Total No. of Questions – [4]

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OCTOBER 2019 / INSEM (T1)

F. Y. M. TECH. (WREE) (SEMESTER - I)

COURSE NAME: Environmental chemistry and microbiology

COURSE CODE:(CVPA11182)

(PATTERN 2018:R1)

Time: [1 Hour]

[Max. Marks: 20]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) a) In CFSTR reactor the reaction get occurred and following data is obtained

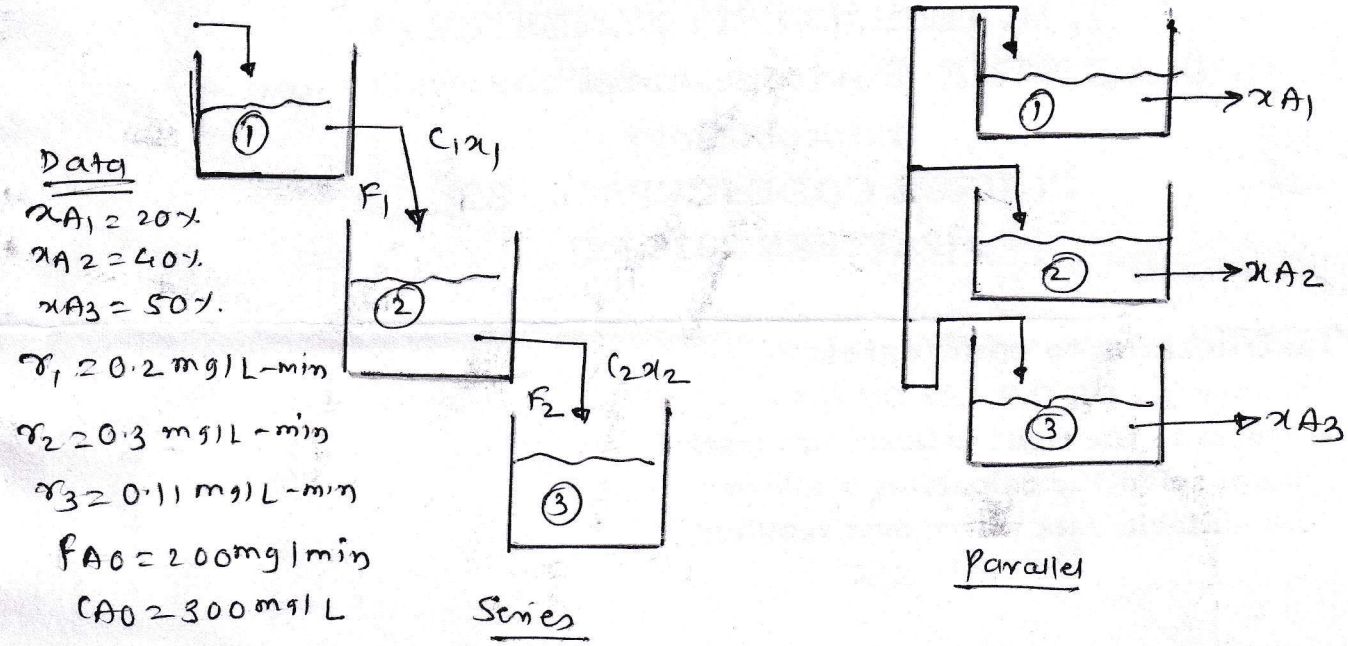
Conc. mole/L	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
-rA (mole/L-min)	0.1	0.3	0.5	0.6	0.5	0.3	0.1	0.06	0.04	0.03

Determine time of reaction in reactor by graphically and by analytically method. Also determine volume of reactor if FoA=30 mole/min for rate of reaction 0.5 mole/L-min. [6]

