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## ***B.Tech. Degree I Semester Regular/Supplementary Examination in Marine Engineering November 2023***

**19-208-0103 ENGINEERING CHEMISTRY**  
(2019 Scheme)

Time: 3 Hours

Maximum Marks: 60

**Course Outcome**

On successful completion of the course, the students will be able to:

- CO1: To Understand the treatment of water to remove hardness  
 CO2: To get exposure to the important aspects of solidstate chemistry and electrochemistry  
 CO3: To Understand and apply the concepts corrosion science  
 CO4: To get exposure on the important types of fuels used in marine applications.  
 CO5: To gain sound understanding on the requirements and properties of a few important engineering materials  
 Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 –Analyze,  
 L5 – Evaluate, L6 – Create  
 PI – Programme Indicators

Answer **ALL** questions

(5 × 15 = 75)

		Marks	BL	CO	PI
I.	(a) Explain the different techniques of desalination of sea water.	10	L1	1	1
	(b) How are boiler scale formed? Discuss the disadvantages of scale formation. Differentiate between scale and sludge.	5	L3	1	1
<b>OR</b>					
II.	(a) Describe how water is purified by ion exchange method for industrial purpose?	10	L2	1	1
	(b) Explain the steps in municipal water treatment.	5	L1	1	1
III.	(a) Explain Potentiometric titrations.	8	L2	2	1
	(b) Explain the setting and working of SHE and calomel electrode	7	L2	2	1
<b>OR</b>					
IV.	(a) Explain different types of Liquid crystals.	10	L2	2	1
	(b) Explain the different types of Nanomaterials.	5	L2	2	1
V.	(a) What factors influence atmospheric corrosion of metals? Discuss in detail the electrochemical corrosion of metals. What methods are used to combat corrosion?	10	L3	3	1
	(b) Write a note on Lacquers.	5	L1	3	1
<b>OR</b>					
VI.	(a) Write a note on Thermodynamics and kinetics of corrosion.	10	L2	3	1
	(b) How is steel protected cathodically? Discuss with an example.	5	L3	3	1
VII.	(a) Define calorific value of a fuel. How is it determined experimentally? Explain.	8	L2	4	1
	(b) Write in brief about the proximate analysis of coal and its importance.	7	L2	4	1
<b>OR</b>					
VIII.	(a) Write a note on refining of petroleum.	10	L2	4	1
	(b) Explain carbonization of coal.	5	L1	4	1

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		Marks	BL	CO	PI
IX.	(a) Briefly discuss the different types of plastic moulding.	10	L2	5	1
	(b) Give the chemistry of preparation and properties of:	5	L1	5	1
	(i) PET				
	(ii) Nylon-6, 6				
<b>OR</b>					
X.	(a) Give brief account of the following:	10	L2	5	1
	(i) BUNA -S				
	(ii) Butyl Rubber				
	(iii) Polyurethane				
	(iv) Natural Rubber.				
	(b) Describe compounding of rubber.	5	L3	5	1

Bloom's Taxonomy Levels

L1 = 21%, L2 = 57.8%, L3 = 21%.

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