Assignment

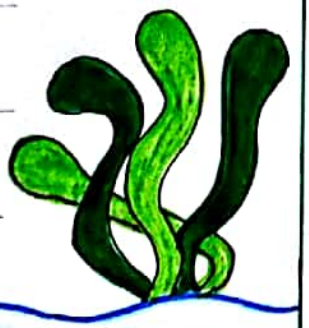
Environment And Ecology (HU401)

Name - Deepmalya Sarkar

Roll - 10801019016

Dept - MCA

Sem - 4th

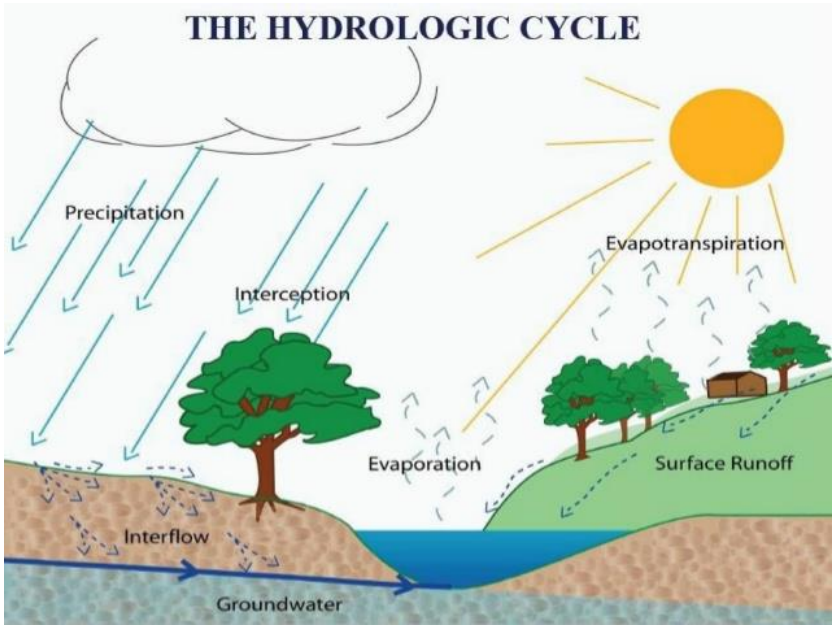


Date of Submission -

Teacher's Signature

Q1. Briefly describe hydrological cycle.

Ans 1. The hydrologic cycle begins with the evaporation of water from the surface of the ocean. As moist air is lifted, it cools and water vapour condenses to form clouds. Moisture is transported around the globe until it returns to the surface as precipitation. Once the water reaches the ground, one of two processes may occur; 1) some of the water may evaporate back into the atmosphere or 2) the water may penetrate the surface and become groundwater. Groundwater either seeps its way to into the oceans, rivers, and streams, or is released back into the atmosphere through transpiration. The balance of water that remains on the earth's surface is runoff, which empties into lakes, rivers and streams and is carried back to the oceans, where the cycle begins again.



Q2. What is the difference between oxygen demanding waste and nutrients?

Ans 2.

Oxygen Demanding Waste	Nutrients
1. Wastes that can be decomposed by oxygen requiring bacteria.	1. They are the essentials required by the body to perform properly
2. Usually is the cause of low oxygen level in the water as a large population oxygen requiring bacteria while decomposing such wastes can deplete oxygen levels in water.	2. They are compounds present in food essentials, and are the building blocks of repair and growth.
3. Leads to creation of dead zones where no marine life can exists.	3. Usually Carbohydrates, Fats, Proteins and Vitamins are the main kinds of Nutrients.
4. Example: Animal feces, sewage, human biodegradable wastes.	4. Example: Vitamin A, Glucose etc.

Q3. Define source, biochemical effects and remediation of arsenic pollution.

