

FORM 3 BIOLOGY HOLIDAY ASSIGNMENT

March 1.

1. Define the terms: habitat, ecological niche, community, carrying capacity, ecosystem.
2. The following organisms were observed in a national park: gazelles, grasses, cheetahs, marabou storks, lions, vultures, wildebeeste, zebras, termites, hunting dogs, chameleons, snakes, lizards and grasshoppers.
  - a) Draw a food web to show the feeding relationships among these organisms.
  - b) Draw a food chain and label the different trophic levels.
  - c) Name one scavenger that forms part of this food web.
3. The data obtained for a fresh water lake showed that there were 7,000 diatoms, 140 tilapia, 420 mosquito larvae and 7 kingfishers.
  - a) Construct a food chain for the above organisms.
  - b) Draw up a pyramid of numbers for these organisms.
4. An ecologist made a count of the following organisms in a small section of a grassland habitat: 400 chameleons, 2 000 grasshoppers, 1 eagle and 20 acacia trees.
  - a) Draw a food chain for these organisms.
  - b) Construct a pyramid of numbers for these organisms.
  - c) Explain how the *pyramid of biomass* differs from the *pyramid of numbers*.
5. A scientist who was observing a rhino feeding in a grassland ecosystem noticed that 30 bloodsucking ticks climbed on to its hide and started to feed. The ticks were soon detected by 3 ox-pecker birds which quickly devoured them.
  - a) Name the kind of relationship that exists between:
    - (i) the ticks and the rhino
    - (ii) the ox-peckers and the rhino.
  - b) Draw a pyramid of numbers for the organisms in this food chain.
6. The olive marsh snake is semi-aquatic and is found in swamps and along river banks. It feeds mainly on frogs, toads and occasionally small rodents. Its main predators are birds such as storks and herons. Construct a simple food chain taking aquatic plants like sedge grass *Cyperus* spp. as the primary producer.
7. What is parasitism? How does it differ from saprophytism?
8. a) What is symbiosis?  
b) Briefly describe this biological relationship using lichens as an example.
9. Briefly describe the environmental greenhouse effect.
10. Describe four ways by which the roundworm *Ascaris* spp. is adapted for parasitism.
11. A grassland ecosystem has a resident population of gazelles. Their predators are a small group of cheetahs. If these cheetahs are killed by poachers, what possible effect will it eventually have on this grassland ecosystem?

12. In a laboratory experiment to investigate the population growth of mice, 20 young mice were placed in a cage and supplied with the same amount of food and water every day. The resulting number of mice is shown in the table below.

	0	25	50	75	100	125	150	175	200	225
	20	20	64	190	420	870	525	350	190	80

- Draw a graph showing the population change of the mice during the period of observation.
- With reference to the graph drawn, explain the change in mice population between:
  - 0 to 25 days
  - 25 to 125 days
  - 125 to 225 days.
- From the graph suggest at which period the growth rate was fastest; give a reason for your answer.
- Calculate the population growth rate during this period.

- In what form is energy transferred from one trophic level to another?
- If only a small fraction of energy is transferred from one trophic level to another, what happens to the rest of the energy?
- In what form does this energy enter the earth's ecosystem?

- Name the organism that causes malaria.
- Briefly describe three effective ways of preventing this disease.

15. A group of students were investigating the number of crayfish in a shallow pond, using the capture-mark-release-recapture method. They caught 50 crayfish, marked them with a dab of white paint on the cephalothorax and then released them back into the same pond. After three days they made a catch of 50 crayfish from the same pond, and of these 3 had the white paint mark.

- Using this data, calculate the population of the crayfish in this pond.
- State any two assumptions that were made in this method of estimating the crayfish population in the pond.
- Suggest another method that could have been used to determine the population of the crayfish.

- Define the term pollutant with regard to environmental pollution.

- List any five types of pollutants of the atmosphere, and state the possible source of each one of them.

17. Name three possible types of pollutants that could reach a river water supply that is used for domestic purposes. State their possible sources.

18. Briefly describe three important human activities that increase the emission of carbon (IV) oxide into the atmosphere. For each, suggest one way of minimising CO<sub>2</sub> emission.

19. Describe the main causes of soil erosion.

20. Describe one waterborne disease, that is, its causative agent, vector, symptoms and possible methods of preventing it.