivers can recover, which helps beavers, birds and riverbanks: a trophic cascade

2.4

restoration repairs a damaged ecosystem towards a target state, e.g. replanting mangroves on a coast; rewilding brings back natural processes and missing species, then lets nature manage itself, e.g. reintroducing beavers or wolves; rewilding has a less fixed target and less human management

3.1

(a) species-based: captive breeding and release / bans on hunting and trade; habitat-based: a network of nature reserves and replanting of bamboo forest

(b) it is popular and appealing, so it attracts public attention and money; protecting its forest habitat also protects many other species there

3.2

award up to [5]: strengths: fish and reef species recover inside the zone; larger fish spill over into fished areas, so catches nearby can rise; protects the whole community, not one species; limitations: cannot stop warming or acidification; fishing communities lose access, so the MPA needs their support and enforcement; conclusion for the case, e.g. effective if well enforced and linked to local incomes such as tourism

3.3

(a) any two: controls deer numbers, so young trees can regrow; restores a missing top predator and natural food webs; increases biodiversity

(b) e.g. conservationists: restores a native species and a natural process; brings eco-tourism; farmers: fear losses of sheep and want compensation; others: hunters lose deer

(c) any two: a large enough area of connected habitat with prey; enough animals released for genetic diversity; support from local people; monitoring after release

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