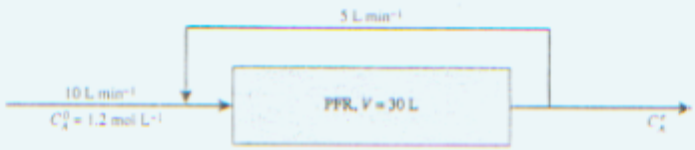
1. Consider the liquid phase reaction: A => products with rate $r = 0.20\ C_A^2$ (mol L^{-1} min^{-1}) that takes place in a PFR of volume 30L.

   (a) What is the concentration of A (C_A^e) exiting the PFR? (15 分)

   (b) What is C_A^e in a PFR with recycle shown below?

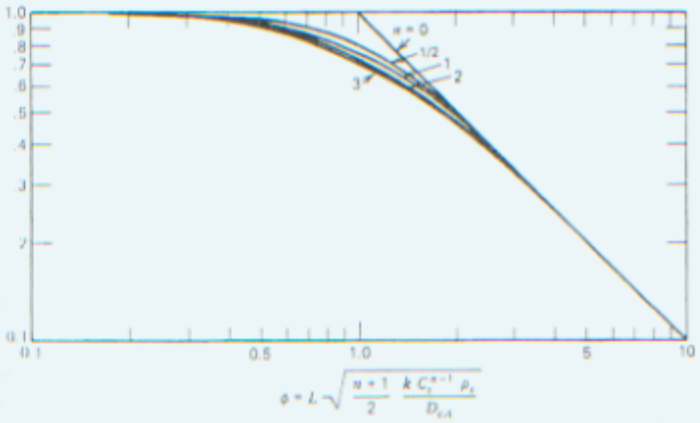


2. A series of experiments were performed using various size of crushed catalyst in order to determine the importance of pore diffusion. The reaction may be assumed to be first order and irreversible. The surface concentration of reactant was $C_s^s = 2 \times 10^{-4}$ mol/cm^3. (15 分)

Data:

Diameter of sphere (cm)	0.25	0.075	0.025	0.0075
R_{obs} (mol/hr.cm^3)	0.22	0.70	1.60	2.40

Determine the "true" rate constant, k_v, and the effective diffusivity, D_e, from the data.



3. 簡答題:

A. 說明不均相觸媒反應步驟，及其與均相觸媒之不同點。

B. 如何利用連續式固定床反應設備分析不均相催化反應之外在質傳阻力並說明製程放大中試驗工廠之重要性。

C. 一般而言溫度對下面那一項之影響最大 (a)表面反應 (b) 內在質傳 (c) 外在質傳 (d) 表面吸附。

D. 下列那一種反應器可能有較大的外在質傳阻力 (a) CSTR (b) Fixed Bed Reactor (c)Batch Reactor (d) Fluidized Bed Reactor . (20 分)