ZOO507 – PRINCIPLES OF ANIMAL ECOLOGY

FINAL TERM MOST IMPORTANT QUESTIONS

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GROUP LINK: https://chat.whatsapp.com/BjC6W0jZx8o9yaC2ISh1Gu

1. What are types of Acid Rain?

There are two main types of acid rain:

1. **Wet Deposition**
   This type occurs when acidic pollutants like sulfuric acid (H_2SO_4) and nitric acid (HNO_3) mix with rain, snow, fog, or dew and fall to the ground. It directly affects soil, plants, water bodies, and buildings.
2. **Dry Deposition**
   In dry conditions, acidic gases and particles (like sulfur dioxide, SO_2, and nitrogen oxides, NO_x) settle on surfaces such as buildings, cars, trees, or soil. These deposits can later be washed away by rain, turning into acidic solutions and causing delayed environmental damage.

2. What are types of biogeochemical cycles?

The main types of biogeochemical cycles are:

1. ***Water Cycle (Hydrological Cycle):*** Involves the continuous movement of water through evaporation, condensation, precipitation, infiltration, and runoff.
2. ***Carbon Cycle:*** Describes the exchange of carbon among the atmosphere, biosphere, oceans, and geosphere through processes like respiration, photosynthesis, decomposition, and combustion.
3. ***Nitrogen Cycle:*** Involves nitrogen fixation, nitrification, assimilation, ammonification, and denitrification, helping to make nitrogen available to living organisms.
4. ***Phosphorus Cycle:*** Circulates phosphorus through rocks, soil, water, and living organisms without involving the atmosphere, crucial for DNA, RNA, and ATP.
5. ***Sulfur Cycle:*** Involves the movement of sulfur through the atmosphere, water, soil, and living organisms, influenced by volcanic activity and fossil fuel combustion.

3. What is radioactive contamination?

Radioactive contamination is the unintended presence or spread of radioactive substances on surfaces, in the air, water, soil, or within living organisms. It occurs when radioactive materials like uranium, cesium, iodine,

or plutonium are released into the environment due to accidents (e.g., nuclear power plant leaks), improper disposal of radioactive waste, or nuclear weapons testing.

Contamination can be external (on skin, clothes, or surfaces) or internal (inhaled, ingested, or absorbed into the body), posing health risks such as radiation sickness, genetic mutations, or cancer due to ionizing radiation damaging tissues and DNA.

4. How marine ecosystem is distributed?

The marine ecosystem is distributed based on depth, distance from shore, and light availability. It is mainly divided into the following zones:

1. ***Intertidal Zone***
   The area between high and low tide; organisms here endure both aquatic and dry conditions (e.g., crabs, barnacles).
2. ***Neritic Zone***
   Extends from the low tide mark to the edge of the continental shelf; well-lit and rich in nutrients, supporting coral reefs and large fish populations.
3. ***Oceanic Zone***
   Begins beyond the continental shelf; less nutrient-rich but vast, inhabited by whales, squids, and deep-sea species.
4. ***Pelagic Zone***
   Open water zone away from the shore and bottom; includes both surface and deep-water organisms.
5. ***Benthic Zone***
   Ocean floor; contains decomposers and scavengers like sea cucumbers and benthic fish, even in deep trenches.
6. ***Abyssal Zone***
   Deepest, darkest part of the ocean; extremely cold and under high pressure, home to bioluminescent and highly adapted species.

5. Define autotrophs.

Autotrophs are organisms that produce their own food using inorganic substances and an external energy source. They do not rely on other organisms for nutrition. Autotrophs are the primary producers in food chains, forming the base of most ecosystems.

There are two main types:

1. ***Photoautotrophs*** – Use sunlight to convert carbon dioxide and water into glucose through photosynthesis (e.g., plants, algae, cyanobacteria).
2. ***Chemoautotrophs*** – Use energy from chemical reactions involving inorganic compounds (like hydrogen sulfide or ammonia) to produce food (e.g., certain bacteria found in deep-sea vents).

