Unit 13 · Ecosystem Ecology

WORKSHEET

Full marks 39

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 39

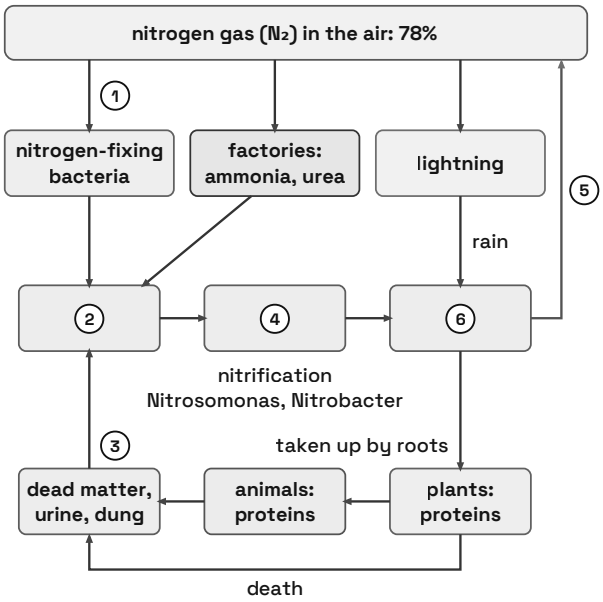
1 Key words [4]

Match each term in column A with its description in column B. Two items in column B are not needed. Each match carries 0.5 mark.

Column A		Column B	
1. edaphic factors	☐	**a.**	one partner is harmed, the other is not affected
2. commensalism	☐	**b.**	dead organic matter and wastes
3. amensalism	☐	**c.**	the arrival of seeds and spores in a bare area
4. detritus	☐	**d.**	the factors of the soil: texture, pH, air and water
5. trophic level	☐	**e.**	one partner gains, the other is neither helped nor harmed
6. ecesis	☐	**f.**	the final, stable community of a succession
7. climax community	☐	**g.**	the conversion of the nitrogen of dead bodies and wastes into ammonia
8. ammonification	☐	**h.**	the position an organism occupies in a food chain
		i.	seeds and spores germinating and growing into adult plants in a bare area
		j.	the study of one species and its environment

2 Label the diagram [3]

The diagram shows the nitrogen cycle. Write what belongs in place of 1 to 6. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

5. _____ **6.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. What is the first biological community that develops in a bare area called? [1]

a. climax community **b.** intermediate community

c. pioneer community **d.** stable community

ii. Which group of bacteria turns ammonium into nitrate in the soil? [1]

a. *Rhizobium* and *Azotobacter* **b.** *Nitrosomonas* and *Nitrobacter*

c. *Pseudomonas* and *Thiobacillus denitrificans* **d.** *Bacillus ramosus* and *Proteus*

iii. Bees visit the flowers of a mustard field, taking nectar and carrying pollen, but the mustard can also be pollinated by the wind and the bees can feed elsewhere. What is this interaction? [1]

a. mutualism **b.** protocooperation

c. commensalism **d.** colonization

iv. In a lake, the phytoplankton present at one moment weigh less than the zooplankton. Which pyramid will be inverted? [1]

a. the pyramid of energy **b.** the pyramid of biomass

c. none; pyramids can't be inverted **d.** the pyramid of number of the grazing chain

v. A person eats a meal of rice and fish curry. The fish had eaten smaller animals that fed on algae. At which trophic levels is the person feeding? [1]

a. only the second **b.** the second (rice) and the fourth (fish)

c. the third only **d.** the first and the second

4 Very short answers [3]

Write very short answers to the following questions.

a. Who coined the term ecosystem, and in which year? [1]

b. Name the three kinds of food chain. [1]

c. Why are there always few top predators, such as tigers, in an ecosystem? [1]

5 Short answers [9]

Write short answers to the following questions.

a. Differentiate between mutualism and protocooperation, with an example of each. [2]

b. "Energy flows, but nutrients cycle." Explain this statement. [2]

c. Many farmers sow lentil or gram on their rice fields after the rice harvest. How does this help the next rice crop? [2]

d. Why can a pyramid of biomass of a pond be inverted, while its pyramid of energy is always upright? [3]

6 Numerical problems [4]

Solve the following problem. Show your working.

The grass of a Tarai grassland has a gross primary productivity of 30,000 kJ/(m^2 year) and uses 12,000 kJ/(m^2 year) in respiration. In the food chain grass → chital → tiger, use the ten percent law on the energy available to the chital. i. Find the NPP of the grass. ii. What percentage of the GPP is the NPP? iii. How much energy reaches the chital, and how much the tiger, on each square meter in a year? iv. Use your answer to explain why tigers need large territories.

Answer: _____

7 Long answers [8]

Write long answers to the following questions.

a. Describe the structural components of a pond ecosystem. [4]

b. A landslide on a hillside in Syangja strips the forest but leaves the soil. Describe, step by step, how the forest could return, and say how this differs from what happens on bare rock left by a glacier. [4]

8 Think [3]

In 1959 the air held 316 parts per million of carbon dioxide; in 2025, 427. Using the carbon cycle, explain where the extra carbon came from, and why burning fossil fuels upsets a cycle that was once in balance.

9 Activity: A food web near you (not marked)

Spend half an hour in a field, garden or pond edge near your school. Write down every plant and animal you see, and what each eats, if you know or can find out.

Organism	What it eats	What eats it	Trophic level

Write one food chain from your list, with arrows from the food to the eater.