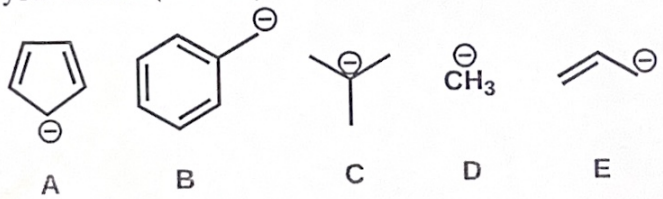
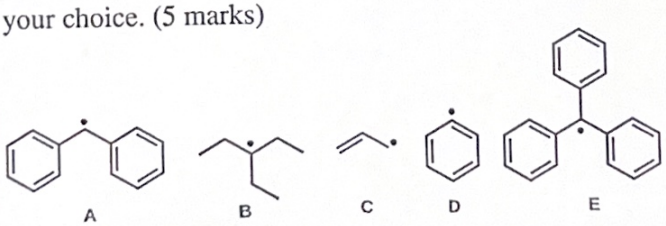
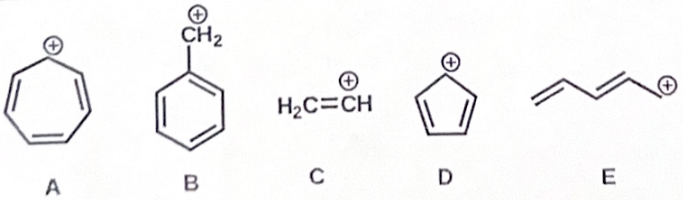
Name of Examination	**Continuous Assessment Test-II** (CAT-II), **Fall 2022-23 Semester,** (December 2022)			
Slot:F1+TF1	Course Mode: Offline		**Class Number (s): CH2022231700654**	
Course Code:	BCHY101L	Course Title:	Engineering Chemistry	
Emp. No.:	51940	Faculty Name:	Dr. G. Ramachandran	School: SAS, Chemistry

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

Q. No.	Sub-division	Question Text	Marks
1.		Differentiate aromatic, anti-aromatic and non-aromatic compounds (in tabular form) and explain why lone pair of nitrogen in pyrrole participates in resonance whereas lone pair of nitrogen in pyridine doesn't participate in resonance? (6 marks) Explanation for lone pair participation in pyrrole and non-participation in pyridine– (4 marks)	10
2.	a.	Arrange the given series of carbanion in the order of decreasing stability and explain your choice. (5 marks)  A B C D E Arrange the given series of radicals in the order of decreasing stability and explain your choice. (5 marks)  A B C D E	5+5
3.		Arrange the given series of carbocations in the order of decreasing stability and explain your choice. (5 marks)  A B C D E Lithium ion secondary batteries delivery high power, doesn't use water as an electrolyte solvent and usually thin. Explain. Key: High power due to lowest reduction potential. It doesn't use water becaouse Li violently react with water and all the Li will decompose. It is thin because high power density and uses organic solvent where movement of electrolyte anion is slower due to low polarity of organic solvent. So to avoid delayed charge movement thin layer of electrolyte is used in turn Li batteries are usually thin.	5+5

4.		Why n-type semiconductor and p-type semiconductor have to be combined to get measurable output voltage in voltaic cell (5 marks). Also, reason out why high pure and mono-crystalline silicon is required for higher efficiency (5 marks). (5 marks for each part of question.)	10
5.	a.	Differentiate super capacitor from a capacitor and explain the reason for its high charge storage capacity. (5 marks)	5 + 5
	b.	Given is the components of battery: Li-Graphite, Ni-Yttria-stabilized Zirconia, Ni-Pt catalyst, H_2, Ni-Pd, solid ß–Alumina, $LiCoO_2$, Nafion, $LiAsF_6$, O_2, H_2O, Yttria (Y_2O_3) stabilized Zirconia (ZrO_2), propylene carbonate, $LaMnO_3$, n-I_2polyvinylpyridine (PVP), $LiClO_4$, H_2+ CO, Ag-catalyst. Pick up suitable components from the above list and construct an energy conversion device which should have the following characteristics: Operates with high efficiency (60-83%), electrolyte is a solid, operates only at very high temperature, and doesn't require noble metals as electrode or catalyst. Explain with energy conversion with suitable chemical equation. (5 marks)	