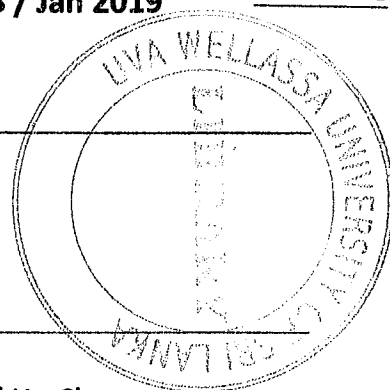


Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
200 level 2nd Semester Examination Dec 2018 / Jan 2019
SCT 233-1, Physical Chemistry



Number of questions: Two (02)
Answer all questions
Time allocation: One (01) hour
Total marks allocated: 200 marks
Scientific calculators are allowed

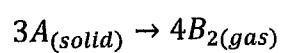
1. In aqueous medium HgCl_2 reacts with $\text{K}_2\text{C}_2\text{O}_4$ yielding KCl , CO_2 and Hg_2Cl_2

- a. Write the balanced equation for the above reaction. (10 marks)
- b. Following data are obtained for three different sets of experiments.

Experiment No	Initial Concentration / mol L ⁻¹		Initial Rate of Reaction / mol L ⁻¹ min ⁻¹
	HgCl_2	$\text{K}_2\text{C}_2\text{O}_4$	
1	0.105	0.15	1.775×10^{-5}
2	0.105	0.30	7.100×10^{-5}
3	0.052	0.30	3.500×10^{-5}

- i. Write the equation for the rate (R) of total reaction using initial concentration of HgCl_2 ($[\text{HgCl}_2]$) and initial concentration of $\text{K}_2\text{C}_2\text{O}_4$ ($[\text{K}_2\text{C}_2\text{O}_4]$). Define all the constants. (10 marks)
- ii. Calculate the order of the reaction with respect to HgCl_2 . (20 marks)
- iii. Calculate the order of the reaction with respect to $\text{K}_2\text{C}_2\text{O}_4$. (20 marks)
- iv. Calculate total order of the reaction. (20 marks)
- v. Calculate the rate constant of the reaction. (20 marks)

2. A certain reaction proceeds through time t as follows,



where A and B denote reactant and product.

Half-life of the reaction is 180 s. Rate constant of the reaction is $0.675 \text{ M}^{-1}\text{s}^{-1}$. How much reactant (A) will be left after a reaction time of 15 min?

(100 marks)

