

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**DEPARTMENT OF APPLIED CHEMISTRY**  
**SUPPLEMENTARY EXAMINATIONS – 16 JULY – 20 JULY 2001**  
**GENERAL CHEMISTRY FOR BIOLOGY & ENVIRONMENTAL**  
**SCIENCE - SCH 1217**  
**TIME: 3 HOURS**

**INSTRUCTIONS TO CANDIDATES**

Answer **ALL** questions. Each question carries 25 marks.

1. (a) What is first order, second order, third order and zero order reaction.  
(b) Derive the equation for the solubility product of a sparingly soluble salt and state the four major conclusions from the equation.
2. (a) What are the units of the rate constant first and second order reactions if the concentrations are expressed in moles per litre and the time in seconds.  
(b) If the rate of a reaction followed the rate law  $k[A][B]^{2/3}$ , what would the units of k be?
3. Calculate the following:  
(a) What volume of 0,2M HCl should be added to 50,00ML 0,1M  $\text{Na}_2\text{CO}_3$  so as to get a solution of pH 10,5.  
(b) The concentration of  $\text{H}^+$  in a  $\text{CH}_3\text{COOH}$  solution is  $10^{-4}\text{M}$ . What is the concentration of the acid  $K_{\text{acid}} = 4,75 \cdot 10^{-5}$ .
4. Draw a titration curve of 100,00ML, 0,1000M,  $\text{CH}_3\text{COOH}$  and 0,1000M NaOH.

**END OF QUESTION PAPER!!!!**