



THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME /STAND ALONE COURSES - LEVEL 4

CHU 2125/CHE 4125 – ANALYTICAL CHEMISTRY I
ASSIGNMENT TEST I – NO BOOK TEST (2006/2007)
TIME : ONE AND HALF HOURS

Date: 27-07-2006 **Time.** 4.00 – 5.30 p.m.

Registration Number :

Question No.	Marks
1	
2	
Percentage	

Instructions to candidates:

This question paper contains 6 pages and two questions.
Answer all questions. Please use a pen (not a pencil) in answering. Write down the answers in the spaces provided. Attached sheets will not be graded.

01. Molarity of a solution is determined titrimetrically by doing six titrations, taking 15.00 cm^3 of sample at a time. Results in units of mol dm^{-3} are given below.

0.2014, 0.2049, 0.2039, 0.2043, 0.2016, 0.2035

- i. How do you report the molarity of this solution? Show all your calculation in detail

(30 marks)

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- [illegible]

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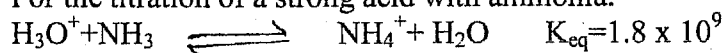
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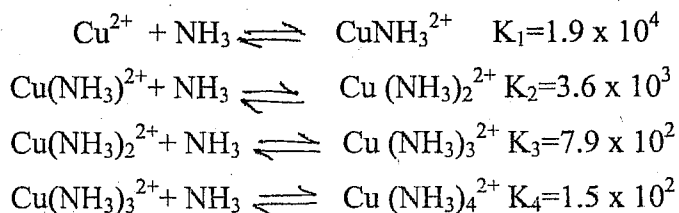
- iv. If you don't detect the presence of proportional systematic error involved in these six results, what is the reason for the variation of results? (10 marks)

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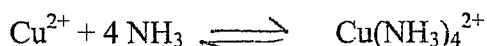
02. For the titration of a strong acid with ammonia.



The reaction of Cu^{2+} with ammonia proceeds stepwise as shown below.



For the overall reaction.



$$K_{\text{eq}} = \frac{[\text{Cu}(\text{NH}_3)_4^{2+}]}{[\text{Cu}^{2+}][\text{NH}_3]^4} = K_1 K_2 K_3 K_4 = 8.1 \times 10^{12}$$

The titration of a strong acid with NH_3 is feasible ($K_{\text{eq}} = 1.8 \times 10^9$).

However, the titration of a solution of Cu^{2+} , with ammonia is not feasible even though $K_{\text{eq}} = 8.1 \times 10^{12}$. Clearly explain why? It is not necessary to give calculations.

Hint. For a quantitative titration, there should be a large vertical portion in the titration curve i.e. p^{H} versus volume of ammonia or p^{Cu} versus volume of ammonia.

(20 marks)



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