Unit 16 · Vegetation

ANSWER KEY · FOR TEACHERS

Full marks 39

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

1 Key words

K · 4

1. virgin
2. tree line
3. in-situ
4. ex-situ
5. Ramsar
6. germplasm
7. agroforestry
8. deforestation

Each carries 0.5 mark.

2 Label the diagram

K · 3

1. Nival (tundra), above 5,000 m snow, ice and rock; lichens, mosses and a few cushion plants
2. Alpine, 4,000–5,000 m no trees: low shrubs (sunpati, juniper) and meadows of grasses and herbs
3. Subalpine, 3,000–4,000 m fir (talis), birch (bhojpatra), rhododendrons, up to the tree line
4. Temperate, 2,000–3,000 m oaks (phalant, khasru), lali gurans, blue pine, hemlock; deodar in the west
5. Subtropical, 1,000–2,000 m chilaune and katus; chir pine on dry slopes; utis along streams
6. Tropical, below 1,000 m sal, saj, simal, karma; sisau and khayar by rivers; tall grasslands

Each carries 0.5 mark.

3 Multiple choice

i. **b.** Rara Tal — K · 1

Rara Tal, Nepal's largest lake, in Mugu, listed in 2007. A Ramsar site is a **wetland** of international importance; the others are not wetlands.

ii. **b.** alpine vegetation — K · 1

Above the **tree line** (about 4,000 m) it is too cold and windy, and the growing season too short, for trees. The **alpine** belt (4,000–5,000 m) has only shrubs, such as dwarf rhododendrons and junipers, and meadows. Subalpine forest, of fir and birch, lies below it.

iii. **b.** to slow down the life of the resting seed, so that it ages very slowly — U · 1

The seed is alive but dormant. Cold and dryness slow down the chemical reactions by which it ages, so it stays alive much longer. A dead seed would be useless to a seed bank.

iv. **b.** forest and other wooded land together — U · 1

40.4% + 4.4% ≈ **44.7%**: forest plus shrubland. Forest alone was 40.4% (5.96 million hectares). Make sure you know which one a question means.

v. **b.** more water runs off over the surface, carrying soil with it — A · 1

Without leaves to break the raindrops' fall and roots and leaf litter to keep the soil open, less water soaks in and more **runs off**, washing the topsoil away. Springs, fed by water that soaks in, then flow less in the dry season.

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4 Very short answers

a. MARKING SCHEME — K · 1

✓ Chitwan, 1973.

b. MARKING SCHEME — K · 1

✓ National Botanical Garden, Godawari.

c. MARKING SCHEME — U · 1

✓ Recalcitrant seeds die when dried or frozen.

5 Short answers

a. MARKING SCHEME — U · 2

✓ Climate, altitude, slope and aspect.

✓ How one of them works.

b. MARKING SCHEME — U · 2

✓ Sal is tropical and its seedlings are killed by frost.

✓ Higher up it is too cold, so frost-tolerant trees replace it.

c. MARKING SCHEME — A · 2

✓ Breeding at the center is ex-situ (outside its habitat).

✓ Releasing it into its own habitat depends on in-situ conservation.

d. MARKING SCHEME — U · 3

✓ Leaves intercept the rain, so drops reach the ground gently.

✓ Litter and roots keep the soil open, so water infiltrates instead of running off.

✓ Roots bind the soil and hold the slopes, reducing landslides.

6 Numerical problems

ANSWER — A · 4

i. 5.96 million ÷ 0.404 ≈ **14.75 million hectares** (147,500 km^2, close to Nepal's 147,181 km^2).

ii. 0.461 × 14.75 million ≈ **6.8 million hectares**.

iii. 15 ÷ 0.1 = **150 times**.

iv. 15 t × 4 = **60 tonnes** a year (against about 0.4 tonne under forest).

MARKING SCHEME

✓ About 14.75 million ha.

✓ About 6.8 million ha.

✓ 150 times.

✓ 60 tonnes a year.

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7 Long answers

a. ANSWER U · 4

A **seed bank** (germplasm bank) is a store where seeds of many kinds of plants, wild and cultivated, are kept at special conditions so that they stay alive for a very long time. The seeds are dried and kept very cold (about −18 °C for long-term storage), which slows their aging. Samples are tested by germination from time to time; when germination falls below about 85% of its starting value, seeds are grown and fresh seed is harvested and stored. Seeds that can't be dried or frozen (recalcitrant seeds such as mango) are kept as living plants or tissue instead. Examples: Nepal's national genebank at Khumaltar; the Svalbard Global Seed Vault.

Importance:

a. It keeps the genes plant breeders need for higher yield, disease and drought resistance and better nutrition.
b. It saves crop varieties and wild species that could become extinct, conserving genetic diversity ex-situ.
c. It supports food security: seeds can be returned to farmers after a disaster, a war or a crop failure.
d. It supplies material for research and for putting plants back into the wild.

MARKING SCHEME

- ✓ A store of seeds of many plants, wild and cultivated, kept alive for a long time (germplasm bank).
- ✓ Dried and kept at about −18 °C to slow aging; tested and regenerated below about 85% germination.
- ✓ Keeps genes for breeders (yield, disease and drought resistance).
- ✓ Saves genetic diversity of rare and threatened plants ex-situ; food security.

b. ANSWER A · 4

From 1978 the state began to hand forests back, and the **Forest Act of 1993** let the households who use a forest form a **community forest user group**: the group makes the rules, **guards the forest** against cutting, grazing and fire, and **shares** its timber, firewood, fodder and income, so people have a reason to protect it.

Most of the regrowth was **not planted**: degraded forests **grew back by themselves** once people looked after them. A 2019 study found community forests had cut forest loss by about **a third** (2000–2012).

Two other measures, any two: **alternative energy** (biogas, electricity, LPG, improved stoves) in place of firewood; **stall-feeding** instead of open grazing; **agroforestry**, private forests and strip plantation; **afforestation and reforestation** with native trees; **herbal farming**; protected areas and laws against illegal logging.

MARKING SCHEME

- ✓ User groups manage, guard and share the forest (Forest Act 1993).
- ✓ Forests regrew naturally once protected; loss cut by about a third.
- ✓ A first other measure.
- ✓ A second other measure.

8 Think

ANSWER HA · 3

Was it forest or grassland before? Natural grasslands such as the phanta or alpine meadows are habitats in their own right; planting trees on them destroys them.

Which tree? A single foreign species gives little food or shelter to local animals, may use much water and dry springs, and some spread as weeds; a mix of native trees supports far more life.

Who will look after it, and who benefits? Plantations fail when the people beside them are left out; letting a degraded forest regrow, protected from grazing and fire, is often cheaper and gives a richer forest.

MARKING SCHEME

- ✓ Whether the land was natural grassland, a habitat in itself.
- ✓ Native or foreign species, and the effect on wildlife and water.
- ✓ Who manages and benefits; natural regrowth as an alternative.

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9 Activity: A vegetation walk

(not marked)

WHAT STUDENTS SHOULD FIND

Below about 1,000 m: sal, saj, simal, sisau and khayar by rivers (tropical). From about 1,000 to 2,000 m: chilaune, katus, chir pine on dry slopes, utis along streams (subtropical). Above about 2,000 m: oaks, lali gurans and blue pine (temperate). The boundaries are higher on warm, dry, south-facing slopes: a dry south-facing slope often carries pine while the cooler north-facing slope beside it at the same height carries broadleaved forest.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	11	14	11	3	**39**

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