

Question Format & QP Setter Information

Name of Examination	Continuous Assessment Test - 2 (CAT-2), Fall 2021-22 Semester, (Dec 2021)		
Slot: D1+TD1	Course Mode: Online	Class Number(s): VL2021220106468	
Course Code:	BCHY101L	Course Title:	Engineering Chemistry

*General Instructions (if any):***1. OPEN BOOK Examinations**

Q. No.	Sub-division	Question Text	Marks	Module	Level	CO	BL
1.		Arrange the carbocations of methyl, ethyl, isopropyl and t-butyl groups based on their relative stability. Explain the factors responsible for the same.	10	3	E	1	L3
		(OR)					
		Write a comment on the hybridization, geometry and stability of methyl anion, benzyl anion, ylide, allyl anion and cyclopentadienyl anion.	10				L3
		(OR)					
		Heterocyclic compounds varied in nature with respect to aromaticity. Write the structure and give your views on the aromatic nature of (i) aziridine (ii) azetidine (iii) pyrrole (iv) pyridine (v) azete	10				L3
		(OR)					
		(i) Simple alkyl radicals differ in terms of their stability. Explain the contributing parameters. (ii) Discuss any three reactions in which free radicals participate	5 5				L3
2.		Distinguish the working principles of electrochemical and electrolytic cells with suitable diagrams and reactions. Discuss one application for each.	10	4	T	5	L4
		(OR)					
		Our mobile phones are built with rechargeable batteries. Delineate the structure and functioning of the batteries with suitable diagrams and reactions.	10				L4
		(OR)					
		Supercapacitors have high power density and longer life compared to batteries. Rationalize the difference with appropriate structural and functional features.	10				L4
		(OR)					
		Both photovoltaic cell and dye sensitized cell operate with semiconductors. (i) Outline the difference in their working principle with suitable diagrams. (ii) Give an	10				

		example of semiconducting material used in both the cells					L4
3.	a	An assignment of green coloration of a fabric is given. Suggest a dye material and describe the process.	5	3, 4	M	1, 5	
	b	How do Ruthenium-Polypyridine and I/I_3^- redox couple improve the efficiency of TiO_2 based solar cell.	5				L3 and L4
		(OR)					
	a	If an option is given to use natural or synthetic dye for dyeing a fabric which one do you choose and why?	5				
	b	Why do we use Si based n- type and p-type semiconductors in photovoltaic cell instead of Si itself? Describe zone refining method.	5				L3 and L4
		(OR)					
	a	Explain why the reagents such as Na_2CO_3 , $NaNO_2$, HCl are used in methyl orange synthesis?	5				
	b	How does one drive energy from a fuel cell? What are the points need to be considered to use it as a valuable energy source in automotive?	5				L3 and L4
	a	Provide the empirical formula of indigotin and its molecular weight. Explain why PCl_5 and Zn/CH_3COOH are used in its synthesis.	5				
	b	How is a fuel cell constructed? List out the solid materials used as the essential components in SOFC.	5				L3 and L4

moderated by

Signature with date

PAJAMA PADHAI