6. Define pollutants and its three examples.

Pollutants are harmful substances that contaminate the environment, causing adverse effects to living organisms and ecosystems. They can be solid, liquid, or gas and may originate from natural or human-made sources.

Examples:

1. ***Carbon monoxide (CO)*** – A colorless, odorless gas from vehicle emissions; harmful to human health.
2. ***Plastic waste*** – Non-biodegradable material that pollutes land and oceans, affecting wildlife.
3. ***Sulfur dioxide (SO_2)*** – A gas from burning fossil fuels; causes acid rain and respiratory problems.

7. What are causes of noise pollution?

Causes of noise pollution include:

1. ***Traffic*** – Noise from cars, buses, trucks, and motorcycles on roads.
2. ***Industrial activities*** – Machinery and equipment in factories and construction sites.
3. ***Airports*** – Loud sounds from airplanes taking off, landing, and flying overhead.
4. ***Loudspeakers and public events*** – High-volume music, announcements, and celebrations.
5. ***Household sources*** – Loud TVs, music systems, generators, and domestic appliances.
6. ***Urbanization*** – Increased population density and construction in cities raise background noise levels.

8. Define Municipal solid waste.

Municipal solid waste (MSW) refers to the everyday garbage and refuse generated by households, businesses, schools, and public places within a city or town. It includes items like food scraps, paper, plastics, glass, metals, textiles, and yard waste. MSW is commonly collected by local municipal authorities and managed through methods like landfilling, recycling, composting, or incineration. Proper handling is essential to prevent pollution, health hazards, and environmental degradation.

9. Differentiate between reuse and recycle.

Reuse and **recycle** both help reduce waste, but they differ in process and purpose:

- Reuse involves using an item again in its original form for the same or a different purpose without altering its structure. For example, refilling a glass jar or using old clothes as cleaning rags.
- Recycle means processing waste materials to make new products. This involves breaking down the item (like melting plastic or paper) and reforming it into something new, such as turning used paper into recycled paper.

10. What is geographical distribution of Markhor in Pakistan?

The geographical distribution of Markhor (Capra falconeri) in Pakistan is primarily in mountainous regions of the north and west. Markhor prefer steep, rocky terrains between 600 to 3,600 meters altitude. They inhabit scrub forests and cliffs, where they are well-adapted to avoid predators. Key areas include:

1. ***Gilgit-Baltistan*** – Especially in the Chitral**,** Gilgit, and Astor valleys.
2. ***Khyber Pakhtunkhwa (KPK)*** – Found in Chitral, Kohistan, and Torghar regions.
3. ***Balochistan*** – In Ziarat, Kalat, and Kirthar mountain ranges.
4. ***Azad Jammu & Kashmir*** – Some isolated populations in hilly areas.

11. Define Amensalism and its two examples.

Amensalism is a biological interaction where one organism is harmed or inhibited while the other organism remains unaffected.

Examples:

1. ***Penicillium mold and bacteria:*** Penicillium releases penicillin, which kills nearby bacteria, but the mold itself is unaffected.
2. ***Large trees shading small plants:*** The large tree blocks sunlight, inhibiting the growth of smaller plants beneath it, while the tree itself is unaffected.

12. What are health effects due to climate change?

Health effects due to climate change include:

1. Heat-related illnesses like heatstroke and dehydration from rising temperatures.
2. Respiratory problems caused by increased air pollution and allergens.
3. Vector-borne diseases (e.g., malaria, dengue) spreading as warmer climates expand habitats for mosquitoes.
4. Waterborne diseases from contaminated water sources due to floods and poor sanitation.
5. Malnutrition from reduced crop yields and food insecurity.
6. Mental health issues linked to climate-related disasters and displacement.

13. What threats are concerned with Snow Leopards?

Threats faced by snow leopards include:

1. Poaching for their fur and bones, used in illegal wildlife trade and traditional medicine.
2. Habitat loss and fragmentation due to human encroachment, infrastructure development, and livestock grazing.
3. Decline in prey species like blue sheep and ibex caused by overhunting and competition with livestock.
4. Human-wildlife conflict, where snow leopards prey on livestock, leading to retaliatory killings by herders.
5. Climate change, which alters their cold mountain habitats and affects prey availability.

