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Section : "A"

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Subject : - Waste
Water Engg-

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QNO 1:

Wastewater Define

Wastewater treatment consists of applying know technology to improve or upgrade the quality of a wastewater.

Wastewater treatment involve collecting the wastewater in a (centralized or decentralized location (wastewater treatment plant) & subjecting the wastewater to various treatment processes.

Importance:

⇒ The principle objective of wastewater treatment generally allow human and industrial effluents to be disposed off without causing danger to human health or unacceptable damage to the natural environment.

→ Wastewater if properly treated, is an important resource used for various purpose including irrigation, lawn watering, car washing, flushing toilets & landscaping etc.

→ Wastewater treatment can also generate biogas as final products which is potential source of energy.

Q NO 1:

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Rectangular tanks are preferred over circular tanks because the rectangular tanks has a large horizontal distance as compare to circular tanks and due to which the settleable solid gets more detention time and it settle down before reaching the outlet.

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QNO2.

Difference between aerobic & Anaerobic -
wastewater treatment.

Aerobic wastewater treatment.

- Aerobic processes use bacteria that require oxygen, so air circulates throughout the treatment tank.
- These aerobic bacteria then break down the waste within the wastewater.
- Some systems utilize a pretreatment stage prior to the main treatment to reduce the chance of clogging the system.
- Electricity is required for system operation.

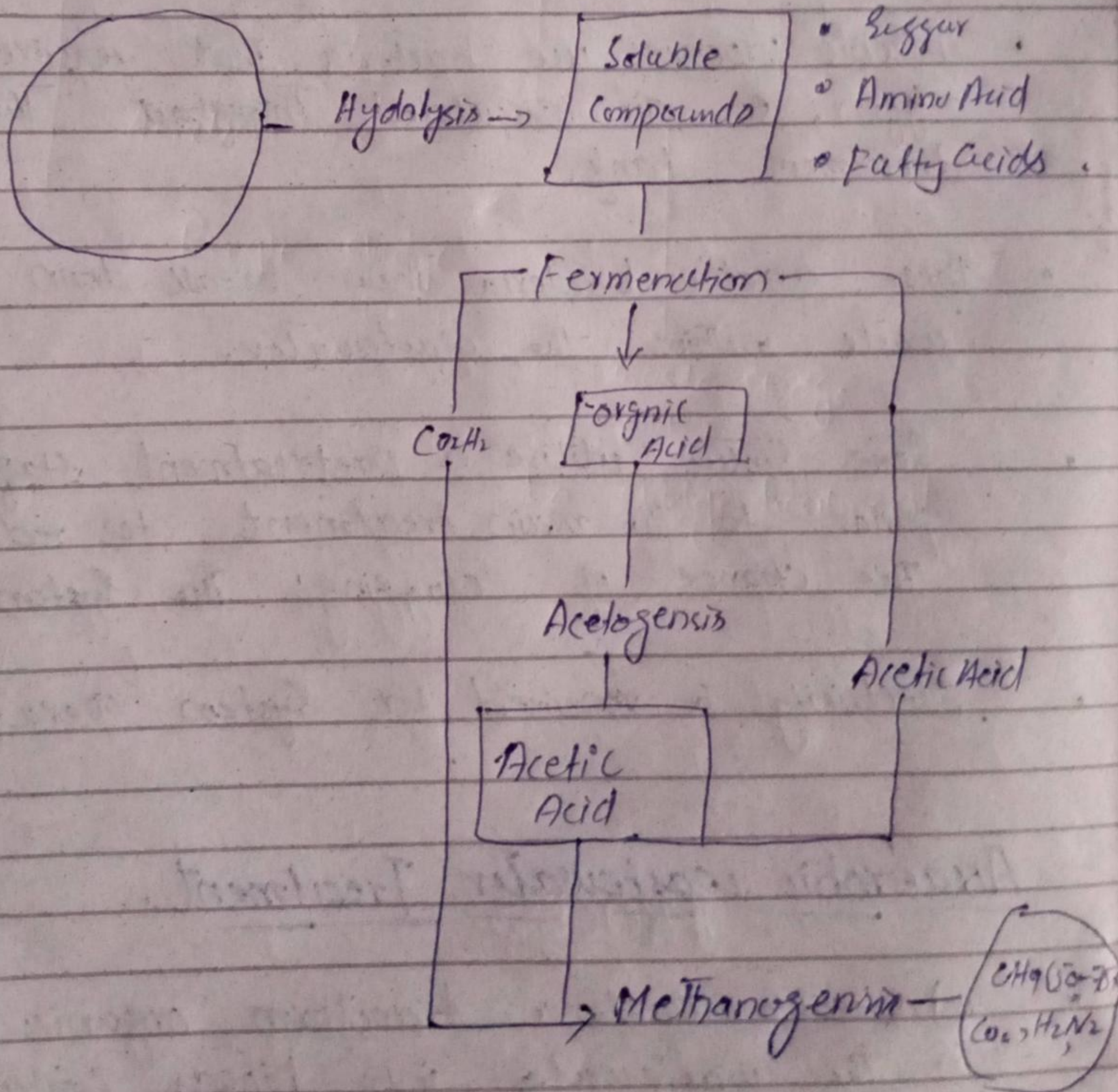
Anaerobic wastewater treatment.

