# CHEMISTRY 324

**Class Examination** **Wednesday, April 30, 2008**

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**Instructions: Answer all questions.**

Time allowed: 55 minutes Total marks: 50

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1. (25 marks)

Write descriptive notes on colloids and their importance in the aquatic environment. Your answer should include reference to the origin of such colloids, their physical properties, their role in the transport of ions, sources of and effects related to variable surface charge, surface complexation reactions and coagulation mechanisms.

2. (5 marks)

A plasma torch is an integral component of ICP-OES and ICP-MS instruments.

i) Outline the purpose of the plasma for each technique (ICP-OES and ICP-MS).

ii) With reference to the ICP-MS technique, explain the term isobaric interference and describe how isobaric interferences can be overcome.

3. (20 marks)

a) A large chemical spill of an organic compound has occurred. Explain how knowledge of the water solubility, can be used with the $K_{ow}$ and $K_d$ values to predict the likely fate of the contaminant in a waterway. As part of your answer define these terms and explain how partition coefficients are interpreted.

b) i) Define the term bioconcentration factor (BCF).

ii) Explain how the BCF of a *neutral hydrophobic organic* compound can be estimated.

iii) Explain how some plants and vertebrates can degrade organic compounds.