School of Chemistry

Aims and Objectives: Session 2023-2024, Semester 1

Module CH1401: Introductory Inorganic and Physical Chemistry

Course Title: Properties of Solutions

Duration: 6 lectures

Lecturer: Dr R. M. Smith

Aims: To introduce the concept of chemical equilibrium and investigate the behaviour of different solution equilibrium systems, including acid-base and redox equilibria. To apply concepts of chemical equilibrium to real-world applications.

Objectives:

Students should have an understanding of the following:

1. **Chemical equilibrium** – Response of equilibrium to change. The equilibrium constant. The concept of activity.

2. **Solubility** – including the behaviour of ionic solutes in solution and equilibrium constant expressions such as K_{sp}, K_{w}.

3. **Acids and bases** – Arrhenius, Brønsted-Lowry, Lewis, strong, weak and conjugate acids/bases. Acid dissociation constant K_a and base association constant K_b. Interpreting acid-base titration data. Predicting the pH of salt and buffer solutions. Characteristic components of buffer solutions including some physiological buffers.

4. **Introductory electrochemistry** – Describing electrochemical cells using oxidation/reduction half cells and using schematic representations. Difference between galvanic and electrolytic cells. The importance of reference half cells especially standard hydrogen electrode in generating standard reduction potentials. From standard reduction potential, determining cell potentials and hence predicting the spontaneity and feasibility of redox reactions.