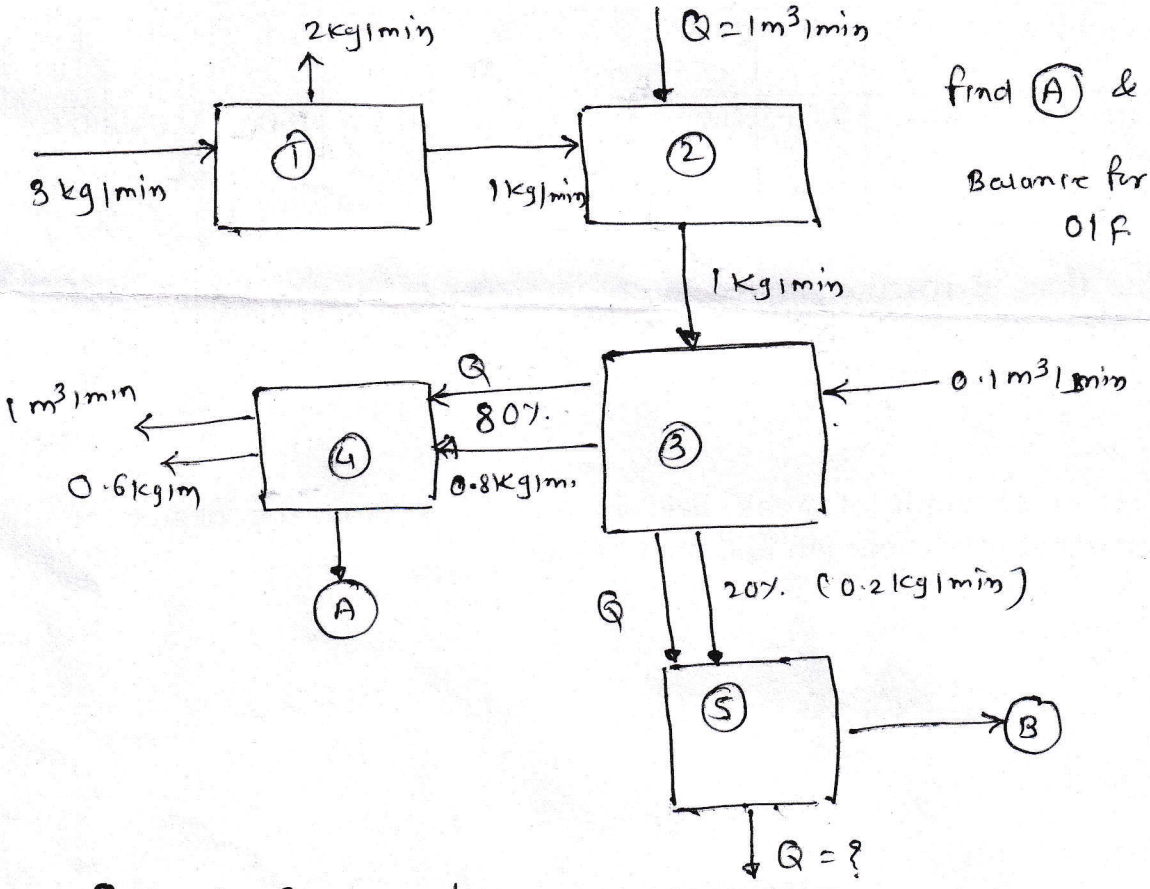
b)Dissociation constant of weak acid is 4 x10^-4 Find the degree of dissociation and pH of solution in 0.4x10^-4 Molar. [4]

OR

Q2)a) Determine volume of reactor for CFSTR position. [6]



b) Balance the following process for material and discharge also find theoretical COD and TOC. [4]



find (A) & B.

Balance for mass I & II & III

Organic compound

$C_3H_5NO_2$ – for COD & TOC

Q3)a) Plot adsorption curve for the following data. [Langmuir only]

Mass of GAC gm	0	0.001	0.01	0.1	0.5	1
Ce mg/L	3.3	3.1	2.8	1.8	1.3	1.2

Also design adsorption process for the following parameter.
Mass of GAC/L =0.02 gm of GAC/L, EBCT=10 min, Q=1000 L/min, density of GAC 450 gm/L [6]

b) Draw a picture of electrolyte cell. Determine the current in amp.is required to liberate 2x10-2 Kg of Iodine from solution of KI in one hours. Take mass of iodine =127 and F=96500C. [4]

OR

Q4) a)Design ion exchange process for the following data. [6]

Cation mg/l	Anion mg/l
Ca++2= 50 mg/l	SO4—2= 10 mg/l
Mg++=30 mg/L	F-=5 mg/L
Cr+6=2 mg/L	OH-=10 mg/l
Ni+2=1 mg/L	

Mass of resins used in cation 400 gm, anion 500 gm. Total cumulative volume of water is 10 lit. Find mili equilivant wt, EC of resin and ion scale.

b)Balance the following redox reaction by oxidation and reduction number method. [4]

$$P + HNO_3 \longrightarrow H_3PO_4 + H_2O + NO_2$$