

CHAPTER FOUR
ECOLOGY
QUESTIONS AND ANSWERS
Part One: direct questions

1. Define the following terms used In ecology

- a)** Biosphere(ecosphere) **b)** Habitat **c)** Synecology
d) Population **e)** Carrying capacity **f)** Autecology **g)** Ecology

Ans:- a) biosphere is the part of earth and atmosphere inhabited living organisms.

b) Habitat is the specific locality with a particular set of conditions where organism lives.

c) The study of many species is called **synecology**.

d) Population refers to all members of a given species in a particular habitat at a particular time.

e) Carrying capacity refers to the maximum number of organism an area can comfortable support without depletion of the available resources.

f) Autecology is the study of an individual species within community. Is involves studying the relationship of the species with biotic and abiotic components of the ecosystem.

g)Ecology is the study of interrelationships of organisms to each other and their environment.

2. what are the two main component of an ecosystem.

ans:- the two main components of an ecosystem are: Abiotic and biotic factor.

3) define the following terms:

(a) community (b) ecosystem (c) Biomass (d) Environment

Ans:- (a) community refers to all organisms belong to different species that interact in the Habitat.

(b)An **ecosystem** is the natural unit composed of abiotic(non-living) and biotic (living) factors whose interactions lead to a self-sustaining system.

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(c) **Biomass** is the total dry weight of the living organism to a particular per unit area.

(d) **Environment** is defined as the whole sum of the surrounding external conditions within which an organism, a community or an object exists.

4) factors in an ecosystem are divided into two main groups, what are they?

Ans:- they are abiotic and biotic factors.

5) what is meant by abiotic factors and tell of them?

Ans:- abiotic factors are non-living environmental factors which effect distribution of organisms like light, temperature, atmospheric pressure, salinity, humidity, soil texture, pH and wind.

6) differentiate these terms: - (a) Intraspecific (b) interspecific competition.

Ans:- (a) Competition between individuals of the same species is known as **intraspecific**.

(b) Competition Between individuals of different species is known as **interspecific competition**.

7) What are similarities and differences between predation and parasitism?

Ans:- The **similarities** between predation and parasitism is that predator or parasite derives its nutrition from some other organism, **while** the **difference** is that Predation is the food relationship in which one organism kills another for food and feeds on it either wholly or in part. While **Parasitism** is the relationship in which an organism obtains nutrients from another live organism without killing it.

8) What are differences between predator and Prey?

Ans:- **predator** is the organism which kills another organism for food while the one was killed is called Prey.

9) Differentiate ectoparasite and endoparasite.

Ans:- A parasite benefits in terms of food and shelter from the host are known as **ectoparasites** e.g ticks while those found inside the body of the host are known as **endoparasites** e.g. plasmodium.

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10) Explain these terms:- (a)Symbiosis (b) saprophytism

Ans:- (a) two different kinds of living things live together, both organisms benefit. This relationship is called **symbiosis**.

(b) **Saprophytism** is a type of nutrition where organisms obtain nutrients from dead organic matter hence causing decomposition. Organisms which feed in this manner are known as saprophytes such include fungi and bacteria.

11) what understand by following words:

a) Nitrogen fixation

b) Denitrification

Ans:- (a) **Nitrogen fixation** is the process by which atmospheric nitrogen convert into form that can be utilised by plants.

(b) **Denitrification** is the process by soil micro-organisms reduce nitrates to nitrate, even ammonia and nitrogen gasses that is not use full to plants.

12) Differentiate between the following terms?

a) carnivores

b) herbivores

c) omnivores

Ans: - a) **carnivores** are animals which eat meat only, usually referred to secondary consumer. b) **Herbivores** are animals that eat plants, usually referred to primary consumer. c) Omnivores are animals that eat both plants and animals.

13) define trophic levels and decomposers?

Ans: - feeding levels that is, producers and the consumer levels (primary, secondary, tertiary and quaternary consumers) are referred to as **trophic levels**. **Whereas**, when living organisms die, they are decomposed by bacteria and fungi which are referred to as **decomposers**.

14) what is a food chain and what is composed of and give specific examples about food chain.

Ans: - The flow of energy from a producer to other organisms called **food chain**. A food chain is composed of producers, consumers and decomposers.

Specific examples of food chains are given below:

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1. <i>Grass</i>	<i>Grasshopper</i>	<i>Bird</i>
2. <i>Napier grass</i>	<i>Goat</i>	<i>Human</i>
3. <i>Kikuyugrass</i>	<i>Mouse</i>	<i>Snake</i>
4. <i>Algae</i>	<i>Mosquito</i>	<i>Tilapia</i>
	<i>NiIe</i>	<i>Human.</i>

15) what is food web?

