



**ACE**  
Engineering College  
(with a Difference in Excellence)

An AUTONOMOUS Institution



QuestionPaperCode: CH102BS

ACE-R20

**Semester End Examination**  
**I B. Tech- I Semester- JULY- 2021**  
**Engineering Chemistry**  
(Common to EEE, CSE, IT, CSD)

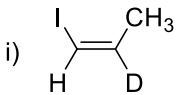
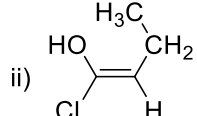
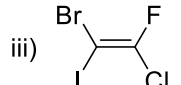
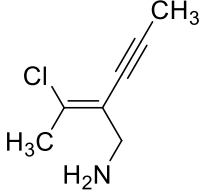
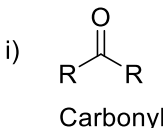
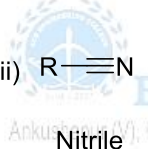
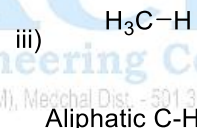
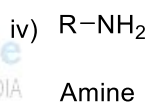
Time: 3 Hours

Max. Marks: 70

H. T. No									
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Answer any **FIVE full** questions from **the following**.  
M=Marks; CO=Course Outcomes; PO= Program Outcomes

Q.No	Question	M	CO	PO
1. a)	What are the basic postulates of the Molecular Orbital Theory. Write the order of the energy levels of the molecular orbitals formed by the Linear combination of Atomic orbitals and describe the method of linear combination.	7	1	PO1
b)	Draw the molecular orbital diagrams of N <sub>2</sub> & F <sub>2</sub> molecules. Calculate their bond order, magnetic moment and comment on their magnetic behavior.	7	1	PO1
2.a)	Give the main postulates of Crystal Field Theory	6	1	PO2
b)	Draw the crystal field splitting of d-orbitals in octahedral complex.	4	1	PO1
c)	Differentiate between N-type and P-type semiconductors	4		PO2
3.a)	Define Desalination. Explain the desalination of brackish water by reverse osmosis.	7	2	PO12
b)	Calculate the temporary, permanent and total hardness of a sample of hardwater in ppm, °Fr and °Cl containing the following dissolved salts per litre Ca(NO <sub>3</sub> ) <sub>2</sub> =16.4mg, CaCl <sub>2</sub> =22.2mg, Ca(HCO <sub>3</sub> ) <sub>2</sub> =16.2mg, MgSO <sub>4</sub> =12mg, Mg(HCO <sub>3</sub> ) <sub>2</sub> =7.3mg/L, NaCl=3.6mg, turbidity=75mg.	7	2	PO2
4. a)	What are polydentate ligands? Discuss its application in the estimation of hardness.	8	2	PO12
b)	Write a short note on i. Phosphate conditioning ii. Calgon conditioning iii. Colloidal conditioning	6	2	PO2
5. a)	Describe the determination of pH of a solution using quinhydrone electrode.	4	3	PO1

b)	Describe the following word with suitable examples. i) Pitting corrosion ii) aeration corrosion	6	3	PO2
c)	Describe the method of electroless plating of nickel.	4	3	PO2
6. a)	Identify the E/Z configuration of the following compounds.	6	4	PO2
	i)  ii)  iii)  iv) 			
b)	Discuss the following terms with suitable examples. i) Enantiomers ii) Diastereomers iii) Markonikov's rule iv) Saytzeff's rule	8	4	PO1
7.a)	Explain differences between $S_N1$ and $S_N2$ reactions with examples.	7	4	PO1
b)	Explain stability of the n-butane with energy level diagram.	7	4	PO1
8. a)	Explain the modes of vibration in IR spectroscopy by using $AX_2$ model.  Write the stretching vibrational frequencies for the following functional groups in $cm^{-1}$ .	6	4	PO1, PO2
	i)  Carbonyl ii)  Nitrile iii)  Aliphatic C-H iv)  Amine			
c)	Write the mechanism of anionic polymerization with an example.	4	5	PO2
d)	Describe few advanced ceramic materials with examples and address their usage.	4	5	PO12