Code No.: CH102BS	R20	H.T.No.			8	R					

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–I–Semester End Examinations (Supply) - December- 2025
ENGINEERING CHEMISTRY
(Common for CSM, ECE, MECH, AI&DS)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1.	a)	Define hardness water? Differentiate between temporary and permanent hardness of water.	[2M]
	b)	Identify break point of chlorination? State its significance.	[2M]
	c)	Solve the bond order of O_2 molecule.	[2M]
	d)	Develop Π molecular orbital of butadiene.	[2M]
	e)	Explain the advantages of Fuel cells.	[2M]
	f)	What is a battery and write its classification.	[2M]
	g)	What is the significance of Octane number?	[2M]
	h)	Solve the GCV and HCV of a fuel having the following composition C=85%, H=8%, S=1%, N=2%, Ash=4%, latent heat of steam=587 cal/g.	[2M]
	i)	Explain why natural rubber needs vulcanization.	[2M]
	j)	Define biodegradable polymers and write its applications.	[2M]

PART-B **(50 Marks)**

2.	Identify scale and sludge formation in boilers and write about the methods for prevention.	[10M]
	OR	
3.	Explain the principle of EDTA method? Describe the estimation of hardness of water by EDTA method.	[10M]
4.	Discuss the crystal field splitting of d-orbitals in tetrahedral and octahydral complexes.	[10M]
	OR	
5.	Develop the molecular orbital diagram of N_2 and find out the bond order.	[10M]
6.	Explain the construction and working of H_2-O_2 fuel cell and write its advantages.	[10M]
	OR	
7.	Explain the construction and working of calomel electrode with a neat diagram.	[10M]
8.	How can flue gas be analyzed with the help of Orsat flue gas apparatus? Discuss the significance of flue gas analysis.	[10M]
	OR	
9.	Explain the determination of calorific value of a gaseous fuel using a Junkers gas calorimeter.	[10M]
10.	Discuss the preparation, properties and applications of Nylon- 6,6 and Thiokol Rubber.	[10M]
	OR	
11.	Analyze the doping mechanism of conduction in poly acetylene (p-doping & n-doping).	[10M]

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