Ans: - the flow of interconnecting food chains is called food Web. b) Construct a food chain where all the consumers are chordates.

16) state types of ecological pyramids?

Ans: - There are three types of ecological pyramids namely pyramid of numbers, pyramid of biomass and pyramid of energy.

17) define population? And state some of characteristics?

Ans: - A **population** is a group of organisms belonging to the same species in a particular habitat. some of the characteristics of populations:

(1) **Density:** Refers to the number of individuals per unit area. For example, fifty antelopes per square kilometre.

(2) **Dispersion:** This is the spread or distribution of organisms in a habitat.

(3) **Population growth:** Refers to the rate of increase in number.

18) State factors that influence population growth rate?

Ans: - Population growth rate may be influenced by such **factors as food availability, space, diseases and pests and predators.**

19) Define adaptation?

Ans: - **adaptation** is a change in an organism that increase its chances of survival in a specific environment.

20) how many different adaptations possess based on their habitat?

Ans:- adaptations based on their habitats, hence there are four main groups of plants namely:

- Xerophytes (xero means dry)
- Mesophytes (Meso means normal)
- Hydrophytes (Hydro means water)

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- Halophytes (Halo means salt)

21) explain the meaning of xerophytes and state their habitat characteristics of conditions?

Ans:- Xerophytes are plants adapted to resist a dry habitat, or to adapt conditions of prolonged drought as in arid and semi-arid areas.

These habitats are characterised by the following conditions:

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- a) Unpredictable and poorly distributed rainfall which is usually less than 250 mm but hardly exceeds 350 mm per year.
- b) Very high day temperatures but very low night temperatures.
- c) They are windy.
- d) d. Low humidity.

22) Explain the meaning of Mesophytes and state their habitat characteristics of conditions?

Ans: - A plant living under normal conditions of water supply or in well-watered soils is described as a **mesophyte**. The habitats of mesophytes have the following general characteristics:

- a) Adequate rainfall ranging from 950 mm-1800 mm that is distributed throughout the year.
- b) Humidity is relatively high.
- c) Thick clouds are common.
- d) Moderate to high temperatures, with low diurnal range.
- e) Less windy.
- f) Shallow water table.

23) Explain the meaning of Hydrophytes and state their habitat characteristics of conditions?

Ans:- Plants which normally grow wholly or partly in fresh water are referred to as **hydrophytes**. Their habitats are characterised by the following conditions:

- a) They have low concentration of dissolved gases.
- b) Waves and currents are usually common.
- c) Light is less abundant under water.

24) Explain the meaning of Halophytes and state their habitat characteristics of conditions?

Ans:- These are plants which are able to tolerate very salty conditions in soil and marine water are called **Halophytes**. These habitats are characterised by the following conditions:

- a) They have high concentration of mineral salts.
- b) They have low concentration of dissolved gases especially in marine water.

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- c) Light intensity is low in marine water.
- d) Currents and waves are common in seas.

Note: Temperatures in marine environment are generally stable.

25) state Some of the negative effects of human activities?

Ans: - Some of the negative effects of human activities include deforestation, soil erosion, overgrazing and pollution.

26) what is the difference between pollution and pollutant?

Ans: - **Pollution** is the release of substances into the environment by human activities in such quantities whose effects are either harmful or unpleasant to humans or other living organisms While **pollutant** is mainly waste that contaminates air, water or soil.

27) What do you understand by the-term air pollution?

Ans: - **Air pollution** is the release of gasses into the air that is harmful to living things.

28) list causes of air pollution? And state the effects of each?

Ans:- causes of air pollution are:-

- a) sulphur based chemicals.
- b) Oxides of nitrogen
- c) Smoke and fumes
- d) Dust
- e) Lead(Pb)
- f) Aerosols

Effects of air pollution

(a) sulphur based chemicals i.e SO₂ and H₂S.

- Are harmful to the organism leading to; bronchitis, pneumonia and heart failure.
- Effects to respiratory tract and hence interfere with gaseous exchange.

(b) Oxides of nitrogen: - i.e NO and NO₂

- The nitrogen oxides dissolve in rain water forming acid rain (with similar effects as for sulphur (IV) oxide)
- Nitrogen (IV) oxide (NO₂) is **carcinogenic means causes of cancer.**

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(c) Smoke and fumes effects

- ❖ When they settle on leaves they block stomata.
- ❖ Stops to happen photosynthesis.

CO₂ causes respiratory poisoning.

(d) Dusts

- Effects dusts settles on plant leaves hence limiting photosynthesis.
- It brings breathing problems.
- It brings respiratory disease.
- It also reduces visibility and irritates the eyes.

