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**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING  
END TERM EXAMINATION - JUN 2023**

**Semester :** Semester II - 2022

**Course Code :** CHE1017

**Course Name :** Sem II - CHE1017 - Applied Chemistry

**Program :** CIV,ECE&EEE

**Date :** 12-JUN-2023

**Time :** 1.00PM - 4.00PM

**Max Marks :** 100

**Weightage :** 50%

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**Instructions:**

- (i) Read all questions carefully and answer accordingly.
  - (ii) Question paper consists of 3 parts.
  - (iii) Scientific and non-programmable calculator are permitted.
  - (iv) Do not write any information on the question paper other than Roll Number.
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**PART A**

**ANSWER ALL THE QUESTIONS**

**(10 X 3 = 30M)**

1. List out any 6 specifications of potable water.  
(CO4) [Knowledge]
2. Considering the given redox reaction, write Nernst's equation.  
 $aA + ne^- \rightarrow bB$   
(CO2) [Knowledge]
3. A boiler wall material is affected by the formation of hard, adhering coating on the inner walls  
a) Name the trouble faced by the boiler in the above situation.  
b) Mention any two ways to overcome the above trouble in boiler.  
(CO4) [Knowledge]
4. Define condensation polymers. Give an example.  
(CO3) [Knowledge]
5. List out any three limitations of H<sub>2</sub>-O<sub>2</sub> fuel cell.  
(CO2) [Knowledge]
6. What is the phenomenon involved in the formation of reddish brown coloured scales on iron/steel materials? What is it chemically?  
(CO3) [Knowledge]
7. Give two reasons why concentration of hardness of water is always expressed in terms of equivalents of Calcium carbonate.  
(CO4) [Knowledge]

8. Name the type of corrosion happening in following cases.  
 a) Corrosion at a bent portion of a metal rod  
 b) Iron undergoing corrosion when in contact with copper  
 c) Ocean going ship (CO3) [Knowledge]
9. Describe the process of electroless plating. (CO3) [Knowledge]
10. Considering classification of batteries, give an example for each. (CO2) [Knowledge]

### PART B

#### ANSWER ALL THE QUESTIONS

(5 X 8 = 40M)

11. Define the terms brackish water and desalination. Explain the process of reverse osmosis. (CO4) [Comprehension]
12. Explain the principle involved in anodic coating and cathodic coating with suitable examples for each. (CO3) [Comprehension]
13. Explain corrosion in the case of iron with the help of electrochemical theory (with a diagram highlighting anodic/cathodic reactions) (CO3) [Comprehension]
14. In the construction of Li-MnO<sub>2</sub> cell,  
 a) Name anode and cathode materials (CO2) [Comprehension]  
 b) Name the electrolyte and cell output  
 c) Write the reaction at anode  
 d) Write the reaction at cathode  
 e) List two applications
15. Discuss the synthesis and applications of Nylon - 6,6. (CO1) [Comprehension]

### PART C

#### ANSWER ALL THE QUESTIONS

(2 X 15 = 30M)

16. a) Discuss the construction cell reactions and cell characteristics of Lithium-ion battery. (7M)  
 b) List out the differences between electroless and electrodeposition. (8M)  
 (CO2,CO3,CO4) [Application]
17. Calculate the Total hardness, Temporary Hardness and Permanent Hardness of a water sample containing: Ca(HCO<sub>3</sub>)<sub>2</sub>=25 ppm, Mg(HCO<sub>3</sub>)<sub>2</sub>=15 mg/L, CaSO<sub>4</sub>=5 mg/L, MgSO<sub>4</sub>=30 mg/L, MgCl<sub>2</sub>=15 mg/L. Express total hardness in °Cl and °Fr. (CO4,CO3,CO2) [Application]