RV College of Engineering®
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Academic year 2024-2025 (Odd Sem)
(CIE-II FOR I SEM CS STREAM)

DEPARTMENT OF CHEMISTRY

Date	11.12.24	Sem - I	CIE-II
Course Code	CM211IA	Maximum Test Marks	50
Course Name	CSMD	Duration	90 Min
CHEMISTRY OF SMART MATERIALS AND DEVICES (CSMD)			

	Test Questions	**M**	**BTL**	**CO**
1	Outline the process of recycling lead-acid batteries and highlight the key steps involved in material recovery, along with necessary chemical reactions.	7	2	1
2	Solid electrolyte interphase is very essential in lithium-ion battery. Justify. Illustrate the construction and working of Lithium cobalt oxide battery along with structural components, electrochemical reactions during charge and discharge cycles.	7	3	3
3	Illustrate the following i) Pyrometallurgy ii) Hydrometallurgy iii) Effect of heavy metal ions on health	7	2	1
4	Outline the constructions and working of Quantum dot sensitized solar cells along with neat labelled diagram.	7	2	3
5	How batteries are different from supercapacitor? Explain the construction of EDLC with neat labelled diagram.	7	3	2
6	Outline the principle of organic photovoltaics along with its construction and working with a labelled diagram.	7	2	2
7	Describe the CVD method for synthesizing carbon nanotubes (CNTs) with a neat labelled diagram. Justify the role of inert gas in above process.	8	3	4

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

	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
Marks Distribution	Max Marks	14	14	14	08	-	28	22			-

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Academic year 2024-2025 (Odd Sem)
(CIE-I FOR I SEM CS STREAM)

DEPARTMENT OF CHEMISTRY

Date	04.11.24	Sem - I	CIE-I
Course Code	CM211IA	Maximum Test Marks	50
Course Name	CSMD	Duration	90 Min
CHEMISTRY OF SMART MATERIALS AND DEVICES (CSMD)			

	Test Questions	M	BTL	CO
1	Polyethene is non-biodegradable, whereas Polylactic acid is biodegradable, justify. Outline the synthesis of Polylactic acid and mention any two applications of it.	7	5	1
2	Describe the key principles of green chemistry, focusing on the importance of prevention, less hazardous chemical synthesis, and the use of safer solvents and auxiliaries. Provide relevant case study to highlight the application of these principles.	7	2	3
3	The following are two different methods used to synthesize Hydrazine. Among them, suggest the greener method based on atom economy and prevention of waste. (Given atomic weight of Na=23, H= 1, O= 16, Cl= 35.5 and N= 14) (i) $NaOCl + 2NH_3 \rightarrow NH_2NH_2 + NaCl + H_2O$ (ii) $H_2O_2 + 2NH_3 \rightarrow NH_2NH_2 + 2H_2O$	7	3	1
4	Discuss the important characteristics of Hydrogels. Provide examples of natural and synthetic hydrogels. List any two biomedical applications.	7	2	3
5	Outline the steps involved in the determination of pKa of weak acid using pH measurements along with its principle.	7	2	2
6	Assume you are performing a conductometric titration of 45 ml Hydrochloric acid solution (HCl) with standard sodium hydroxide (0.75N). As you add standard NaOH to the HCl solution, you observe the changes in conductivity. Based on the principle of conductometric titration: (i) Predict the nature of graph (ii) Justify the nature of graph before and after equivalence point. (iii) Assume equivalence point is 1.6 ml, then calculate the amount of HCl in 750 ml solution (gram equivalent weight of HCl = 36.5)	7	3	2
7	Explain the estimation of amount of copper in E-waste volumetrically along with principle, procedure and calculation.	8	2	4

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

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	14	14	14	08	-	29	14	-	7	-

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Academic year 2024-2025 (ODD Sem)

(IMPROVEMENT TEST FOR I SEM CS STREAM)

DEPARTMENT OF CHEMISTRY

Date	02.12.2024	Sem - I	CIE-IT
Course Code	CM211IA	Maximum Test Marks	50
Course Name	CSMD	Duration	90 Min
CHEMISTRY OF SMART MATERIALS AND DEVICES (CSMD)			

	Test Questions	**M**	**BTL**	**CO**
1	Summarize the principles of green chemistry (a) catalysis, (b) the use of renewable feedstocks, with suitable examples. How do these principles contribute to sustainability in environmental applications?	7	2	1
2	Justify the replacement of polythene bag by polylactic acid and illustrate the synthesis of polylactic acid. List any two biomedical applications.	7	3	3
3	Using the principles of redox chemistry, examine the steps involved in the conversion of graphite to reduced graphene oxide by modified Hummers method. Also, list the electronic and energy device applications of graphene.	7	2	1
4	Propose the semiconductor material extracted from sand. Interpret the importance of different steps involved in the manufacturing of semiconductor chips.	7	4	3
5	Based on the concept of sustainable chemistry, interpret the properties, functionalities, and biomedical applications of hydrogels.	7	3	2
6	Identify the suitable electrodes and construct the smart electrochemical glucose sensor. Highlight the functionalities of electrodes and enzymatic reactions in glucose detection.	7	3	2
7	Describe an experiment to evaluate the copper composition in PCB e-waste volumetrically. Analyze the copper composition in PCB e-waste, while considering its environmental impact for sustainable e-waste management.	8	3	4

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

	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
Marks Distribution	Max Marks	14	14	14	08		14	21	08		

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