Environment Class 15

20th March, 2024 at 1:00 PM

REVISION OF QUESTIONS GIVEN IN THE PREVIOUS CLASS (01:14 PM)
WATER POLLUTION (01:28 PM):

- **Parameters used by the Central Pollution Control Board (CPCB) to measure water pollution:**
- a) Temperature:
- Many aquatic organisms can't survive if the temperature of the natural water body increases, this issue is called thermal pollution.
- This can be due to the discharge of hot water from power plants, industrial facilities, and the operation of boats, and other watercraft.
- b) Dissolved Oxygen.
- c) pH Value.
- d) Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD):
- BOD is a measure of the amount of oxygen that is consumed by bacteria as they break down organic matter in the water, thus a higher BOD means more organic pollutants.
- COD is a measure of the amount of oxygen that is required to chemically oxidize organic matter or even inorganic matter, thus more amount of pollutant means more COD.
- Both BOD and COD are measured in milligrams per litre (mg/L).
- For the water sample, COD is higher than BOD.
- This is because chemical oxidation is faster and such oxidizing agents can also oxidize inorganic pollutants.
- Some important chemicals that are used in COD measurement are Potassium dichromate, Potassium permanganate, copper sulfate, and Titanium Sulfate.
- e) Conductivity:
- Conductivity doesn't directly tell about a particular pollutant but can be used to know about salinity and metallic pollutants.
- f) Nitrate and Nitrite:
- Nitrate is a soluble compound found in fertilizers, animal manure, and other sources.
- Nitrite is less stable and produced when nitrate is reduced by bacteria.
- Water with high nitrate and nitrite can interfere with the oxygen-carrying capacity of the blood (Blue Baby Syndrome).
- g) Fecal Coliform and total coliform:
- Coliform bacteria are found in the feces of warm-blooded animals including humans.
- The presence of coliform bacteria indicates the presence of other dangerous microbes. also

- **Ground Water Pollution (02:07 PM):**
- The major sources can be chemical pollutants such as pesticides, herbicides, and fertilizers, leaks and spills of petroleum products, industrial waste from manufacturing and mining, and landfills used for waste management.
- **Some of the most important pollutants are:**
- i) Arsenic - Arsenic contamination is mainly due to geological factors.
- ii) Lead, Cadmium, and Chromium - mainly due to industrial discharge and mining activity.
- iii) Nitrate - Mostly due to agriculture.
- iv) Fluorides - Mostly due to geological factors.
- v) Salinity - Due to excessive irrigation.
- vi) Iron and Manganese - Due to geological factors.
- vii) Uranium - Due to geological factors.

FUMIA ---> these are due to geological factors.

- **Sand Mining:**
- Sand is a minor mineral as per the Mines and Mineral (Development and Regulation) Act of 1957.
- Sand mining is a widespread and often illegal practice that involves the extraction of sand from riverbeds, and beaches, used in construction and manufacturing.
- **Unregulated sand mining has adverse consequences:**
- i) Destruction of riverbed habitats.
- ii) Destabilising of river banks due to erosion.
- iii) Adverse impact on groundwater recharge.
- iv) Loss of biodiversity.
- v) Lowering the water table can cause water security issues.
- vi) Coastal sand mining can erode beaches which are important for tourism and coastal protection.
- vii) It can also lead to saltwater intrusion.
- As per Government regulations, riverbed mining is not allowed in monsoon season, all districts need to have a comprehensive mining plan, and an annual audit mining lease must occur.
- Revision of the Previous Years Questions (02:25 PM):

SOUND POLLUTION (02:58 PM):

- As per the **World Health Organization** (WHO), the described sound limit is 45 decibels by day and 35 decibels by night.
- Anything above 80 decibels is hazardous, it can cause increased blood pressure, loss of temper, anxiety, depression, decrease in work efficiency, and loss of hearing.
- In the Air (Prevention and Control) of Pollution Act 1981, sound pollution is identified as an air pollutant.
- The Government has also notified Noise Pollution (Regulation and Control) Rules, 2000 under the Environment Protection Act of 1986 which provides guidelines for the prevention and control of noise pollution.
- **Radioactive Pollution (03:06 PM):**
- Radioactive pollution is the result of nuclear explosions, testing of nuclear weapons, mining of radioactive ores, accidents at nuclear power plants, and handling and disposal of nuclear waste.
- Short-term exposure to high levels of radiation can cause immediate illness or death and even exposure to short-dose for longer term increases the risk of cancer and other diseases.
- **Light Pollution (03:16 PM):**
- Excessive or inappropriate use of outdoor artificial light is called light pollution.
- There are many types of light pollution:
- i) Glare - High intense light that can cause visual discomfort.
- ii) Skyglow - Brightening of the night sky due to scattering of artificial light.
- iii) Clutter - Excessive grouping of light sources.
- Nocturnal light interrupts sleep patterns and confuses circadian rhythm.
- It also affects the migration patterns of animals and habitat formation.

WASTE MANAGEMENT ISSUES (03:27 PM):

- **Solid Waste:**
- The total municipal solid waste generated in the country is more than 160 thousand tonnes per day.
- We don't have enough landfills to take care of all the solid waste which is being generated.
- One of the most important things that can be done is to invest in waste to energy.
- **The following methods can be adopted:**
- a) Incineration (direct burning) - Best suitable for dry waste.
- b) Plasma gasification:
- An extreme thermal process using plasma that converts organic matter into syn gas.
- c) Pyrolysis:
- It involves the application of heat with no added oxygen in order to generate a syn gas.
- d) Bio-methanation:
- Organic material is microbiologically converted under anaerobic conditions to make biogas.
- These techniques have the **benefits** of:
- i) Landfill usage and expansion can be greatly reduced.
- ii) Transportation of waste to long distances can be reduced.
- iii) Contributes to energy output.
- **Challenges:**
- i) Low calorific value:
- ii) Municipal solid waste is not segregated properly.
- iii) It has a very high biodegradable (wet) waste with high moisture content.
- iv) Incinerators develop toxic ash or slag and contribute to air pollution.
- v) To Produce, power is very expensive and distribution companies may not buy it.
- vi) Opposition from local people.
- **Plastic Waste:**
- India produces more than 3.5 million tonnes of plastic annually, and only about 50% is recycled.

oils (bio gas) and/or

THE TOPIC FOR THE NEXT CLASS - WASTE MANAGEMENT (TO BE CONTINUED.....) AND ALTERNATIVE ENERGY SOURCES