Uva Wellassa University of Sri Lanka 0025
Faculty of Applied Sciences
Department of Science and Technology
400 Level 1st Semester Examination – July/August 2019
MRT 472-1 Water Chemistry Laboratory II

Instructions
Duration: 01 hour
Number of structured essay questions: 10
Mark allocation: 100
Answer all the questions.

Index Number:

1)

a) What is meant by the acidity of water? (1.5 marks)

b) What is mineral acidity? (1.5 marks)

i) Which pH range indicates presence of mineral acidity in water/wastewater sample? (1 mark)

ii) To determine mineral acidity,
The sample should be titrated with _____ using either _____ indicator, which gives the color change of _____ at pH _____ or using _____ indicator which gives the color change of _____ at pH _____.
(3 marks)

c) What is total acidity? (1.5 marks)

i) To determine total acidity,
First determine mineral acidity as mention in 1) b) ii.
Then, add _____ indicator and continue titrate with _____ until color changes from _____ to _____.

(1.5 marks)

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2)

a) Sketch and label the electrocoagulation setup that you built up in the laboratory experiment? (6 marks)

b) Prior to the electrocoagulation experiments, electrodes are abraded with sand papers. Mention why? (2 marks)

c) What electrodes were used as anode and cathode in this experiment. (2 marks)

Anode: _____

Cathode: _____

3)

a) What processes occur at the anode electrode in the electrocoagulation experiment? (2.5 marks)

i) Write down the reaction(s) at anode using the electrode that you mention in 2) c. (1.5 marks)

b) What is the process at the cathode electrode in the electrocoagulation experiment? (2.5 marks)

i) Write down the reaction(s) at cathode using the electrode that you mention in 2) c. (1.5 marks)

c) For what purpose NaOH is used to increase conductivity of the solution? (2 marks)

4)

a) Electrodes are usually placed much closer to each other in electrocoagulation experiment. Explain why? (3 marks)

b) Why does the stirrer speed have to be kept low during the electrocoagulation experi

(3 m

c) A gas is produced and escaped at one of the electrodes.

i) What is that gas produced?

(1 m

ii) What is the advantage of having that gas production during electrocoagulation proc

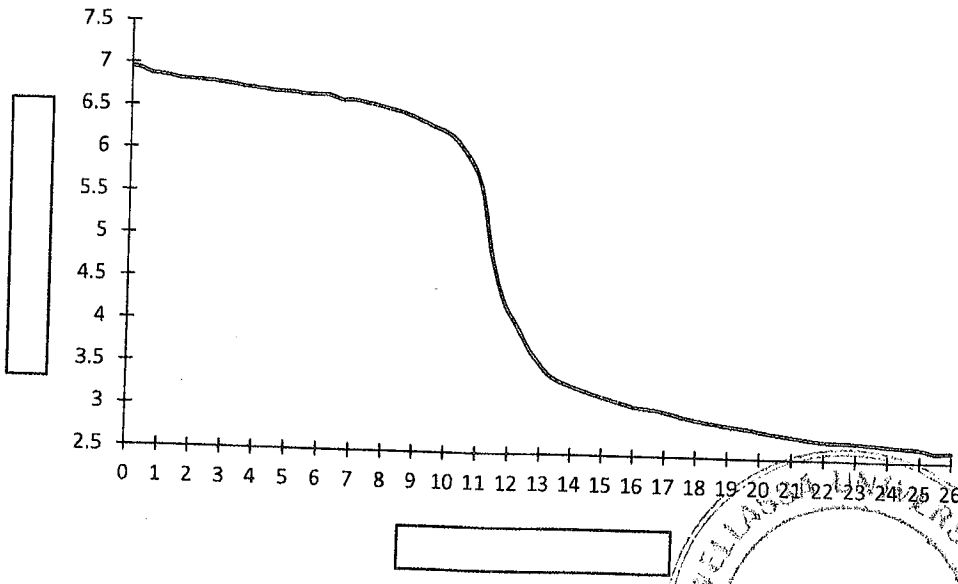
(3 mar

5)

a) What is meant by buffer capacity of water?

(3 mar

b) Following is the graph drawn at the end of the experiment of determining buffer capac of tube well water sample (100 ml) using 0.01 M HCl.



i) Label the axis of the graph. (2 marks)

ii) Calculate the buffer capacity of tube well water (5 marks)

6)

a) What is the main purpose of measuring residual chlorine?

(2.5 marks)

b)

i) What is meant by chlorine demand? (2.5 marks)

ii) What is meant by chlorine dosage? (2.5 marks)

c) What is meant by Free available chlorine residual?

(2.5 marks)

7)

a) What is adsorption? (2 marks)

b) What are the two types of adsorption? (2 marks)

c) Following table depicts the data from adsorption isotherm constructing experiment for adsorption of acetic acid on activated carbon.

i) Fill in the last column and mention the units of that column. (4 marks)

Sample No	Amount of activated carbon (g)	Initial mol of acetic acid (mol)	Equilibrium mol of acetic acid (mol)	Adsorption
1	1.5	0.0265	0.0120	
2	1.5	0.0413	0.0280	
3	1.5	0.1032	0.0850	
4	1.5	0.2065	0.1915	
5	1.5	0.3098	0.2965	

ii) What were the equilibrium isotherm models used to fit the experimental data? (2 marks)

8)

a) What is the test used to measure the chlorine residual in the laboratory? (1 mark)

i) What is the indicator used in the chlorine residual measuring experiment? (1 mark)

b) What were added to the titrant vessels (sample) other than the indicator you mentioned in part a) i), in the residual chlorine measuring experiment? (3 marks)

i) _____

ii) _____

iii) _____

c) What were added in the burette in the chlorine residual measuring experiment? (1 mark)

i) What is the color change? (1 mark)

ii) Write down the reaction between Cl_2 and the titrant that you mention in 8) a? (3 marks)

) Draw the wastewater treatment flow diagram of Ceylon Cold Stores' (Elephant House) wastewater treatment plant that you visited. (10 marks)

10) Draw the wastewater treatment flow diagram of BOI Export Processing Zone Biyagama's main wastewater treatment plant that you visited. (10 marks)