

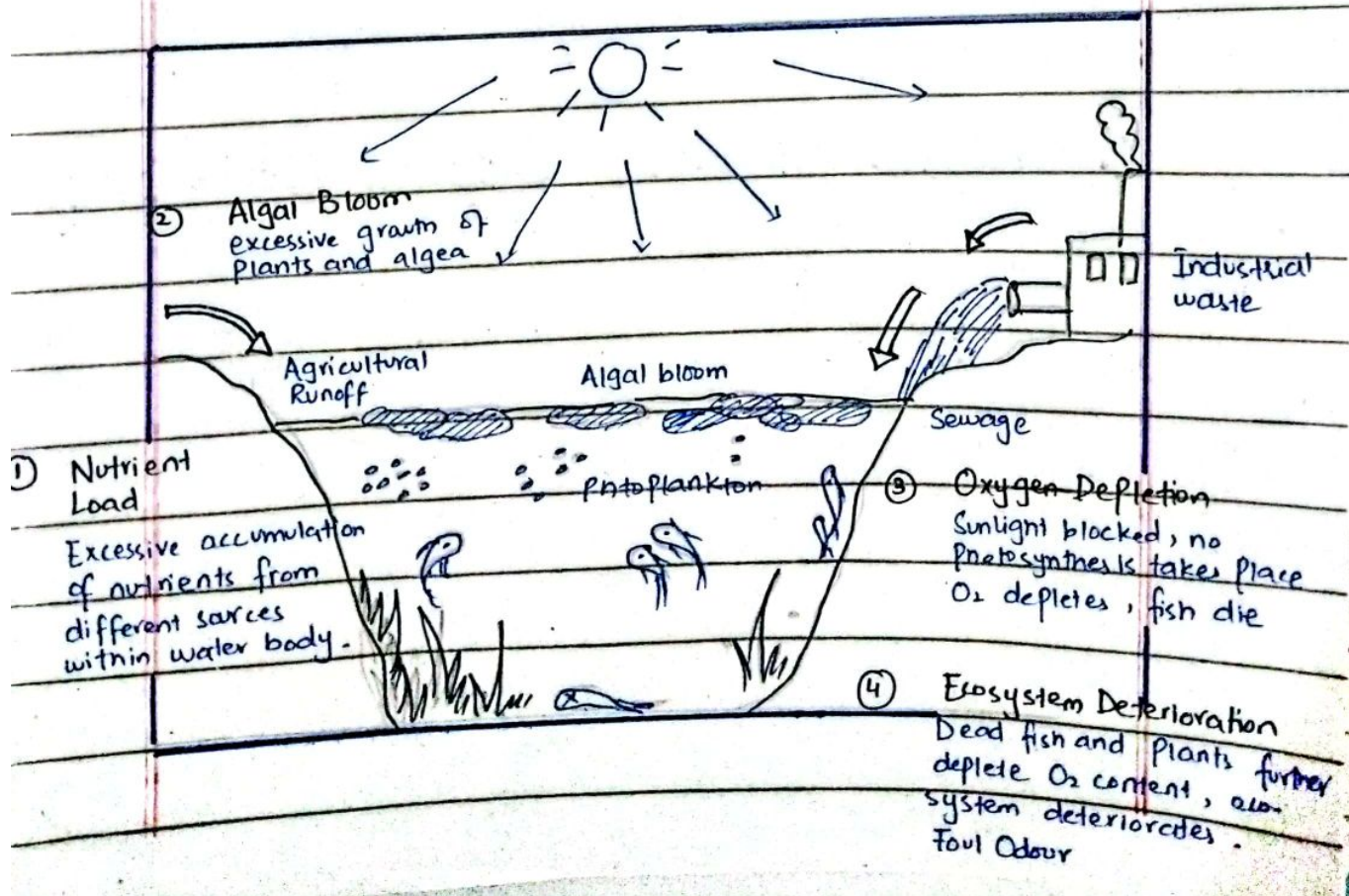
Question :

Define eutrophication. Explain difference between natural and artificial eutrophication. Discuss methods of combating eutrophication.