- Anaerobic bacteria transform organic matter in the wastewater into biogas containing large amounts of methane gas and carbon dioxide.

Great efficient process.

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- Often used to treat industrial wastewater that contain high level of organic matter in warm temperature.
- It can be used as a pretreatment prior to aerobic municipal wastewater treatment.



(3)

Briefly describe Activated Sludge process with diagram?

- Process for treating Sewage or Industrial wastewater using aeration and a biological floc composed of bacteria and protozoa.

- Is a biological process that can be used for oxidizing carbonaceous biological matter, oxidizing nitrogenous matter (NH_3 and N_2) removing nutrients (N and P).

- Aeration method - diffused aeration - surface aeration (lones) and pure oxygen aeration.

- The sludge blanket is measured from the bottom of the clarifier.

- The sludge volume index is the volume of settled sludge in mm occupied by 1 gram of dry sludge solids after 30 min of settling in a 1000 ml graduated cylinder.

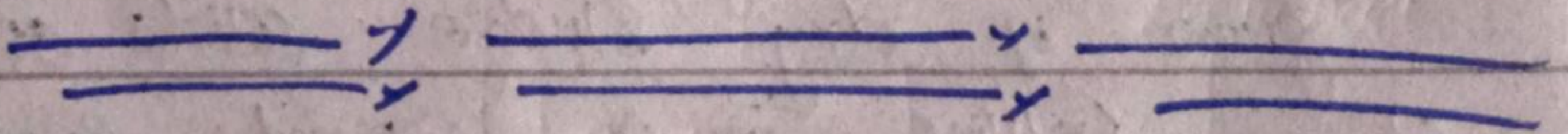
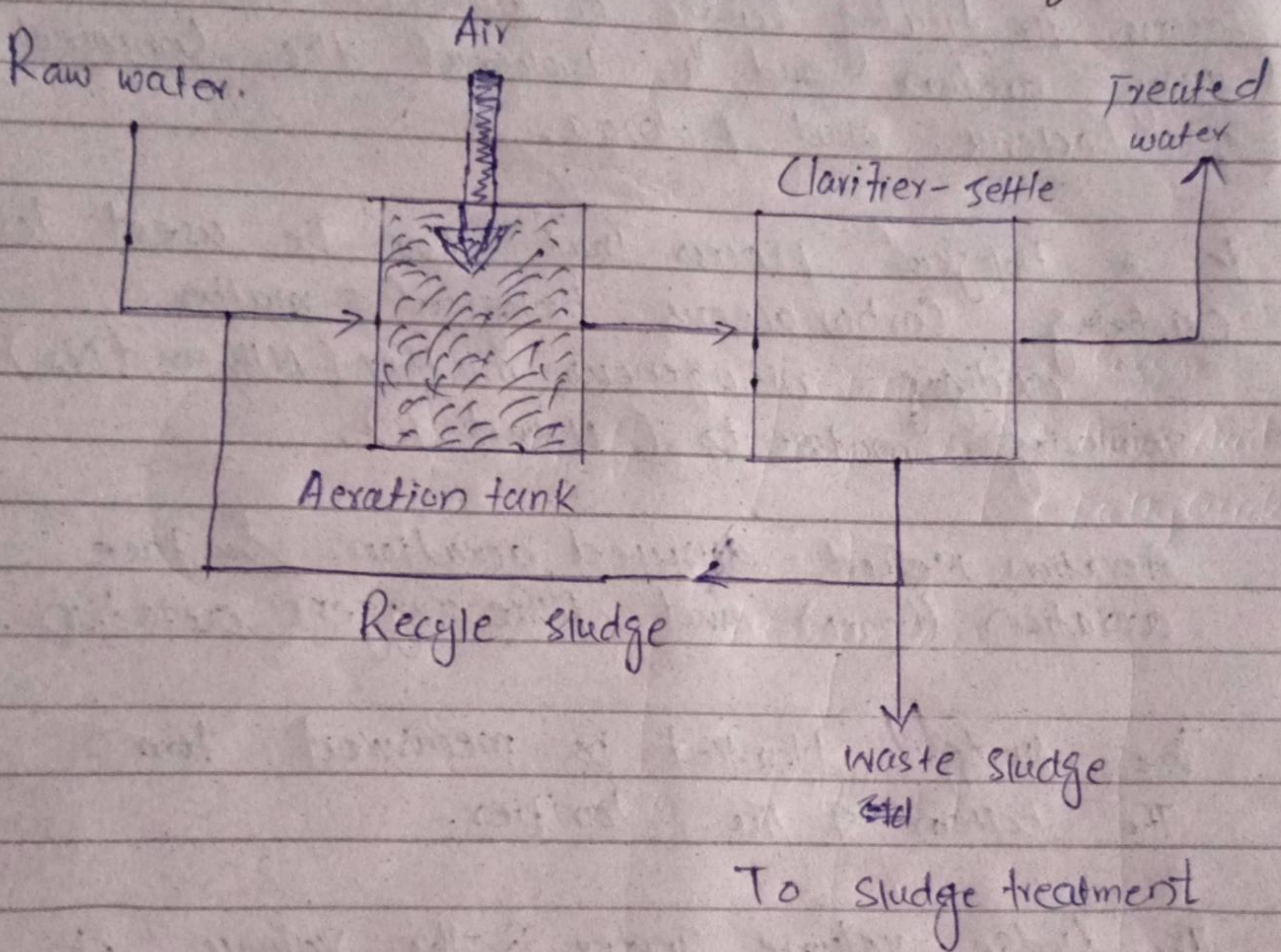
PROCESS:-

