



**Academic year 2022-2023 (Odd Sem)**  
**(OFFLINE CIE-I FOR I SEM CS STREAM)**

**DEPARTMENT OF CHEMISTRY**

Date	January 2023	Maximum Quiz Marks	10
Course Code	22CHY12A	Maximum Test Marks	50
Sem - I	CIE-I	Duration (Quiz + Test)	120 Min
<b>CHEMISTRY OF SMART MATERIALS AND DEVICES</b>			

Instructions- All quiz questions should be answered in first 2 pages. 7

Quiz		M	BTL	CO
1	Among the following polymers (lactic acid, polycaprolactam and cellulose) identify the natural biodegradable polymer.	1	1	1
2	Calculate the atom economy for combustion of methane, given by the equation $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \Rightarrow 2\text{H}_2\text{O}(\text{g}) + \text{CO}_2(\text{g})$ . (given, atomic mass of C = 12, H = 1 and O = 16)	1	3	4
3	Identify the functional group in PHBV polymer responsible for biodegradation.	1	2	3
4	In recycling of lead acid battery by pyrometallurgical process, Pb-alloy along with pure lead is obtained. Justify.	1	3	4
5	List any two advantages of battery recycling process.	1	1	2
6	Write any one cathodic reaction of Li-Air battery, when nonaqueous electrolyte is used.	1	2	3
7	Give any one hazardous effect of mercury due to leaching from e-waste.	1	1	2
8	Mention the oxidation state of Mn in $\text{LiMnO}_2$ battery before and after discharge reaction.	1	3	2
9	Justify the role of solid electrolyte interphase (SEI) in Lithium-ion battery.	1	5	3
10	Represent reserve battery symbolically.	1	2	1



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Test Questions		M	BTL	CO
1	How sutures used in surgical process undergoes biodegradation? Explain the synthesis of polylactic acid with its two medical applications.	7	2	1
2	What are Hydrogels? Give an example and explain the mechanism of such hydrogels drug delivery.	7	3	3
3	Justify the importance of any four green chemistry principles with relevant examples.	7	5	4
4	Outline the recycling process of Lead acid battery by pyrometallurgy and mention any two limitations of it.	7	4	3
5	With the help of flow chart, explain the extraction of copper from PCB by Hydrometallurgy.	7	2	2
6	Explain any four-battery characteristics and mention their importance with respect to advanced battery.	8	2	2
7	Illustrate the construction and working of LiCoO <sub>2</sub> battery with charging and discharging reactions involved in it.	7	1	1

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	2+14	3+15	3+14	2+7	3+7	3+2	3+7	7	1+7	
	Target	2+10	3+16	3+17	2+7						

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