Eutrophication :-

The term eutrophication is derived from Greek word *eutrophus* means well-fed. Eutrophication can be defined as the excessive enrichment of water bodies with nutrients such as nitrates or phosphates which promote excessive growth of plants and algae and depletes water of available oxygen thus causing the death of fish and other aquatic organisms.

Steps of Eutrophication :-



Agricultural
Runoff

Sewerage

Causes

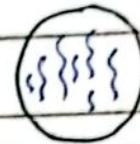


Eutrophication

Death of aquatic organisms



Impacts



Foul Smell



Deteriorated
Ecosystem

Types of Eutrophication :-

Eutrophication is divided into two types which are discussed below :

- 1) Natural Eutrophication.
- 2) Cultural Eutrophication

Natural Eutrophication

Natural Eutrophication refers to the slow accumulation of sediments within a water body.

Cultural Eutrophication

Cultural or artificial eutrophication refers to excessive accumulation of sediments or nutrients in a water body close to human vicinity.

Date: _____

Contributing factors

Natural eutrophication is caused by natural events such as wind erosion, sedimentation.

Cultural eutrophication is caused by anthropogenic activities such as sewerage, agricultural run off, industrial discharge within water body.

Time Scale

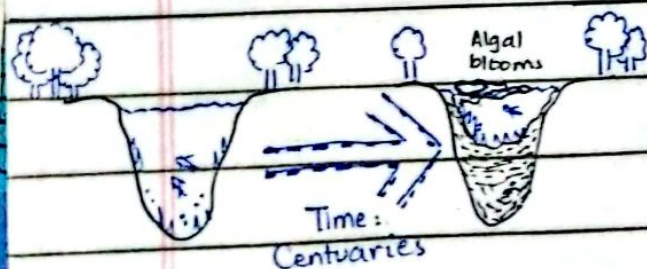
Natural eutrophication is a slow aging process and takes place over centuries.

Cultural eutrophication is a fast process - aided by human involvement - it takes place within decades.

Effect

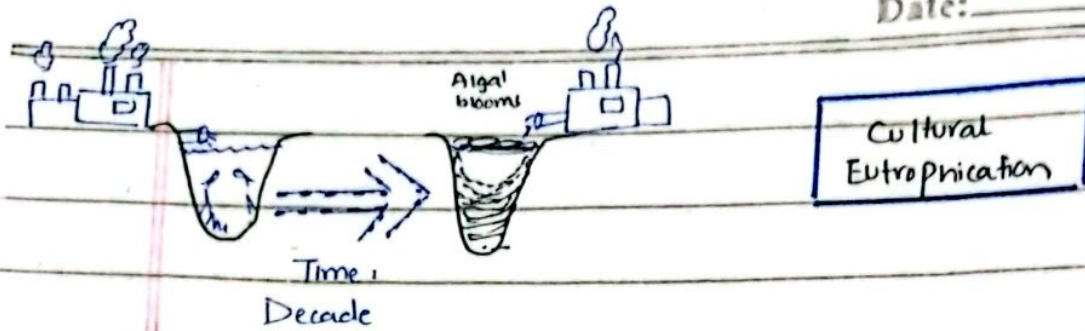
Both natural and cultural eutrophication are responsible for :

- Death of fish and aquatic organism
- Destruction of aquatic ecosystem
- Spread of toxins and foul smell
- Disturb the aesthetic beauty of that particular area



Natural Eutrophication

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Solutions: Combating Eutrophication

Eutrophication is a natural process - However ; human activities have greatly accelerated this process. As a result it has become a global environmental problem.

