

Tutorial 1  
26/7/2017

1) Calculate the activation energy for the decomposition of benzene diazonium chloride to give chlorobenzene and nitrogen assuming the reaction to be first order. The rate constant at various temperatures is in Table 1.

<b>k (sec<sup>-1</sup>)</b>	<b>T (K)</b>
0.00043	313
0.00103	319
0.00180	323
0.00355	328
0.00717	333

Table 1

2) It is desired to find the rate expression for the ethylene glycol production by hydrolyzing ethylene oxide in the presence of sulfuric acid. Lab test experiments performed in batch reactor charged with 500mL of ethylene oxide in water at a concentration of 2 kmol/m<sup>3</sup> mixed with 500mL of water containing sufficient quantities of sulfuric acid. The temperature was maintained at 55°C. Ethylene glycol concentration measured at different times is in Table 2. Find the rate equation using the integral method. Assume water is present in excess.

<b>Time (mins)</b>	<b>Concentration (kmol/m<sup>3</sup>)</b>
0	0
0.5	0.145
1.0	0.270
1.5	0.376
2.0	0.467
3.0	0.610
4.0	0.715
6.0	0.848
10.0	0.957

Table 2

3) Consider the reaction between triphenyl methyl chloride (A) and methanol (B) conducted under isothermal conditions. The initial concentration of methanol is 0.5 kmol/m<sup>3</sup>. Assume methanol is in excess. Data measured is given in Table 3.

<b>Time (mins)</b>	<b>Concentration (kmol/m<sup>3</sup>)</b>
0	0.05
50	0.038
100	0.0306
150	0.0256
200	0.0222
250	0.0195
300	0.0174

Table 3

Find the rate expression using integral method