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Section C

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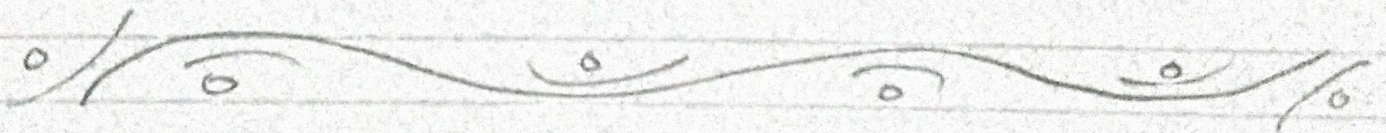
Deptt BE (Civil)

Subject Wastewater Engineering

Submitted to Engr. Nadeem Ullah

Assignment No 1

Date 2-07-2020



QNO 1

Answer:

⇒ (1) Hydraulic Retention Time (HRT):

The hydraulic retention time or HRT is the amount of time in hours for wastewater to pass through a tank, such as an aeration tank.

Changes in the HRT of an activated sludge process can affect biological activity. For example, decreasing HRT adversely affects nitrification, while increasing HRT favors nitrification and the solubilization of colloidal BOD and particulate BOD.

⇒ (2) Sludge Retention time (SRT):

The Solid Retention time (SRT) is the average time the activated-sludge solids are in the system.

The SRT is an important design and operating parameter for the activated sludge process and is usually expressed in days.

It controls the concentrations of bacteria throughout the treatment system. A higher SRT contributes to a higher bacterial concentration in the reactor, which gives rise to: smaller reactor size, larger separator size, reduce sludge production and higher aeration requirement due to extra oxygen required for endogenous respiration.

QNo2:

Answer:

Method used for decoupling SRT and HRT:

By decoupling the SRT and HRT, the liquid wastewater can be processed faster. HRT is the time water is retained within the digester and is equal to reactor volume divided by the average volumetric flow rate. In many instances a short HRT will reduce capital operation cost. There may be some advantages for simple design generally reliable and easily managed. Although modern control permit it hands off management of more complex design that decouple HRT and SRT.

Some of the more common digester types are given below.

- * Continuous stirred tank reactor.
- * HRT Contract Reactor.
- * HRT Sequencing Batch reactor.
- * Plug flow reactor.
- * Ludox bed reactor.

Q No 3:

Answer:

Advantage of decoupling SRT from
HRT:

HRT treatment Technology has relatively
low equipment cost.

* Available HRT treatment system
can be applied at small as well as larger
scale.

* HRT process stability can be
easily achieved.

* Management Requirement is low.

* off-gas air pollution can be eliminated

* foaming of surfactant containing wastewater
can be avoided.

* The HRT treatment technology
does not require the import of expensive
equipment.

* HRT non biodegradable organics can
be degraded.

* less space is required for an HRT
treatment plant compared to an HRT
treatment plant.

