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**Course: Introduction to Environment (1421) Semester: Spring, 2023**

**Level: BA. Associate Degree**

**Assignment no 2**

**Q. 1 a. Differentiation between Terms**

**i. Soil Texture and Soil Structure:**

- Soil Texture: Soil texture refers to the relative proportions of sand, silt, and clay particles in the soil. It determines how well the soil can retain water and nutrients.
- Soil Structure: Soil structure relates to the arrangement of soil particles into aggregates or crumbs. It influences the soil's ability to hold air and water and affects root penetration.

**ii. Weather and Climate:**

- Weather: Weather refers to the short-term atmospheric conditions in a specific location, including temperature, humidity, precipitation, wind speed, and atmospheric pressure. It can change rapidly over hours or days.
- Climate: Climate represents the long-term average of weather patterns in a particular region over an extended period (typically 30 years or more). It includes factors like temperature, precipitation, and seasonal variations.

**iii. Altitude and Latitude:**

- **Altitude:** Altitude refers to the height above sea level of a specific location on the Earth's surface. As altitude increases, atmospheric pressure decreases, and temperatures tend to drop.
- **Latitude:** Latitude measures the distance north or south of the equator and runs parallel to it. It influences the amount of solar energy received, affecting temperature patterns on Earth.

#### iv. **Erosion and Weathering:**

- **Erosion:** Erosion is the process of transporting soil, rock, or sediment from one place to another by agents like wind, water, or ice. It involves the movement of already weathered materials.
- **Weathering:** Weathering is the breakdown of rocks and minerals into smaller particles due to exposure to various weather elements like wind, water, and temperature changes. It is a precursor to erosion.

#### v. **Ecofeminism and Ecocentrism:**

- **Ecofeminism:** Ecofeminism is a movement that links the oppression of women and the exploitation of nature. It advocates for an interconnected approach to environmental and gender issues.
- **Ecocentrism:** Ecocentrism is an environmental philosophy that prioritizes the intrinsic value of nature and ecosystems over human interests. It promotes a holistic approach to environmental conservation.

### **Q. 1 b. Justification of Statements**

#### **a. Fossil Fuels are said to be nonrenewable energy resources:**

Justification: Fossil fuels, such as coal, oil, and natural gas, are formed from ancient organic matter over millions of years. Their formation process is very slow, and the rate at which they are being consumed far exceeds their natural replenishment. Hence, they are considered nonrenewable as they cannot be replaced within a human lifetime.

#### **b. The ozone layer is formed in the stratosphere and not the**

**troposphere:** Justification: The ozone layer is primarily located in the stratosphere, at an altitude of about 10 to 50 kilometers above the

Earth's surface. It is formed through the action of ultraviolet (UV) radiation from the sun on oxygen molecules. The troposphere, being closer to the Earth's surface, does not contain sufficient UV radiation to create the ozone layer.

c. **By planting more trees, we can reduce the impact of global warming:** Justification: Trees play a vital role in mitigating global warming by sequestering carbon dioxide (CO<sub>2</sub>) through photosynthesis. They absorb CO<sub>2</sub> from the atmosphere and store it as carbon in their biomass. Additionally, forests act as carbon sinks, helping to offset human-induced greenhouse gas emissions.

d. **The water in the oceans is not considered as available water:** Justification: The water in the oceans is saline (salty) and not suitable for direct consumption or most human uses without desalination. It is not readily available for use in agriculture, drinking, or industrial purposes without proper treatment.

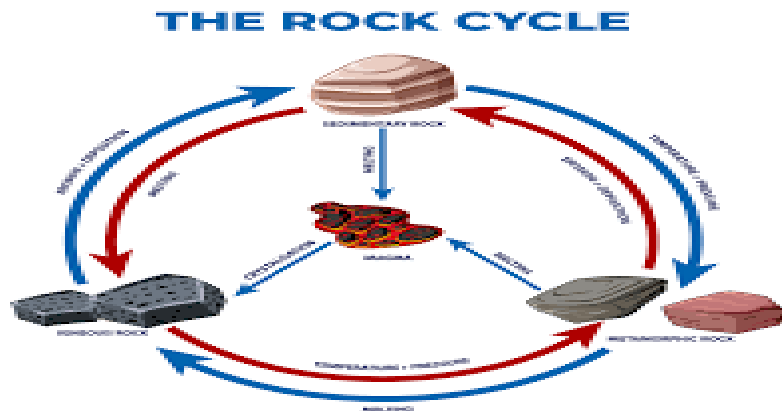
e. **Natural rain has an acidic pH:** Justification: Natural rainwater is slightly acidic due to the presence of dissolved carbon dioxide (CO<sub>2</sub>) from the atmosphere. CO<sub>2</sub> reacts with water to form carbonic acid, which lowers the pH of rainwater to around 5.6. This natural acidity is referred to as "acid rain," although it is not harmful to the environment.

