RV Educational Institutions
RV College of Engineering
Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi
Approved by AICTE, New Delhi

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Academic year 2023-2024 (Odd Sem)

(OFFLINE CIE-I FOR I SEM CS STREAM)

DEPARTMENT OF CHEMISTRY

Date	November 2023	Maximum Quiz Marks	10
Course Code	22CHY211AI	Maximum Test Marks	50
Sem - I	CIE-I	Duration (Quiz + Test)	120 Min

CHEMISTRY OF SMART MATERIALS AND DEVICES

	Test Questions	M	BTL	CO
1	List the applications of Biodegradable, Biocompatible and Hydrogel polymers in bio-medical engineering. Outline the synthesis of PLA.	7	2	1
2	Illustrate any four green chemistry principles with relevant examples.	7	3	3
3	Design a sustainable and efficient lead-acid battery recycling process with neat flow chart along with chemical reactions that minimizes environmental impact. Discuss the environmental benefits of your proposed recycling system.	7	3	4
4	Illustrate battery classification with example, explain the following battery characteristics voltage and cycle life.	7	3	3
5	Explain the construction with neat labelled diagram and working of $LiCoO_2$ battery with charging and discharging reactions involved in it.	7	2	2
6	Illustrate the principles of colorimetric estimation of Cu. Outline the procedure and calculation involved in it.	7	2	2
7	Outline the principle, experimental procedure, model graph, including the choice of titrant, reference electrode and indicator electrode in estimation of acid content of soft drinks using pH titration method.	8	2	1

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

	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
Marks Distribution	Max Marks	15	14	14	7		29	21			
	Target	10	16	17	7						

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Academic year 2023-2024 (Odd Sem)

(OFFLINE CIE-II FOR I SEM CS STREAM)

DEPARTMENT OF CHEMISTRY

Date	December 27.12.23	Sem - I	CIE-II
Course Code	CHY211AI	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 involved in the synthesis of conducting polyaniline. List any two applications of it.	7	2	2
2	Outline the construction and working of glucose sensor and explain the sensing mechanism with reactions at respective electrodes.	7	3	3
3	Illustrate a sustainable and efficient method for green hydrogen production that minimizes environmental impact. List any two applications of it.	7	3	4
4	Explain the synthesis of CNT by modified chemical vapor deposition method and explain the need of functionalisation, with an example.	7	3	3
5	With neat labelled diagram, explain the construction and working of quantum dot sensitized (QDSSC) solar cell.	7	2	2
6	Explain the construction and working of Pseudo type supercapacitor. How it is different from Electrolytic Double Layer supercapacitor.	7	2	2
7	Outline the principle, experimental procedure and calculation involved in the estimation of iron by potentiometric titration using std $K_2Cr_2O_7$. Mention the metal ions present before and after equivalence point.	8	2	1

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

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	08	21	14	7		29	21			

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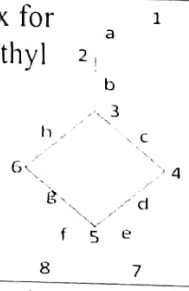
Academic year 2023-2024 (Odd Sem)

(OFFLINE IMPROVEMENT TEST FOR I SEM CS STREAM)

DEPARTMENT OF CHEMISTRY

Date	December 22.01.24	Sem - I	Improvement Test
Course Code	CHY211AI	Maximum Test Marks	50
Course Name	CSMD	Duration	90 Min

CHEMISTRY OF SMART MATERIALS AND DEVICES (CSMD)

	Test Questions	M	BTL	CO
1	What is memory storage device? Explain any three types of electronic memory devices.	7	2	2
2	Discuss the steps involved in the manufacturing of semiconductor chips along with flow chart.	7	3	3
3	What are liquid crystals? Explain the construction and working of liquid crystal display with a neat labelled diagram.	7	3	4
4	Explain the construction and working of organic light emitting display along with neat labelled diagram.	7	3	3
5	What is the significance of molecular Interactions? Explain the following stabilizing interactions in protein by taking suitable example (i) Hydrogen bonding (ii) Van der Waals Forces	7	2	2
6	Compile the vertex adjacency and edge adjacency matrix for following hydrogen omitted structure of ethyl dimethyl cyclobutane. 	7	2	2
7	Discuss the principle and procedure used for the estimation of acetic acid in the given solution. Plot the model graphs and explain the chemistry behind the variation of pH.	8	2	1