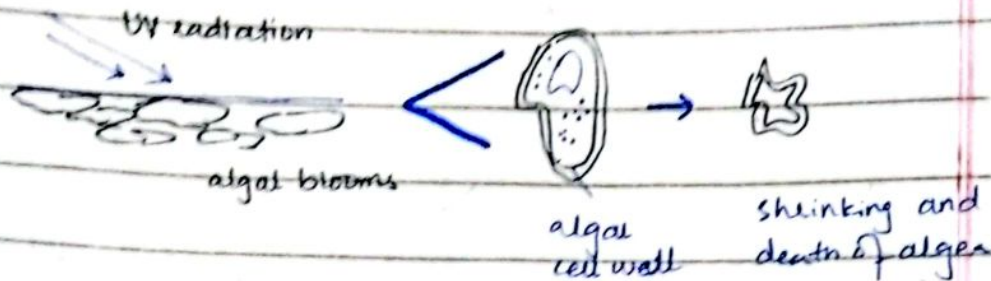
Following steps can help combat eutrophication :

1) **Bioaugmentation** — Bioaugmentation refers to the introduction of such micro-organisms that can accelerate the natural nutrient cycle within a water body thus helping the quick decomposition of algae.

2) **Biomaniipulation** — Biomaniipulation is the introduction of such organisms - particularly fishes - that can survive and help remove excessive algae from water body.

3) **Ultrasonification** — In this method , high frequency UV-waves are used. These waves target algal cell wall

thus causing the death of algae and making the ecosystem more liveable.



4) **Dredging** — Excessive sedimentation and algal blooms can be physically removed from a waterbody. This requires physical labour and effort to restore a deteriorating ecosystem. fish and other species can be introduced at a later stage.

5) **Oxygenation** — Water bodies that are excessively enriched with nutrients and algae can be oxygenated in an attempt to restore the ecosystem. This helps in fast decomposition of algal matter, removes foul odour and makes water liveable for fish and other aquatic organisms.

6) **Use of Chemicals** — The use of chemicals such as copper sulphate and sodium arsenide is also deemed effective against eutrophication. However, excess of these chemicals is not recommended as they

have adverse impact on sensitive aquatic population.

7) Other Measures :-

Besides these, other measures can also be adopted in order to avoid eutrophications. These are listed as follows :

• Individual Level

- Reduction of phosphorus in chemical detergents
- Elimination of use of chemicals in our daily life.

• Community Level

- Spread awareness among masses
- Use of purifying plants to remove excessive nitrates & phosphates from wastewater
- Adoption of sustainable agriculture practices

Discuss briefly noise pollution. (CSS-2020) 10 marks

Noise Pollution :

The term 'noise' is derived from Latin word nausea meaning feeling of sickness. Noise Pollution can be defined as any unwanted, unpleasant or annoying sound that proves harmful to human health as well as environment.

Unit of Sound Intensity :

Noise or Intensity of sound is measured in Decibels (dB). Human ears can perceive sound from 20-100 dB. Above it is considered harmful.

WHO Recommendation :

World Health Organization (WHO) recommends a sound level of 45 dB during the day and 35 dB at night. A sound intensity level of 80 dB is hazardous.

Sources of Noise Pollution :