### **Q. 1 c. Energy Conservation Practices at Household Level**

1. **Switch to LED Lighting:** Replace incandescent bulbs with energy-efficient LED bulbs, which consume less electricity and have a longer lifespan.
2. **Unplug Electronics:** Turn off and unplug electronic devices when not in use, as they continue to draw power in standby mode.
3. **Energy-Efficient Appliances:** Choose energy-efficient appliances with high energy star ratings, as they consume less electricity.
4. **Insulate and Seal:** Insulate windows and doors to prevent air leaks and maintain indoor temperature, reducing the need for heating or cooling.

5. **Use Natural Light:** Utilize natural daylight as much as possible during the daytime, reducing the need for artificial lighting.

**Q. 1 d. Diagram of Rock Cycle**



The Rock Cycle is a continuous process that describes the transformation of rocks from one type to another over geological timescales. It involves three main types of rocks: igneous, sedimentary, and metamorphic.

1. **Igneous Rock Formation:** Magma from the Earth's mantle cools and solidifies, forming igneous rocks. These rocks can be extrusive (formed on the Earth's surface, e.g., basalt) or intrusive (formed beneath the Earth's surface, e.g., granite).
2. **Sedimentary Rock Formation:** Weathering and erosion break down existing rocks into sediments. These sediments are then transported and deposited by natural agents like water, wind, or ice. Over time, the layers of sediment undergo compaction and cementation, forming sedimentary rocks (e.g., sandstone, limestone).
3. **Metamorphic Rock Formation:** Existing rocks, either igneous or sedimentary, undergo metamorphism due to high temperature and pressure in the Earth's crust. The original rock structure changes, leading to the formation of metamorphic rocks (e.g., marble from limestone).

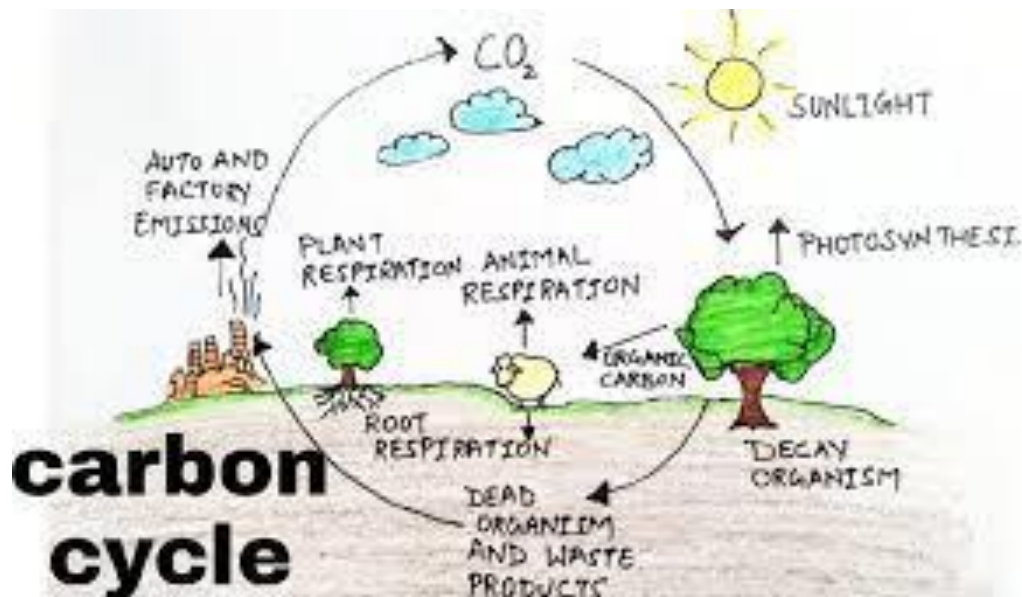
The cycle is dynamic, and rocks can go through multiple processes and transformations, driven by geological forces, and may eventually become part of another rock type.

