

大葉大學 九十二 學年度 研究所碩士班 招生考試試題紙

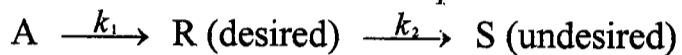
系 所 別	組 別	考 試 科 目 (中文名稱)	考 試 日 期	節 次	備 註
生物產業科技學系	甲 組	生 化 工 程 學	4 月 13 日	第一節 08:30~10:00	可使用計算機

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

共二頁

1. Please explain the following technical items:

- What is the typical chemical (or food) process?
- What are the three fundamental transport processes?
- What is the growth pattern of microorganism in batch culture?
- What is Biochemical engineering?
- What is Biotechnology?
- If $-r_A = (1 \text{ mole/liter min}) C_A^n$, $C_{A0} = 10 \text{ mole/liter}$, find the time when $C_A = 0$?
- How to increase the desired product R for the following reaction?



(30 points)

2. To explain the kinetics of enzyme-substrate $A + E \xrightleftharpoons{K} X \xrightarrow{k_3} R + E$ and $K = \frac{k_1}{k_2}$, please set up (a) the

Michaelis-Menten mechanism by using an equilibrium assumption ($K = \frac{[X]}{[A][E]}$) and with $[E]_0 = [E] + [X]$;

(b) the Briggs-Haldane mechanism by employing a steady-state assumption ($\frac{d[X]}{dt} = 0$) and $[E]_0 = [E] + [X]$.

(40 points)

3. For the elementary reaction in series $A \xrightarrow{k_1} R \xrightarrow{k_2} S$, $k_1 = k_2$, at $t = 0$ and $C_A = C_{A0}$, $C_R = C_S = 0$.

Please find the maximum concentration of R and when it is reached.

(15 points)

4. A yogurt fluid of 30 liters/hr having a half-life ($t_{1/2}$) of 200 hr following a first-order kinetic decay is to be treated by passing it through two ideal stirred tanks (MFRs) in series, $V = 12,000$ liters each. In passing through this system, how much has the yogurt decayed?

(15 points)