(e) Lead(pb).

- ◆ When inhaled, it is absorbed into the blood stream and accumulates in the liver, kidneys and bones of animals affecting physiological functioning of these organs.
- ◆ Lead is also thought to interfere with mental development of children.
- ◆ In plants, it leads to the blocking of stomatal pores making it difficult for the plant to carry out gaseous exchange and hence no photosynthesis leading to death.

(f) Aerosols

The main pollutant in these aerosols are copper, lead and chlorofluorocarbon (CFC) compounds.

The main effect of Chlorofluorocarbons is **depletion of the ozone layer** leading to increased penetration of ultra (UV) radiation.

The UV radiation causes skin cancer and affects crops.

29) How to control air pollution?

Ans: - **Legislation.**

Governments need to enforce the relevant legislative acts on environmental pollution. Automobiles should be fitted with filters and catalytic converters in their exhaust pipes to reduce emission of oxides of nitrogen, sulphur and carbon.

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30) what do you understanding by the term-water pollution?

Ans: - water pollution is the release of substances into the water that is harmful to living organism depend on that water.

31) Give the various sources of water pollution and their effects.

Ans: - sources of water pollution include: -

o Domestic Effluents

Water pollution may cause epidemic diseases.

o Industrial Effluents

Industrial wastes may contain metallic-. * pollutants.

o Oil Spillage

Oil layer on water reduces oxygen supply to the water and this may lead to death of aquatic life forms.

o Heat

Heat reduces the amount of dissolved gases in water e.g. oxygen and carbon (IV) oxide. May cuase hot water shortage of oxygen or lack of photosynthesis Heat raises respiratory rate to abnormal levels causing malfunctioning in the organisms. The hot water may even kill the living organisms directly due to the high temperatures.

o Agro-chemicals

affects the respiratory activities of aquatic organisms. Nitrates and phosphates in fertilisers cause eutrophication.

o Lead

The effects of lead whether inhaled or ingested are similar as discussed under air pollution.

o Mercury

Mercury interferes with the process of melanin formation leading to skin lightening, blindness, paralysis and even death. Methyl mercury is volatile and very toxic. It is absorbed by aquatic organisms or through leaves and roots of plants hence entering the food web involving human beings.

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o Soil Erosion

This makes water unclean and unfit for human consumption. The silt particularly reduces light penetration hence hindering photosynthetic activity. It also clogs the respiratory surfaces of aquatic organisms e.g. gills in fish and stomata in plants. This interferes with gaseous exchange.

32) How can be controlled by water-pollution?

1. Legislation.
2. Industries should control
3. Proper treatment and disposal of sewage.
4. Encourage the use of unleaded petrol.
5. The public should be educated on correct amounts of inorganic fertilisers and pesticides to be used.

33) state the unique cause of all pollutions?

*Ans: - **Radioactive Emission** is the cause soil, air and water pollution.*

34) what is radiation?

Ans: - the energy released when an atom broken down are referred to **Radiation**

39) what is radioactive or nuclear reactors and give common substance that be broken to release nuclear energy?

Ans: - the industries which radiation produced are called radioactive or nuclear reactors. Some of the common substances broken down to release nuclear energy are uranium, radium, germanium, plutonium and hydrosonium (heavy water).

40) state the uses of nuclear energy?

Ans: - Nuclear energy is used in the generation of electricity and propelling of nuclear war planes, nuclear propelled ocean vessels, space ships and submarines.

41) state the effects of radioactive emission?

Ans: - **Effects of Radioactive Emissions**

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- a) Increased mutation rates with increased abnormalities some of which are inheritable.
- b) It causes cancer such as bone tumours and leukaemia.
- c) Excess doses of radioactive emissions cause so much damage leading to death.

42) How to control radioactive emission?

Ans:- control is:- Due to potential dangers of nuclear waste disposal and energy management, **the control is only by dialogue between nations with the nuclear technology.**

43) study this question

The table below gives information about some diseases. Complete the table

Disease malaria is caused by protozoan	parasite called Plasmodium.
Mode of transmission:-	The <i>Plasmodium</i> is transmitted from an infected person to a healthy person by a female <i>Anopheles</i> mosquito (vector)
Symptoms of malaria:-	high regular fevers accompanied by profuse sweating punctuated by chills and shivers. Headaches, muscle and joint pains are felt most of the time. The patient lacks appetite and vomits from time to time.
Disease of amoebiasis is caused by:-	Protozoan called <i>Entamoeba histolytica</i> .
Mode Of transmission	When the amoebae cysts are ingested, the cyst's membrane is digested and the protozoa are released. When they reach the large intestines and the colon, the <i>E. histolytica</i> multiply.
Symptoms of Amoebiasis	The disease is usually characterised by diarrhoea, dehydration, fever and abdominal

