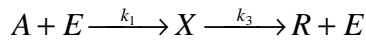


大葉大學九十學年度研究所碩士班招生考試試題紙

系 所 組 別	考 試 科 目 (中 文 名 稱)	考 試 日 期	備 註
食品工程系甲組	化學反應工程	4 月 22 日 第 2 節	可攜帶工程 用計算機

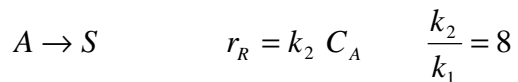
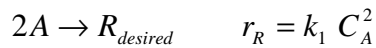
註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

1. Given the enzyme reaction mechanism (*Michaelis and Menten*, 1913).



Derive the rate equation  $r_R = \frac{k_3 [A][E_0]}{K_M + [A]}$  and how to find the  $K_M$ ? 20%

2. Given the reactions



- a) What are the fractional yield expression  $\phi(R/A)$  and  $\phi(R/R+S)$  for this system? 15%  
 b) In what type of single reactor, plug or mixed, would you expect to find the  $C_{R,max}$ ? 15%

3. The irreversible isomerization  $A \rightarrow B$  was carried out in a batch reactor and the following concentration-time data were obtained:

t(min.)	0	5	8	10	12	15	17.5	20
$C_A(\text{mol/dm}^3)$	4.0	2.25	1.45	1.0	0.65	0.25	0.06	0.08

Determine the reaction order and the specific reaction rate. 30%

4. Milk is pasteurized if it is heated to  $63^\circ\text{C}$  for 30 min, but if it is heated to  $74^\circ\text{C}$  it only needs 15 sec for the same result. Find the activation energy of this sterilization process. (Arrhenius' Eqn:

$$k = k_0 e^{-E/RT}) \quad 20\%$$