

Date: \_\_\_\_\_

NAME SHARAFAT ALI KHAN

ID 7706

SECTION "C"

SUBJECT Waste Water Engineering

DEPARTMENT BE (CIVIL)

SUBMITTED TO ENGR. MADEENA

SESSIONAL ASSIGNMENT NO. 1

Date: \_\_\_\_\_

## QUESTION NO: 1

ANS Briefly describe each one of these parameter.

### ANSWER

## HYDRAULIC RETENTION TIME (HRT)

HRT define as the ~~average~~ <sup>ratio</sup> of the reactor volume and feed flow rate, represents the average time the cells and substrates stay inside the reactor. HRT is very important parameter for hydrogen and methane production in continuous mode. very low HRT comforts the washout of the reactor which means all the active microorganisms escape out from the reactor on the contrary an adequate <sup>low</sup> HRT favored the washout of methanogens guaranteeing the survival of hydrogen producers.

## SOLID RETENTION TIME (SRT)

The solid Retention time (SRT) is the time the solid fraction of the waste water spend in a treatment unit. It is the quantity of solids maintained in the reactor divided by the quantity of solids coming out of the reactor each day.

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$$SRT = \frac{V \times c_d}{Q_{out} \times C_{out}}$$

$C_{out}$  is the solid concentration of the effluent in a conventional, completely mixed or plug flow reactor, the HRT equals the SRT.

The solids retention time or SRT control the counti concentration of bacterial through the treatment system.

- Smaller reactor size
- Larger separator size
- Reduced sludge production.

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## QUESTION NO: 02

What are the methods used for decoupling SRT from HRT.

ANSWER:

### Method used for Decoupling SRT from 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 flowrate. In many instances a short HRT will reduce capital operation cost. There may have some advantages for a simple design generally reliable and easy managed.

Through modern control permits it hands off management of more complex design the couple HRT and CRT. Some of the more common digesters are given below.

→ Co

→ Continous stirred tank reactor

→ HRT contact Reactor.

→ HRT Sequencing batch reactor

→ Plug flow reactor

→ Unduced load Reactor

## QUESTION NO: 03

What are the advantages of decoupling SRT From HRT.

## ANSWER.

HRT treatment technology has relatively low equipment cost.

- ⇒ Available HRT treatment system can be applied at small as well as longer scale.
- ⇒ Management requirement is less
- ⇒ HRT process stability can be easily achieved
- ⇒ Off-gas air pollution can be eliminated
- ⇒ Foaming of surfactant containing does not require the import of expensive equipment
- ⇒ HRT nonbiodegradable organic can be degraded
- ⇒ Less space is required for an HRT treatment plant compared to an HRT treatment plant.

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