Ans 3. Sources: -

It occurs naturally in the earth and in the seas. It is odourless and tasteless. Arsenic is an element (As) that occurs in the earth's crust-rock, soil, all natural sources of exposure, or can be traced to deep water brines used to produce oil and natural gas. Environmental sources of arsenic stem from the continuing use of its compounds and pesticides, from its unintended release during the mining of gold and lead and from the combustion of coal, of which it is a contaminant. Industrial effluents also contribute arsenic to water in some areas. It is widely thought that naturally occurring arsenic dissolves out of certain rock formations when groundwater levels drop significantly. Surface arsenic-related pollutants enter the groundwater systems by gradually moving with the flow of groundwater from rains, melting of snow, etc. Drinking water, especially groundwater, is a major source of arsenic for most people.
Inorganic arsenic can occur in the environment in several forms but in natural waters, and thus in drinking-water, it is mostly found as trivalent arsenate (As(III)) or pentavalent arsenate (As (V)). Organic arsenic species, abundant in seafood, are very much less harmful to health, and are readily eliminated by the body.

Biochemical Effects: -

Arsenic commonly occur in insecticides , fungicides and herbicides. Arsenic exerts its toxic action by attacking SH groups of an enzyme, thereby inhibiting action
SH(Enzyme)SH + O2As(O) >> S (Enzyme)S-As-O + 2OH-
The enzymes which generate cellular energy in the citric acid cycle are adversely affected. The inhibitory action is based on inactivation of pyruvate dehydrogenase by complexation with As, were by generation of ATP is prevented.
A more important step is ATP generation is the enzymatic synthesis of 1,3 diphosphoglycerate from glyceraldehyde 3-phosphate . Arsenic interacts by producing 1-arseno-3-phosphoglycerate instead of 1, 3 diphosphoglycerate.

Remediation: -

Some of the techniques are oxidation, precipitation, ion exchange, solid liquid separation, biological removal process, reverse osmosis, reduction, coagulation with different metal salts, iron or manganese removal method, etc.

Q4.

Q A. What is thermal pollution?

Ans A. Thermal pollution is defined as sudden increase or decrease in temperature of a natural body of water which may be ocean, lake, river or pond by human influence. This normally occurs when a plant or facility takes in water from a natural resource and puts it back with an altered temperature. Usually, these facilities use it as a cooling method for their machinery or to help better produce their products.

Q B. How does thermal pollution affect the environment?

Ans B.

- Decrease in DO(Dissolved oxygen) levels
- Increase in toxins
- Loss of biodiversity
- Ecological Impact
- Affects reproductive systems
- Increases metabolic rate
- Migration

Q C. How can you control thermal pollution?

Ans C. The following measures can be taken to prevent or control high temperature caused by thermal pollution:

1. Heated water from the industries can treated before discharging directly to the water bodies.

2. Heated water from the industries can be treated by the installation of cooling ponds and cooling towers.

3. Industrial treated water can be recycled for domestic use or industrial heating.

4. Through artificial lakes: In this lake Industries can discharge their used or heated water at one end and water for cooling purposes may be withdrawn from the other end. The heat is eventually dissipated through evaporation.

Q 5. Shortly describe various Volatile Organic Compounds(VOCs) and their effect on human health.

Ans 5. Volatile organic compounds (VOCs) are organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air, a trait known as volatility. For example, formaldehyde, which evaporates from paint and releases from materials like resin, has a boiling point of only –19 °C (–2 °F).

Some Compounds are:

Vinyl chloride: It is used to produce polyvinyl chloride resins and is most toxic as it is a suspected carcinogen

Trichloroethylene: A commonly used cleaning agent and is a suspected carcinogen and ground water contaminant.

Tetrachloroethylene: Major components in the production of chloroflurocarbons and causes tumors in animals.

Carbon tetrachloride: Finds application in the fire extinguisher, synthesis of various chemicals, fumigants. Insoluble in water and trace amount found in water and is toxic when ingested.

Effects on human health:

VOCs include a variety of chemicals that can cause eye, nose and throat irritation, shortness of breath, headaches, fatigue, nausea, dizziness and skin problems. Higher concentrations may cause irritation of the lungs, as well as damage to the liver, kidney, or central nervous system. Long-term exposure may also cause damage to the liver, kidneys or central nervous system.

Some VOCs are suspected of causing cancer and some have been shown to cause cancer in humans. The health effects caused by VOCs depend on the concentration and length of exposure to the chemicals.