14. What are biodegradable pollutants?

Biodegradable pollutants are substances that can be broken down naturally by microorganisms like bacteria, fungi, and other decomposers into harmless components over time. They don't persist long in the environment and typically cause less lasting damage.

Examples:

- Food waste
- Paper and cardboard
- Sewage and human waste
- Plant materials (leaves, wood)

15. Differentiate between autecology and synecology.

- Autecology studies the relationship of a single species with its environment — focusing on its behavior, physiology, and adaptations.
- Synecology examines the interactions among groups of species or entire communities within an ecosystem, including how they coexist and affect each other.

16. What are sources and causes of light pollution?

Sources of Light Pollution:

1. Streetlights
2. Commercial and residential outdoor lighting
3. Billboards and advertising lights
4. Vehicle headlights
5. Sports stadium and event lighting
6. Industrial and construction site lighting

Causes of Light Pollution:

- Excessive or poorly designed artificial lighting that directs light upward or sideways instead of down.
- Over-illumination in urban areas.
- Use of high-intensity lights during nighttime when not necessary.
- Lack of shielding or use of inefficient lighting fixtures.

17. What is Ozone and how it is being depleted?

Ozone is a molecule made of three oxygen atoms (O_3). It forms a layer in the Earth's stratosphere called the ozone layer, which absorbs most of the Sun's harmful ultraviolet (UV) radiation, protecting living organisms.

Ozone depletion happens mainly because of human-made chemicals like chlorofluorocarbons (CFCs), halons, and other ozone-depleting substances. These chemicals break down ozone molecules when they reach the stratosphere through a chemical reaction that releases chlorine and bromine atoms. These atoms destroy ozone by converting it into oxygen (O_2), thinning the ozone layer and increasing UV radiation reaching the Earth's surface. This leads to higher risks of skin cancer, cataracts, and harm to plants and marine life.

18. What are the types of radioactive particles?

The main types of radioactive particles emitted during radioactive decay are:

1. **Alpha particles (α)**
   Consist of 2 protons and 2 neutrons (a helium nucleus). They have low penetration power and can be stopped by paper or skin but are harmful if ingested or inhaled.
2. **Beta particles (β)**
   High-energy, high-speed electrons (β^-) or positrons (β^+) emitted from the nucleus. They penetrate further than alpha particles but can be stopped by materials like plastic or aluminum.
3. **Gamma rays (γ)**
   Electromagnetic radiation (photons) with very high energy. They have strong penetration power and require dense materials like lead or concrete for shielding.

4. **Neutrons**
   Neutral particles released in some nuclear reactions; highly penetrating and can make other materials radioactive.

19. What is natural cause of Acid Rain?

Natural causes of acid rain include:

- Volcanic eruptions, which release sulfur dioxide (SO_2) and nitrogen oxides (NO_x) into the atmosphere.
- Wildfires, producing nitrogen oxides and other gases.
- Lightning, which generates nitrogen oxides through high-temperature reactions in the atmosphere.

20. What are causes of lake waste pollution?

Causes of lake waste pollution include:

1. ***Industrial discharge*** – Release of untreated or poorly treated chemicals, heavy metals, and toxic waste into lakes.
2. ***Agricultural runoff*** – Fertilizers, pesticides, and animal waste washed into lakes causing nutrient pollution and eutrophication.
3. ***Domestic sewage*** – Untreated or partially treated sewage adds pathogens and organic waste.
4. ***Solid waste dumping*** – Plastics, garbage, and debris thrown directly into lakes.
5. ***Urban runoff*** – Oil, grease, and chemicals from roads and city surfaces carried into lakes during rainfall.
6. ***Deforestation and soil erosion*** – Sediment runoff clouds lake water, harming aquatic life.

21. How mining waste is generated?

Mining waste is generated during the extraction and processing of minerals from the earth. Mining waste is produced because only a small portion of the mined material is valuable, and the rest becomes waste that needs proper disposal to prevent environmental contamination. It includes:

1. ***Overburden*** – Soil and rock removed to access mineral deposits.
2. ***Tailings*** – Residue left after extracting valuable minerals from ore; often contains toxic chemicals and heavy metals.
3. ***Waste rock*** – Non-valuable rock separated from ore during mining.
4. ***Sludge and slurry*** – Byproducts from mineral processing and washing.
5. ***Scrap and discarded equipment*** – From mining operations.

