Experiment 5

Molar Conductivity of Electrolytes

Name : ______________________ Group :________________

Matric no. : ___________________ Date of exp. : ___________

Lecturer : ____________________

(Use the ample space provided for calculations and your own personal notes)

DATA PROCESSING AND CALCULATIONS

Tables 1(a) -1(d) are for NaCl, CH_3COONa, HCl and CH_3COOH solutions respectively.

Table 1(a): Electrolyte = NaCl

c/mol dm^{-3}	Λ / mS cm^{-1}				$\sqrt{c}/(mol^{1/2}dm^{-3/2})$
	1streading	2ndreading	3rdreading	average	

Table 1(b): Electrolyte = CH_3COONa

c/mol dm^{-3}	Λ / mS cm^{-1}				$\sqrt{c}/(mol^{1/2}dm^{-3/2})$
	1streading	2ndreading	3rdreading	average	

Table 1(c): Electrolyte = HCl

c/mol dm^{-3}	Λ / mS cm^{-1}				$\sqrt{c}/(mol^{1/2}dm^{-3/2})$
	1streading	2ndreading	3rdreading	average	

Table 1(d): Electrolyte = CH_3COOH

c/mol dm^{-3}	Λ / mS cm^{-1}				$\sqrt{c}/(mol^{1/2}dm^{-3/2})$
	1streading	2ndreading	3rdreading	average	

Extra space for repeats: Electrolyte =

c/mol dm^{-3}	Λ / mS cm^{-1}				$\sqrt{c}/(mol^{1/2}dm^{-3/2})$
	1streading	2ndreading	3rdreading	average	

TABLE 2: Comparison of values of Λ_o derived from experiment to that from literature.

Electrolyte type	Literature value, Λ_o (298.15 K) / S m^2 mol^{-1}	Experimental value Λ_o ± / S m^2 mol^{-1} ; (T=___ ± __K)
HCl	426.16 x 10^{-4}	± (T= ± K)
NaCl	126.45 x 10^{-4}	± (T= ± K)
CH_3COONa	91.0x 10^{-4}	± (T= ± K)
CH_3COOH	390.7x 10^{-4}	± (T= ± K)

TABLE 3: Degree of dissociation index α and the dissociation constant K_a for acetic acid.

These measurements were conducted at temperature = ____± __= K . Literature value of K_a =1.8 x 10 $^{-5}$ (mol dm^{-3}) at 298.15K .

Concentration C / (mol dm^{-3})	Molar conductivity, λ_m / S m^2 mol^{-1}	Molar conductivity at infinite dilution, λ_o / S m^2 mol^{-1}	α from eqn. (7)	K_a from eqn. (6)

Average K_a = ______.___± _____.

3. DISCUSSION

1. Relative to your error bounds, are the values for Λ_o and K_a derived from experiment close to the literature values?
2. The degree of dissociation is given by $\alpha = \Lambda_m / \Lambda_o$. Why is this expression not very accurate? How can it be corrected so that it becomes more accurate? [Hint: refer to the Onsager equation]