## Q. 2 Carbon Cycle and Diagram

The Carbon Cycle is the process through which carbon atoms circulate among the Earth's atmosphere, oceans, land, and living organisms. It involves several interconnected processes:

1. **Photosynthesis:** Plants and algae absorb carbon dioxide (CO<sub>2</sub>) from the atmosphere and, through the process of photosynthesis, convert it into organic carbon compounds, releasing oxygen (O<sub>2</sub>) as a byproduct.
2. **Respiration:** Living organisms, including plants and animals, undergo cellular respiration, releasing CO<sub>2</sub> back into the atmosphere as they metabolize organic matter for energy.
3. **Decomposition:** When plants and animals die, their organic matter undergoes decomposition by bacteria and fungi. This process releases CO<sub>2</sub> back into the atmosphere.
4. **Combustion:** When fossil fuels (e.g., coal, oil, gas) and forests are burned, carbon is released as CO<sub>2</sub> into the atmosphere. Human activities, such as burning fossil fuels and deforestation, have significantly increased the amount of CO<sub>2</sub> in the atmosphere.
5. **Carbon Sequestration:** Carbon is also stored or sequestered in oceans and terrestrial ecosystems. The oceans act as a vast carbon sink, absorbing CO<sub>2</sub> from the atmosphere.

Diagram of the Carbon Cycle:



Sediments | ----- / \ / \ -----  
 -- | Ocean || Fossil Fuels ||| (Coal, Oil, Gas) | -----  
 -

The carbon cycle helps regulate the Earth's climate and is essential for sustaining life on our planet.

### Q. 3 Soil Formation and Soil Profile

**Soil Formation:** Soil is formed through the process of weathering, which breaks down rocks into smaller particles, and the subsequent transformation of these particles through biological and chemical processes. Soil formation involves five factors:

1. **Parent Material:** The type of rock or mineral from which the soil originates influences its properties.
2. **Climate:** Temperature and precipitation patterns impact the rate of weathering and organic matter decomposition, affecting soil formation.
3. **Topography:** The landscape's shape and slope influence water drainage and accumulation, influencing soil development.
4. **Organisms:** Plants, animals, and microorganisms contribute to soil formation through their interactions, including organic matter decomposition.
5. **Time:** Soil formation is a gradual process that takes thousands to millions of years, depending on the factors above.

**Soil Profile:** A soil profile is a vertical section of the soil that shows its distinct layers or horizons. Each horizon has different characteristics, and together, they make up the soil profile:

1. **O Horizon (Organic Layer):** The topmost layer is rich in organic matter, consisting of decomposed plant and animal material.
2. **A Horizon (Topsoil):** This layer is enriched with organic matter and nutrients, making it the most fertile part of the soil.
3. **E Horizon (Leaching Layer):** This layer is characterized by the leaching of minerals and nutrients due to water movement.
4. **B Horizon (Subsoil):** The subsoil contains accumulated minerals leached from the upper layers, and it may have some clay accumulation.
5. **C Horizon (Parent Material):** The C horizon is composed of partially weathered parent material, which is the source of the soil.
6. **R Horizon (Bedrock):** The bottommost layer is the unweathered bedrock, representing the parent material from which the soil is formed.

A well-developed soil profile consists of all these horizons, showing the influence of soil-forming processes over time.

#### **Q. 4 Potential Threats to Biodiversity**

Biodiversity refers to the variety of life forms, including species, genes, and ecosystems, on Earth. Several factors pose potential threats to biodiversity:

1. **Habitat Loss and Fragmentation:** Human activities, such as deforestation, urbanization, and agriculture, lead to the destruction and fragmentation of natural habitats, disrupting ecosystems and displacing species.
2. **Climate Change:** Global warming and climate change are altering temperature and precipitation patterns, affecting species' distribution and survival.
3. **Pollution:** Pollution from industrial activities, agriculture, and urban runoff contaminates ecosystems and can harm wildlife and plants.



4. **Overexploitation:** Overharvesting of natural resources, such as overfishing and hunting, can deplete populations of certain species.
5. **Invasive Species:** Introduction of non-native species into new environments disrupts the ecological balance and outcompetes native species.
6. **Disease:** Emerging diseases and pathogens can negatively impact wildlife populations.
7. **Ocean Acidification:** Increased carbon dioxide in the atmosphere is causing ocean acidification, affecting marine life like coral reefs and shell-forming organisms.
8. **Habitat Degradation:** Degradation of ecosystems, such as wetlands and coral reefs, reduces their capacity to support diverse species.
9. **Genetic Erosion:** Reduction in genetic diversity of species due to human activities can make populations more vulnerable to diseases and environmental changes.
10. **Lack of Conservation Efforts:** Insufficient conservation measures and policies can lead to the loss of endangered species and vulnerable ecosystems.

Addressing these threats requires global efforts in conservation, sustainable practices, and the protection of natural habitats. Biodiversity conservation is crucial for the health of ecosystems and the well-being of all living beings on Earth.