22. What is scope of ecology?

The scope of ecology covers the study of relationships between living organisms and their environment at various levels. It includes:

1. ***Organismal ecology*** – Focus on individual organisms and their adaptations.
2. ***Population ecology*** – Study of groups of individuals of the same species and their dynamics.
3. ***Community ecology*** – Interactions among different species living together.
4. ***Ecosystem ecology*** – Energy flow and nutrient cycling within biological communities and their physical environment.
5. ***Landscape ecology*** – Patterns and processes across larger areas involving multiple ecosystems.

6. ***Global ecology (biosphere ecology)*** – Study of ecological processes at the planetary scale, including climate change and biodiversity.

23. What are causes of water pollution?

Causes of water pollution include:

1. ***Industrial waste*** – Discharge of chemicals, heavy metals, and toxins into water bodies.
2. ***Sewage and domestic waste*** – Untreated or poorly treated human waste contaminating water.
3. ***Agricultural runoff*** – Fertilizers, pesticides, and animal waste entering lakes and rivers.
4. ***Oil spills*** – Leakage from ships, pipelines, or drilling activities.
5. ***Plastic and solid waste dumping*** – Trash accumulating in water bodies.
6. ***Mining activities*** – Release of harmful substances and sediments into water.
7. ***Urban runoff*** – Pollutants from roads, vehicles, and construction washed into water systems.

24. What are effects of Air pollution?

Effects of air pollution include:

1. ***Health problems*** – Respiratory diseases (asthma, bronchitis), heart problems, and increased risk of cancer.
2. ***Environmental damage*** – Acid rain harming soil, water, plants, and aquatic life.
3. ***Climate change*** – Greenhouse gases contributing to global warming.
4. ***Reduced visibility*** – Smog and haze affecting transportation and quality of life.
5. ***Damage to vegetation*** – Pollutants can stunt plant growth and reduce crop yields.
6. ***Harm to wildlife*** – Affecting animal health and disrupting ecosystems.

25. Define interspecific and intraspecific interaction?

Interspecific interaction refers to relationships between individuals of different species living in the same area. Examples include predation, competition, mutualism, and parasitism. **Intraspecific interaction** occurs between individuals of the same species, such as competition for resources, mating behaviors, or cooperation within a population.

26. What are fauna of desert ecosystem?

Fauna of desert ecosystems includes animals adapted to survive extreme heat, water scarcity, and sandy or rocky terrain. Common desert animals are:

- ***Reptiles:*** Lizards (like the horned lizard), snakes (e.g., rattlesnakes).
- ***Mammals:*** Camels, foxes (like the fennec fox), jackrabbits, kangaroo rats.
- ***Birds:*** Roadrunners, vultures, owls.
- ***Insects and arachnids:*** Scorpions, ants, beetles, spiders.

27. What is food web and why it is important?

A food web is a complex network of interconnected food chains showing how different organisms in an ecosystem are related through feeding relationships.

Importance of a food web:

- It demonstrates the flow of energy and nutrients through an ecosystem.
- Shows how species depend on each other for survival.
- Helps understand ecosystem stability; if one species is removed, it shows possible impacts on others.
- Reveals biodiversity and interdependence among organisms.

28. Write importance of phosphorus in ecology.

Importance of phosphorus in ecology:

- Essential nutrient for plants and animals, vital for DNA, RNA, and ATP (energy molecule) production.
- Supports energy transfer and storage in living cells.
- Key component of cell membranes (phospholipids).
- Helps in growth and development of organisms.
- Limits productivity in many ecosystems because it is often a scarce nutrient, controlling plant and algae growth.
- Plays a crucial role in nutrient cycling and maintaining ecosystem health.

Disclaimer:

For best results, it is advised NOT to rely on this file only. Go through video lectures, handouts and other sources as well.

Regards,
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