Unit 30 · Conservation Biology

ANSWER KEY · FOR TEACHERS

Full marks 35

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. biodiversity → **c.** the variety of life at the level of genes, species and ecosystems
2. genetic diversity → **h.** the variety of alleles within one species
3. in-situ conservation → **a.** protecting organisms in their own natural habitat
4. ex-situ conservation → **b.** protecting organisms outside their natural habitat
5. hunting reserve → **d.** an area where hunting is allowed by law, under license
6. conservation area → **i.** a protected area where local people go on living and using the land
7. biodiversity hotspot → **e.** a region rich in endemic plants that has lost most of its natural vegetation
8. Ramsar site → **j.** a wetland listed as internationally important under a treaty

Each carries 0.5 mark. K · 4

2 Label the diagram

1. Genetic diversity
2. Species diversity
3. Ecological diversity

Each carries 1 mark. K · 3

3 Multiple choice

i. **b.** safeguarding organisms outside their natural habitats — K · 1

Ex situ, "out of its place": zoos, botanical gardens, breeding centers, seed banks and cryopreservation. The first and third options describe **in-situ** conservation.

ii. **b.** Shey Phoksundo National Park — K · 1

Shey Phoksundo, in Dolpa and Mugu, the largest national park, holds Phoksundo Lake. (Some books call it Nepal's deepest lake too; Rara Lake is deeper.)

iii. **b.** genetic diversity — U · 1

Red, pink and white plants of **one species** differ in their genes: that is **genetic diversity**. The 40 species of tree would be species diversity, and the forest beside a stream and a grassland would be ecological (ecosystem) diversity.

iv. **b.** people live, farm and use resources inside a conservation area under a management plan; inside a national park, settlement and grazing are forbidden — U · 1

A conservation area joins conservation with the **livelihoods of the people living in it**; Annapurna has villages, farms and lodges. A national park keeps people's use out of its core. (Conservation areas are usually larger: Annapurna is the biggest protected area of all.)

v. **b.** ex-situ conservation, because the young are raised away from their natural habitat — A · 1

The eggs hatch and the young grow up in tanks at the center, **away from their natural home**: that is **ex-situ** conservation, wherever the center stands. Releasing them back into the river then supports the **in-situ** population. The two work best together.

4 Very short answers

a. MARKING SCHEME — K · 1

✓ The wild water buffalo (arna).

Science Playground, Katunje, Bhaktapur
Book a class visit: https://science-playground.com/booking

b. MARKING SCHEME K · 1

✓ Krishnasar Conservation Area; the blackbuck.

c. MARKING SCHEME U · 1

✓ No genetic diversity: one disease can kill the whole crop.

5 Short answers

a. MARKING SCHEME U · 2

✓ At least 1,500 endemic vascular plants, and at least 70% of the natural vegetation lost.

✓ The Himalaya hotspot.

b. MARKING SCHEME A · 2

✓ 0.1^0.25 (the ratio of areas to the power 0.25).

✓ About 56%.

c. MARKING SCHEME U · 2

✓ Reptiles are cold-blooded and suit hot places; much of Nepal is cold.

✓ Birds are warm-blooded and use Nepal's many habitats at all heights.

d. MARKING SCHEME U · 3

✓ Any one cause with an example.

✓ A second.

✓ A third.

6 Long answers

a. ANSWER U · 4

1. It gives us **food**: crops, livestock, fish, wild fruits and vegetables, and the genes to breed better ones.
2. It gives **medicines** (sarpagandha, yew, yarsagumba, penicillin), timber, fiber, fodder and firewood.
3. It **keeps ecosystems balanced and working**: food webs, the cycling of nutrients, fertile soil.
4. It gives **ecosystem services**: oxygen, clean air and water, flood control, pollination, pest control, the cleaning of wastes.
5. It makes ecosystems **stable and resilient**: more species and more genetic variety means more ability to survive disease and climate change.
6. It gives **income** through ecotourism (Chitwan, Sagarmatha, Annapurna).
7. It has **cultural, spiritual, aesthetic and educational** value.
8. It is the **heritage** we must pass on: an extinct species can never be brought back.

MARKING SCHEME

✓ Food, medicines, timber, fiber and fodder.

✓ Ecosystem services: oxygen, clean water, pollination, pest and flood control.

✓ Stable, resilient ecosystems; genes for the future.

✓ Income from ecotourism; cultural and aesthetic value; heritage that can't be brought back (any one).

b. ANSWER

Wetlands, areas covered by shallow water or with soil soaked with water (marshes, swamps, lakes, floodplains, rice fields), cover about 5% of Nepal (743,500 ha in 242 wetlands). They sustain life in many ways:

1. **Biodiversity**: they hold rich ecosystems and are homes for many plants, fish, amphibians, reptiles, mammals and birds; many threatened species depend on them (the gharial and Gangetic dolphin of the Koshi, the wild water buffalo of Koshi Tappu, the cotton pygmy goose of Ghodaghodi, wintering water birds from across the Himalaya).
2. **Floods**: they soak up water in heavy rain and release it slowly.
3. **Clean water**: they trap pollutants and sediment.
4. **Climate**: they store carbon.

Science Playground, Katunje, Bhaktapur
Book a class visit: https://science-playground.com/booking

5. **Livelihoods**: fertile land, fish, fodder, reeds; recreation and ecotourism (bird watching at Koshi Tappu, boating on Phewa). U · 4
6. **Soil**: wetland plants prevent erosion.
7. **Knowledge and culture**: research and education; sacred sites such as Gosaikunda.

Because they are being drained, filled and polluted, wetlands are among the fastest-disappearing ecosystems. Conserving them (Nepal has 10 Ramsar sites under the Ramsar Convention) protects all the species that live in them, and the services people depend on.

MARKING SCHEME

- ✓ Rich biodiversity; threatened species depend on them (an example).
- ✓ Flood control and clean water.
- ✓ Carbon storage; fertile land and livelihoods; recreation (any one).
- ✓ Disappearing fast, so conserved, e.g. as Nepal's 10 Ramsar sites.

7 Think

ANSWER HA · 3

If hunting is strictly limited to a few **old males** each year, the herd hardly shrinks, since the females and younger males go on breeding. The **fees** pay for managing the reserve and its guards, and for the local people, who then gain from keeping the animals alive and help stop **poaching** and overgrazing of their pastures.

MARKING SCHEME

- ✓ Only a few old males are shot, so the herd's breeding isn't harmed.
- ✓ The fees pay for managing and guarding the reserve.
- ✓ Local people gain, so they protect the animals against poaching.

8 Activity: A wetland in a tray

(not marked)

WHAT STUDENTS SHOULD FIND

With no sponge the water rushes straight off, carrying soil: a flash flood. A sponge soaks most of it up and lets it out slowly, and the water below is clearer, since it traps the soil. A wetland does the same: it **prevents floods** and **filters** the water (it traps sediment and keeps soil from being washed away).

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	11	18	3	3	**35**

Science Playground, Katunje, Bhaktapur
Book a class visit: https://science-playground.com/booking