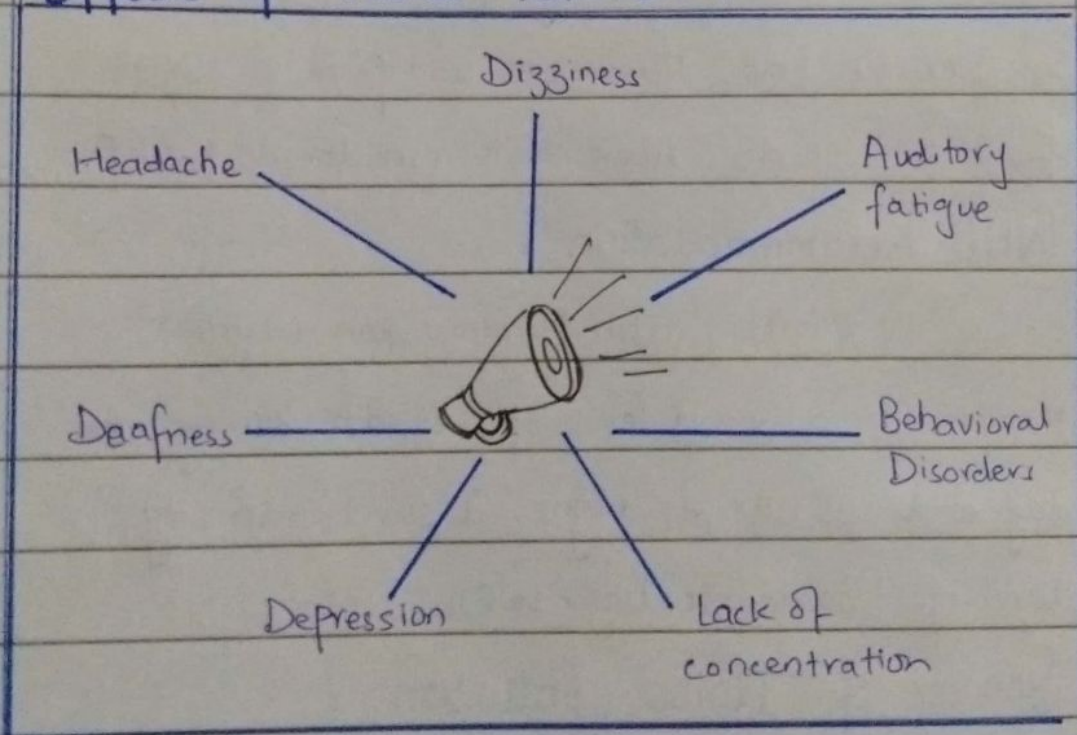
There are two main sources of noise pollution. These are listed as :

- i- Indoor Noise Pollution
- ii- Outdoor Noise Pollution

i- **Indoor Noise Pollution** — Indoor sources refers to sources that are present within homes or residential areas. These include noise from a washing machine, microwave, music system etc.

ii **Outdoor Noise Pollution** — Outdoor noise comes from external sources. This include noise from vehicles, trains, aircrafts, construction area, loudspeaker etc.

Effects of Noise Pollution :



Measures to Prevent Noise Pollution :

Noise Pollution can be reduced by taking precautionary measures to reduce sound level at source and from receiver's end.

Some measures are listed as follows:

Source Control :

- i- **Improved Technology** — In order to reduce noise pollution at source, improved technological measures should be adopted. This may include applying a sound proofing material over machinery to absorb excessive noise or using fan with more blades to reduce noise.
- ii- **Sound Proofing** — The use of sound proof material such as acoustics tiles, carpets, drapery can also help reduce sound. The use of double pane windows is another important measure to reduce sound.
- iii- **Use of Building Codes** — Building codes should be followed while opting for constructing residential or commercial building constructions and as per these codes essential measures should be taken to maintain sound to an optimum level.

Control At Receiver's End :

- i- **Safety Measures** — Workers safety measures under Occupational Health and Safety Administration (OSHA) should be ensured by providing them

a stress free environment.

- ii- Use of PPE's — The use of Personal Protective equipments (PPE's) by all workers should be ensured. These may include safety helmet, earplugs, earmuffs etc.

Community Measures :

- i- Education — Educating masses about harmful effects of noise pollution can help a great deal. Other measures like ban on honn near residential areas, use of loudspeaker and loud music during festivals should also be banned.
- ii- Planting Trees — Planting tree belts and vegetation around roads and industrial areas can also help. Trees absorb sound and thus create a buffer zone.
- iii- Industries Away from Residences — Industries should be build away from residential areas. This Prevents unnecessary harms of noise pollution on nearby communities.