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

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	08	21	14	7		29	21			

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CM21HA / 22CHY12A / 22CH22A

USN | 1 | RV | 2 | 3 | A | D | 0 | 0 | 3 |

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

I / II Semester B. E. Regular / Supplementary Examinations Feb 2024

Common to AI / BT / CSE / CY / CD / IS

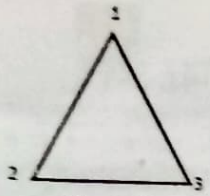
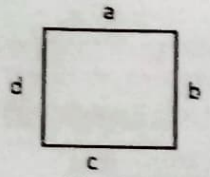
CHEMISTRY OF SMART MATERIALS AND DEVICES

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

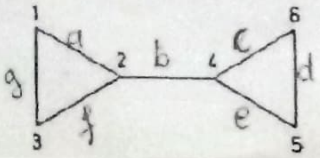
1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer SIX full questions from Part B. In Part B question number 2 and 11 are compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8 & 9 and 10.
3. Handbook of chemistry is permitted.

PART-A

1	1.1	Give an example of a bio-compatible polymeric material.	01
	1.2	What is circular economy in case of e-waste management?	01
	1.3	Write the vertex adjacency matrix for the below Fig 1.3.  Fig 1.3	01
	1.4	Predict the edge adjacency matrix for the below Fig 1.4.  Fig 1.4	01
	1.5	What is green computing?	01
	1.6	Give an example of organic materials used in memory storage device.	01
	1.7	Write the structure conductive form of polyaniline.	01
	1.8	What is the main role of ferrocene in synthesis of *CNT* preparation by modified *CVD* method?	01
	1.9	Justify the role of SEI layer in the lithium-ion battery.	01
	1.10	What is the role of TiO_2 in quantum dot sensitized solar cells?	01

PART-B

2	a	What are biodegradable polymers? Explain the synthesis of poly lactic acid (PLA) along with chemical reactions and applications of it.	07
	b	Explain any three green chemistry principles with an example.	07
3	a	Explain the electrostatic interaction, short range repulsion and ion pair interactions with examples.	07
	b	Deduce the vertex adjacency matrix and edge adjacency matrix for the below Fig 3b.	07

		 Fig 3b	
		OR	
4	a	What is molecular topology? Explain the applications of molecular topology in designing the drug molecules.	07
	b	Write the importance of topological indices. Explain with examples of Zagreb indices and Wiener number.	07
5	a	Outline the steps involved in the manufacturing of semiconductor with suitable explanation.	07
	b	Explain the construction and working of liquid crystal based display devices.	07
		OR	
6	a	Write a note on the following. i) Polymer based memory device ii) Bio composite based memory devices.	07
	b	Illustrate the construction and working mechanism of light emitting devices.	07
7	a	Outline the synthesis of graphene by modified hummers method and applications of it.	07
	b	What are electrochemical sensors? Explain the mechanism involved in it along with their real life applications.	07
		OR	
8	a	Explain the synthesis of carbon nanotube by modified chemical vapor deposition technique along with neat labeled diagram and steps involved in it.	07
	b	Explain the following with an example. i) Gas sensor ii) Piezo electric sensors.	07
9	a	Illustrate the construction and working metal air battery along with necessary reactions involved along with advantages.	07
	b	Explain the construction and working of organic solar cells with the detailed steps involved in the energy generation.	07
		OR	
10	a	Explain the following with respect to advanced battery. i) Capacity ii) Energy density iii) Cycle life.	07
	b	Outline the construction and working of pseudo capacitor and hybrid capacitor with neat labeled diagram.	07
		LAB COMPONENT	
11	a	Outline the principle, procedure, instrumentation and calculation part involved in the colorimetric determination of copper.	10
	b	Explain the experiential determination of iron using potentiometric principle. Explain the nature of graph along with the change in Nernst equation before and after equivalent points.	10