**Uva Wellassa University of Sri Lanka**
**Faculty of Science and Technology**
**Department of Science and Technology**
**400 Level 1st Semester Examination – July/August 2016**

Uva Wellassa University

# MRT 453-1 Water Quality Data Management

**Instructions to candidates**
Use Visual MINTEQ Software for calculations
Duration: One (01) hour
Number of questions: Two (02) Essay
Answer all questions
Mark allocation: 100 Mark

1. a. Calculate the pH of 0.05 M $Na_2CO_3$ at 26°C using the "Calculated from mass balance" option and "Calculated from mass and charge balance" option in Visual MINTEQ. (10 mark)

   b. Using the Visual MINTEQ output information, explain which option requires more numerical work. (15 mark)

   c. What is the advantage of using the option explained under 1.b? (15 mark)

2. a. What are the relative proportions of $Ca^{2+}$, $SO_4^{2-}$ and $CaSO_4°$ in a 0.017 M $CaSO_4$ solution at pH 7.0 and at 26°C? Is the solution over-saturated with respect to any solid phase? Explain. (20 mark)

   b. What is the minimum equilibrium temperature of the 0.017 M $CaSO_4$ solution at pH 7.0, with respect to gypsum? (Give the answer to one decimal place). (20 mark)

   c. What is the molarity of the $CaSO_4$ solution which is at equilibrium with respect to gypsum at pH 7.0 and 14.3°C? (Give the answer to three decimal places) (20 mark)

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