CHEMISTRY Honors Practical Examination' 2021

Gurudas College Centre

Paper- CC-3-5-P

(Physical Chemistry)

FM-30 Time: 2hr

Determination of rate constant of saponification of methyl acetate at room temperature (Conductometrically)

1. Answer the following questions based on this experiment:
   (a) Write the necessary chemical equation for this reaction and comment on order of the reaction.
   (b) Write the integrated rate equation for such reaction when the reactants are in same concentration. Give unit of the rate constant.
   (c) Explain the overall change in conductance values of the reaction mixture throughout the entire reaction.
   (d) Write down the working formula for determining the rate constant of saponification of methyl acetate using conductance measurement explaining the terms.
   (e) Explain the process of preparing 250 ml exact (M/60) methyl acetate at $30^{O}C$ from pure methyl acetate [with density at $t^{O}C = 0.932 – (t-20)x1.25x10^{-4}$ gm/ml]

   2+3+3+2+5
2. Use the following data at $30^{O}C$ and determine the rate constant of saponification of methyl acetate (using Excel):
   (a) Conductance of 50 ml exact (M/60)NaOH solution = 1.64 mS
   (b) Conductance of the mixture of 25 ml exact (M/60) NaOH and 25 ml exact (M/60) acetic acid solutions = 0.69 mS
   (c) Kinetic data:

   Set: 25 ml exact (M/60) NaOH solution + 25 ml exact (M/60) methyl acetate solution

   Time of half-discharge: 0:0 min:sec

Time (min)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Conductance (mS)	1.55	1.48	1.41	1.36	1.31	1.27	1.23	1.2	1.17	1.14	1.12	1.09	1.08	1.06	1.04

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