- Pre-treatment stage to remove large solid & other undesirable substance.

- Aeration stage, where aerobic bacteria digest biological wastes.

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- Settling stage allows undigested solid to settle, form a sludge that must be periodically removed from the system.



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Q NO 3:-

Assimilative Capacity of Receiving Bodies.

Assimilative Capacity of receiving water bodies refer to the ability of a body of water to cleanse itself. Its capacity to receive wastewater without deleterious effect and without causing damage to aquatic life or human who consume the water.

It is level to which water body or nature control the toxicity without affecting the aquatic life.

Although wastewater is properly treated before it is disposed of the natural water streams still it has impurities pollutant that need to be removed or made less effective so that the receiving water bodies may not become unsuitable for use or cause damage to the aquatic life.

How does it help wastewater treatment.

i) Dilution: Dilution is the process of reducing the concentration of pollutant in receiving water, usually simply by mixing with more quantity of water.

ii) Dispersion:

Dispersion is the distribution of pollutant in relatively large area of water.

iii) Sunlight: Sunlight facilitates biological decomposition of pollutant and kill pathogens by ultraviolet radiation (UV).

(1)

Q NO 4:

Sludge treatment.

Sludge treatment is the process used to manage and dispose of sewage sludge produced during waste water and drinking water treatment.

Sludge is mostly water with lesser amount of solid material removed from liquid sewage.

Advantage of sludge treatment.

→ It reduce pathogen and volume to be disposed.

→ protect wildlife, aquatic life and also prevent diseases.

→ Producing Bio gas.

→ Reduction of odor and disease causing agents.

→ Sustainable management of organic waste.

(2)

Treatment Process.

Thickening :: Gravity & floatation.

Digestion - Aerobic, Anaerobic

Mechanical Dewatering → vacuum, filtration, centrifugation -

Disposal → land application
Burial.

Advantage of Wastewater Esgg.

- Diverse, Can be used for ~~m~~ one household up a huge plant.
- Remove organics.
- Oxidation & Nitrification achieved.
- Biological nitrification without adding Chemicals -
- Biological Phosphorus removal.
- Generally, funding issues are lesser with onsite treatment plant compared to centralized plants, where the water has to be transported treated and brought back to the same spot.
- Stabilization of sludge.
- Solid / Liquid separation.
- Capable of removing ~ 97% of suspended Solids.
- The most widely used wastewater treatment process.

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QNO5

Define Environmental Impact Assessment.

An environmental study comprising collection of data, predication of qualitative & Quantitative Impact, comparison of alternative, evaluation of preventive, mitigatory & and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, & framing of & recommendation and such other components as may be prescribed.

"OR"

A formal process to predict the environmental consequences of human development activities and to plan appropriate measures to eliminate or reduce adverse effect and to enhance positive effect.

(2)

Parameter of Wastewater treatment.

(i) Biochemical Oxygen Demand:

The Biochemical oxygen demand is the amount of oxygen consumed by aerobic microorganisms to break down the organic matter present in the wastewater. It is the BOD, which is the actual measured parameter and its indication of the amount of organic matter consumed within 5 days as from testing.

(2) Chemical oxygen demand:

The COD is an alternate measure of the amount of organic matter - the amount of oxygen used up by a strong oxidising agent is measured - the value is greater importance when evaluating wastewater from industries since their effluent tend to be toxic to microorganisms thereby affecting the validity of BOD result.

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(3) Total Suspended Solid:

The TSS is measured to indicate the amount by mass of fine suspended particles. Effluent discharged in the water course must contain low level of TSS since TSS cause turbidity. affecting the amount of light to aquatic plant and also cause visual ~~part~~ pollution.

w Total Kjeldahl Nitrogen (TKN).

Wastewater usually contain high level of nitrogen containing compound. The nitrogen exist mostly in free forms, organic nitrogen ammonia and reduced nitrogen.

The ~~KFN~~ TKN value hence indicate the amount of nitrogen of all these 3 forms.

The TKN is useful in monitoring the plant.

