



RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (Special Degree in Chemistry/ B.Sc. (General) Degree

Third Year - Semester I Examination - June / July 2018

CHE 3207 - ELECTROCHEMISTRY

Time: Two (02) hours

Answer all questions.

Use of a non-programmable calculator is permitted.

1. a) Write short notes on following corrosion forms.
  - i. Pitting corrosion
  - ii. Passivation
  - iii. Erosion corrosion
  - iv. Crevice corrosion(50 Marks)
- b) Briefly describe corrosion control methods. (20 Marks)
- c) Defend the statement: "Iron rusts more quickly" in contact with a less active metal and more slowly in contact with a more active metal." (30 Marks)
2. a) Answer the following questions based on Mercury cell method used in chlor-alkali process.
  - i. What is the material used for the cathode?
  - ii. Write down the anodic, cathodic and overall redox reactions.
  - iii. State major advantage and major disadvantage of this method?(30 Marks)
- b) Electrolysis of water can be used to make breathable oxygen. Write down the anodic, cathodic and overall reactions relevant to the above process. (30 Marks)

- c) Briefly explain the use of electrocoagulation in water treatment applications. (40 Marks)
3. a) What is a fuel cell? (10 Marks)
- b) How does a fuel cell differ from a secondary battery? (20 Marks)
- c) State four (04) applications of fuel cells. (20 Marks)
- d) Explain how a Hydrogen fuel cell works using relevant chemical reactions. (50 marks)
4. a) State major steps involved in electroplating. (20 marks)
- b) Discuss the following terms
- i. over potential
  - ii. overvoltage (40 marks)
- c) A technician electroplates a sculpture with 0.86 g of Chromium metal by electrolysis of  $\text{Cr}_2(\text{SO}_4)_3$ . If 12.5 min is allowed for the plating, how much current will be needed? (40 marks)

Relative atomic masses are  $\text{Cr} = 52.00$ ,  $\text{S} = 32.07$ ,  $\text{O} = 16.00$ .

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