THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. Degree Programme / Stand alone courses in Chemistry
Level 5 –Assignment Test 2 – 2009 / 2010

CHU 3129/CHE 5129 – INSTRUMENTAL METHODS IN CHEMICAL ANALYSIS

Duration: One and half hours
Date and time: 06th April, 2010 from 4.00 p.m. to 5.30 p.m.

Reg. No.....

Question number	marks
1	
2	
3	
Total	

Instructions to students

Answer all questions in the spaces given. Additional sheets will not be marked.

1. (i) Comment on the following statement.
"In reverse phase chromatography it is the most polar components that move fastest."

(04 marks)

(ii) Give an example of a mobile phase and a stationary phase that can be used in reverse phase TLC.
Mobile phase –

Stationary phase -

(04 marks)

(iii) Why electrophoresis is not considered as a chromatographic technique?

(02 marks)

(iv) What is band broadening in column chromatography? Give two reasons for band broadening.

(06 marks)

(v) The migration of species in electrophoresis depends on some factors. Name three factors and briefly explain what and how they affect the migration.

(06 marks)

2. (i) Gas Solid Chromatography (GSC) is usually used to separate gases and very volatile compounds with low molecular weight. Why?

(03 marks)

(ii) Give three major properties of a liquid that can be used as a stationary Phase for Gas Chromatography (GC)?

(06 marks)

(iii) The detectors use in GC do not respond exactly the same way to every compound. How do you correct this error?

(03 marks)

(iv) What are the advantages of temperature programming in GC?

(04 marks)

(v) The compounds A and B were separated using gas chromatography. The column length was 60.00 cm.

a) How many theoretical plates are there if the chromatographic peak of A was eluted at 15.00 min. with a width of 4.00 cm?

(08 marks)

b) If the retention factor of A is 5.00 what is the dead time of the column ?

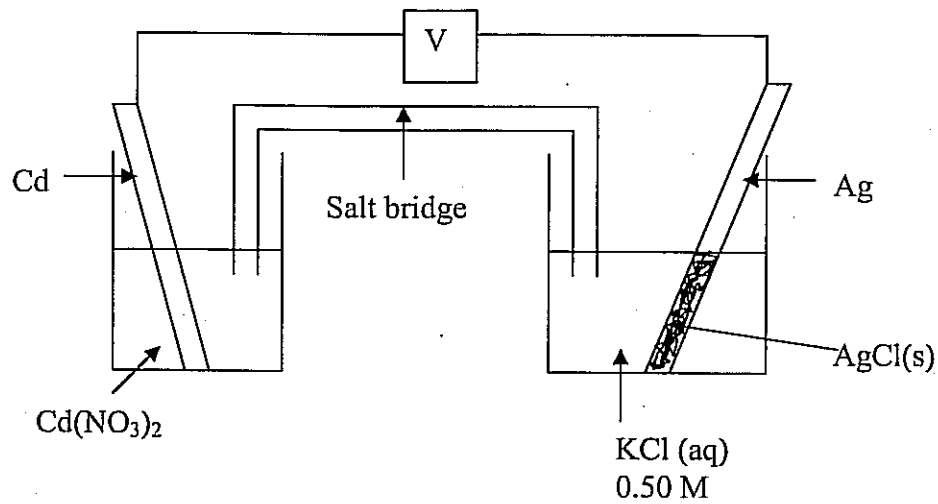
(07 marks)

c) A good separation of A and B was attained with a selectivity factor of 1.5. What is the retention time of B?

(07 marks)

3. (i) Write a line diagram for the cell in the figure.

(05 marks)



(iii) Write the half cell reactions and the net cell reaction.

(06 marks)

(iv) What is the concentration of Cd^{2+} when the volt meter reading of the cell in the above figure is + 701 V?
($E^0_{AgCl/Ag} = 0.222$ V, $E^0_{Cd^{2+}/Cd} = -0.402$ V, $R = 8.314$ J K^{-1} mol^{-1}, F= 96,485 C, T = 298 K)

(14 marks)

(iv) What is the difference in principle between Coulometry and Voltametry?

(05 marks)

(v) Write two differences between Polarography and other voltametric methods.

(04 marks)

(vi) Write three advantages of potentiometric titrations compared to normal visual titrations.

(06 marks)