RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General/Special) Degree

Third Year Semester I Examination – Oct / Nov 2015

CHE 3308– SPECIAL TOPICS IN ENVIRONMENTAL CHEMISTRY

Answer **6 (six)** questions only Time: Three Hours

(1). a. Explain the term 'Clay Minerals' [10 marks]

b. What are the major elemental composition of clay minerals [10 marks]

c. Give a discription of the tetrahedron and Octahedron structures in Silicate minerals with illustrations [30 marks]

d. Different types of silicate clays are composed of sandwiches of layers with various substances in their interlayer space. Taking this statement into consideration name the two main categories and explain the four types of silicate clay minerals [50 marks]

(2). a. Explain the regions of atmosphere in detail [25 marks]

b. Discribe the temperature variation from the Troposphere to the Thermosphere using illustrations [25 marks]

c. Discuss the difference between weather and climate [10 marks]

d. What are the principle weather and climate controles, explain each one in detail [40 marks]

(3). a. Out of the Oxygen, Carbon, Nitrogen, Phosphorus cycles, discuss any **three** cycles and show the importance of each cycle [75 marks]

b. Why is the Sulphur cycle important ? [25 marks]

(4). a. How is the Nernst equation used to solve oxidation reduction reactions in an aquatic environment [30 marks]

b. Explain the concept of pE [10 marks]

c. What are the methods you can use to calculate pE, explain with equations [20 marks]

d. Why is it important to use Eh-pH diagrams in aquatic chemistry [20 marks]

e. If a value of 10^{-7}M is used for the Fe^{3+}/Fe^{2+} system, explin the pE - pH diagram for the aqueous Fe^{3+}-Fe^{2+} system [20 marks]

(5). a. Discribe the Temperature- Density relationship of lakes [30 marks]

b. Explain the importance of the Bjerrum plot for CO_2 speciation [20 marks]

c. Discuss the Primary production and Nurient Cycling in lakes [50 marks]

(6). a. What is Alkalinity in water? Explain how you would measure alkalinity in the laboratory [40 marks]

b. Explain the term total solids in water and what are the conciquences if the water has high concentration of dissolved solids [20 marks]

c. Discribe the analytical procedures to determine Total solids and flotables [40 marks]

(7). a. What is Sodium Absorption ratio and why is it important [20 marks]

b. Explain the Chloride tolarence criteria for plants [20 marks]

c. Describe the types of water in soil [40 marks]

d. Discuss the critical levels of water in soil in detail [20 marks]