

Module 3: Biodiversity and Evolution
2.3.4 Maintaining Biodiversity
Questions

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| (a) outline the reasons for the conservation of animal and plant species, with reference to economic, ecological, ethical and aesthetic reasons |
| (b) discuss the consequences of global climate change on the biodiversity of plants and animals, with reference to changing patterns of agriculture and spread of disease |
| (c) explain the benefits for agriculture of maintaining the biodiversity of animal and plant species |
| (d) describe the conservation of endangered plant and animal species, both <i>in situ</i> and <i>ex situ</i> , with reference to the advantages and disadvantages of these two approaches |
| (e) discuss the role of botanic gardens in the <i>ex situ</i> conservation of rare plant species or plant species extinct in the wild, with reference to seed banks; |
| (f) discuss the importance of international cooperation in species conservation with reference to The Convention in International Trade in Endangered Species (CITES) and the Rio Convention on Biodiversity |
| (g) discuss the significance of environmental impact assessments (including biodiversity estimates) for local authority planning decisions |

6 (a) The traditional English folk song, *The Derby Ram*, contains the lyric:

*"As I went out to Derby, all on a market day
I spied the biggest ram, sir, that ever was fed on hay"*

The song is likely to have been inspired by the successes of farmers in the eighteenth century who developed a sheep known as the 'Dishly Ram'. This ram gave rise to a breed which grew more quickly, producing more wool and meat than other varieties of sheep.

(i) Explain how it would be possible for farmers in the eighteenth century to produce a larger, more profitable variety of sheep from an existing flock of sheep.

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(ii) Since the eighteenth century, other ways of improving productivity in sheep have been developed.

State **one** further way of improving productivity that is used by modern farmers.

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(b) Crop yield can be improved by the use of fertilisers. In the eighteenth century, these are likely to have been organic fertilisers in the form of manure or compost.

(i) Suggest how organic fertilisers improve the yield of plant crops.

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- (ii) Inorganic fertilisers are not directly toxic to living organisms. However, the excessive use of these fertilisers can lead to a reduction in the biodiversity of farmland.

Suggest how the excessive use of inorganic fertilisers on **farmland** can cause a reduction in its biodiversity.

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- (iii) Explain why a reduction in biodiversity may present problems for **agriculture** in the future.

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[Total: 12]

QUESTION 7 STARTS ON PAGE 22

- 5 (a) The black poplar was once a common tree throughout southern Britain. Its numbers have decreased by 94% since 1942 and it is in danger of becoming extinct in the wild.

There are thought to be approximately 2500 black poplars surviving in Britain today.

Use the information above to calculate the original number of black poplar trees in 1942.

Show your working.

Answer = [2]

- (b) Species such as the black poplar contribute to the biodiversity of the UK.

Suggest **three** reasons why the conservation of the black poplar is important.

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- (c) Botanic gardens are important in the conservation of plant species.

- (i) State why the conservation of a species in a botanic garden is described as *ex situ*.

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8 On Christmas Eve 1987, the last female Spix's Macaw, *Cyanopsitta spixii*, was removed from the wild in Brazil. The last remaining male bird continued to live in the wild for a further six years. This male bird, having lost its partner, mated with a Blue-winged Macaw, *Propyrrhura maracana*.

(a) Explain why eggs produced by this mating did not hatch.

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(b) Spix's Macaws became endangered because the birds were illegally trafficked to collectors in other parts of the world. This is against the CITES agreement.

(i) State what the abbreviation CITES stands for.

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(ii) State **two** of the aims of the CITES agreement.

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(c) Once it was realised that the Spix's Macaws were in danger of becoming extinct, the collectors were "invited" to allow their macaws to take part in a breeding programme.

Suggest **two** factors to be taken into consideration when selecting individuals for this breeding programme.

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4 In India, the population of the white-backed vulture, *Gyps bengalensis*, has fallen by 97% to an estimated 4 000 vultures. This vulture is now considered to be 'critically endangered'. Reasons for the decline in numbers include:

- vultures feed on carcasses including those from farm animals.
- these farm animals may have been treated with a pain killer. This particular pain killer causes kidney failure in the vultures.
- the use of this pain killer is being phased out. However, many farmers continue to use up their stocks of the drug.
- this pain killer is not easily biodegradable and will remain in the environment for many years.

(a) (i) Suggest what is meant by *critically endangered*.

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(ii) Calculate the **original** population of the white-backed vulture.

Show your working.

Answer = [2]

(b) In an effort to save the white-backed vulture, a captive breeding programme has been set up.

Three centres in India have been built, each housing up to 40 individuals. These vultures have been collected from different areas of the Indian subcontinent.

(i) Explain why the decision was made to conserve the species in captivity (*ex situ*) rather than in the wild (*in situ*).

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- (ii) Explain why the white-backed vultures in the captive breeding programme were,
- collected from several different areas
 - housed in three separate centres.

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(c) Outline **three** reasons why the conservation of the white-backed vulture is important.

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