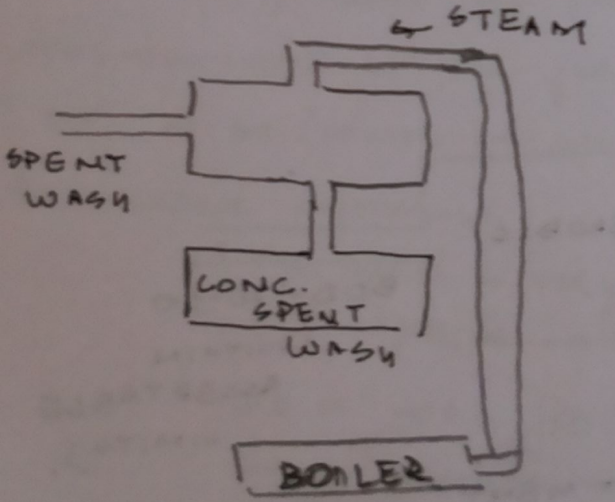
3. What is 'sloughing' ? What is its significance ?

4. Explain with a sketch the basic concept behind the Destrotherm facility for incinerating distillery spent wash.

The basic concept behind the Destrotherm facility for incinerating distillery spent wash is to boil to produce steam which can be passed through the spent wash to make it concentrated.



½

5. Explain how you choose the right treatment technique for a given waste water based on the values of COD and BOD.

Your Name: [redacted] Roll No. [redacted] Group 5

CEL 140 ENVIROMENTAL STUDIES
Min-2 Examination

13

Duration: 1 Hour

Please answer in brief without missing the points. Show sketches where ever required.

Do not ask any doubt. Transfer of any material / calculator not allowed.

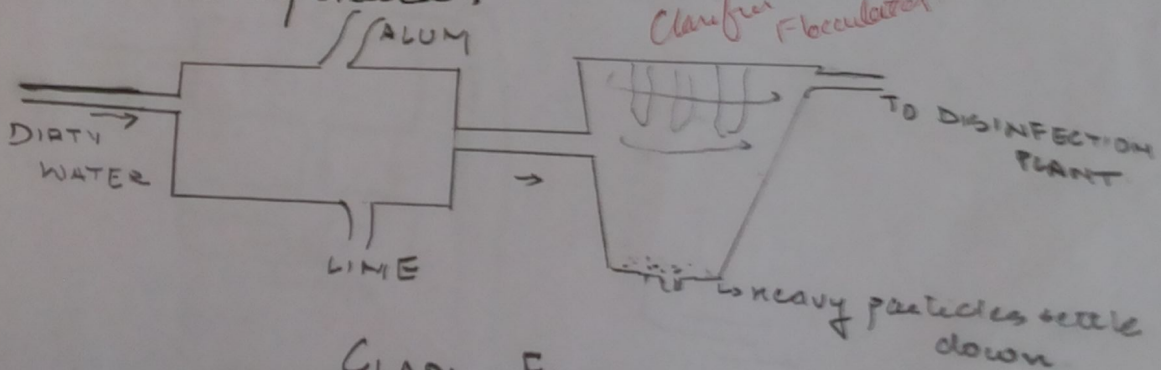
You cannot keep mobiles / cell phones with you during the exam.

Correct answers carry +4 marks and <u>completely wrong answers carry -2 mark.</u>

3

1. Explain with sketch how colloidal particles are removed from water in a water treatment plant ?

They are removed using clari-flocculation. It is a process in which we use alum and ~~to~~ lime water. ~~Alum~~ ~~neutralizes~~ colloidal particles are slightly ~~ve~~ charged. So they come and stick to the positively charged flocs. Lime helps in maintaining the pH of the solution. When colloidal particles stick to the flocs, it gets heavy and can be separated.



CLARI-FLOCCULATION

2. Briefly explain with a sketch working of the external evaporator in the Sprannihilator for incinerating distillery spent wash.

BOD - Biochemical Oxygen Demand.
COD - Chemical Oxygen Demand.

$BOD < COD$.

2½

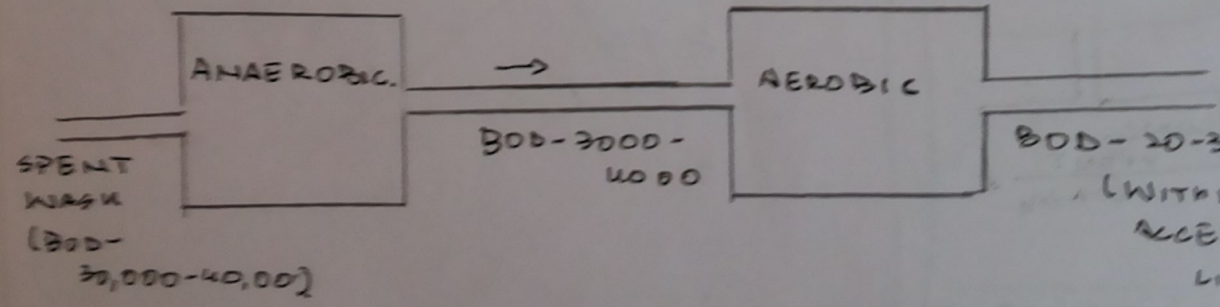
If the ratio $\frac{BOD}{COD}$ is high, we can use biological techniques for waste water treatment. On the other hand, if the ratio $\frac{BOD}{COD}$ is small, we can not use biological treatment.

Eg. $\frac{BOD}{COD}$ → 0.55 - Use Biological Technique

→ 0.1 - Cannot use biological technique.

The value of BOD can also mention whether we should use aerobic methods or anaerobic methods.

Rules 7



BIOLOGICAL TREATMENT OF SPENT WASH.

6. Compare Type I settling and Type II settling. Give example.

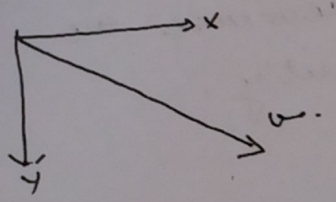
3

Type I settling

→ velocity of particle is a straight line.

→ Mass of particle remains same.

→ Eg. sedimentation of sand particles.

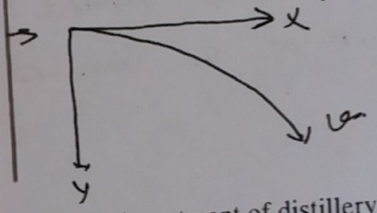


Type II settling.

velocity of particle is not a straight line.

There is usually increase in size of particle during the process.

Eg. sedimentation of colloidal particles using flocs.



7. Briefly explain with a sketch the biological treatment of distillery spent wash and the associated problems.

Distillery spent wash has high BOD value (30,000 - 40,000) we just do anaerobic process which brings down the BOD value to 3000 - 4000. we then process the product formed in an aerobic environment which further decreases the BOD value to 20-30 (which is within acceptable limits).

Associated problems

- The cost is very high.
- It requires a lot of infrastructure.
- It is not a foolproof method and has many uncertainities.

3

← Diagram on left side.

8. Why do biological methods often fail to treat hazardous wastes? What can be done if a hazardous waste is to be forcibly treated biologically?