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	pains and severe pains when passing stool.
Disease cholera is caused by a	bacterium known as <i>Vibrio cholerae</i> .
Mode of transmission of cholera	When the People leaving in unhygienic conditions, i.e. where sanitation is poor and the domestic water supply is contaminated, can easily contract the disease. Once there is an outbreak of the disease, it spreads rapidly and can cause an epidemic.
Symptoms of cholera:	The exposed intestinal wall then becomes irritated and damaged by the toxins produced by the bacteria, and this causes violent diarrhoea and vomiting. This is accompanied by severe abdominal pains. Death by cholera can be rapid - within 24 hours of infection in extreme cases.
Disease typhoid is caused by	bacterium called <i>Salmonella typhi</i>
Mode of transmission of Typhoid	The bacteria are passed out in either urine or faeces. Sometimes the bacteria can be present in sweat and saliva and so the clothes and beddings of the patient can be sources of infection to others.
Symptoms of typhoid	Its incubation period lasts for about two weeks after which a fever and rash develop, followed by severe diarrhoea

44) two diseases caused by bacteria and two diseases caused protozoan?

Ans: - **typhoid** and **cholera** are caused by bacteria and **Amoebic Dysentery** and Malaria are caused by protozoan.

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45) state the prevention of diseases below: -

(a) cholera (b) typhoid (c) Amoebic Dysentery (d) Malaria

Ans:- (a) prevention of cholera:

- ❖ Sanitary disposal of faeces and refuse is needed to prevent the contamination of water and food.
- ❖ The pit-latrines in rural areas should be deep.
- ❖ Domestic water should be boiled and filtered, or chlorinated before use so as to kill bacteria and their spores.

(b) Prevention of Typhoid:-

- There should be proper disposal of faeces and urine to prevent spread of the bacteria.
- Domestic water should be boiled or chlorinated before drinking to kill the bacteria.
- Before the eating must be wash your hands.

(c) prevention of Amoebic Dysentery:-

- ❖ Prevention of the infection aims at avoiding contamination of food or water with cysts.
- ❖ Boiling water before drinking and proper food storage and proper faecal disposal.

(d) Prevention of Malaria:-

⌚ The prevention of recent method is the development of vaccines against the *Plasmodium*. Traditionally malaria has been controlled by use of nets to prevent mosquito bites.

⌚ Drainage of stagnant water and clearance of vegetation around houses destroys the breeding and resting sites of mosquitoes hence reduction in their numbers.

⌚ Tins, plastic containers and polyethene papers that hold water should also be destroyed.

Part Two: Complete the blank spaces

1. **Habitats** are categorized into terrestrial (**land**) habitats and aquatic (**water**) habitats.
2. An **ecological niche** is the position that an organism occupies in a habitat.

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3. **A photographic light meter** is used to measure light intensity while the **Seechi disc** measures light penetration in water.
4. Air temperature is measured by a **thermometer**
5. Atmospheric pressure is measured using a **barometer**
6. **Humidity** refers to the amount of water vapour in the atmosphere.
7. The instrument used to measure humidity is **Paper hygrometer**.
8. **Wind** is moving air. It increases the rate of water loss from organisms, therefore affecting their distribution.
9. **A wind vane or a wind sock** is used to determine direction of prevailing wind. The speed of wind is measured by **anemometer**.
10. **Salinity** refers to the salt concentration of water, causing a division of the aquatic environment into marine, estuarine and fresh water.
11. **pH (hydrogen ion concentration)** is the measure of how acidic or alkaline water is in aquatic habitat or soil solution.
12. **Ascaris lumbricoides** is a parasitic roundworm which belongs to the phylum Nematoda.
13. The genus **Ascaris** is the largest nematode parasitic to humans.
14. **Ascaris lumbricoides** has two hosts, human beings and pigs.
15. **Schistosomiasis (Bilharzia)** is a parasitic disease of the blood.
16. There are three different species of schistosoma that infect human beings. These include ***Schistosoma mansoni*, *Schistosoma haematobium* and *Schistosoma japonicum***.
17. The parasite is spread when people drink water contaminated by a larval form called **cercariae**.
18. When the faeces or urine containing eggs are disposed of into water. The eggs hatch into larvae called **miracidia**.
19. **Ascaris lumbricoides** It lays many eggs to increase the chances of survival even when some are destroyed. The eggs have a protective shell to survive harsh environmental conditions.
20. **Schistosomiasis (Bilharzia)** It is caused by a flatworm of the phylum Platyhelminthes of the genus *Schistosoma*.