CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. I Sem Supply End Examinations, January-2024
Engineering Chemistry
Common to CSE, IT, CSM

Time: 3 Hours   **Max. Marks: 70**

Note
 i. This Question paper contains Part- A and Part- B.
 ii. All the Questions in Part A are to be answered compulsorily.
 iii. All Questions from Part B are to be answered with internal choice among them.

****

PART-A

10 X 02 = 10 Marks

			Marks	CO	BL
1.	a	Distinguish the bond order of O_2 molecule.	2M	CO1	L4
	b	Identify any four salient features of CFT.	2M	CO1	L3
	c	Explain temporary and permanent hardness of water?	2M	CO2	L2
	d	Why is Calgon conditioning better than Phosphate conditioning.	2M	CO2	L1
	e	What is Pitting corrosion?	2M	CO3	L1
	f	Derive Nernst equation for single electrode potential.	2M	CO3	L3
	g	Illustrate Saytzeff's rule (Dehydrohalogenation of alkyl halides)	2M	CO4	L2
	h	Explain the Anti Markownikoff's rule with example.	2M	CO4	L2
	i	Write the principle of electronic magnetic spectrum.	2M	CO5	L1
	j	List the various applications of electronic spectroscopy.	2M	CO5	L1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Write the energy level diagram for N_2 calculate the bond order, magnetic properties?	6M	CO1	L3
	b	Enumerate the salient features of Crystal field theory.	4M	CO1	L2
		OR			
3	a	Explain crystal field splitting of transition metal ion d- orbital tetrahedral complexes.	4M	CO1	L2
	b	Write the energy, level diagram for NO and calculate the bond order, magnetic properties.	6M	CO1	L3

4	a	Summarize a short note on the following a) Phosphate conditioning b) Ozonisation	4M	CO2	L2
	b	Explain the principle of EDTA method? Describe the estimation of hardness of water by EDTA method.	6M	CO2	L5

<center>OR</center>

5	a	What is the principle of reverse osmosis? What are main advantage of reverse osmosis over ion exchange process?	6M	CO2	L1
	b	A Sample of hard water contains the following dissolved salts per litre. $CaCl_2$=111mgs, $CaSO_4$=13.6mgs, Ca $(HCO_3)_2$=16.2mgs, Mg $(HCO_3)_2$=14.6mgs, silica=40mgs, Turbidity=10mgs. Calculate the temporary, permanent and total hardness of water in ppm	4M	CO2	L3

6	a	Discuss the construction and working of calomel electrode with a neat diagram.	6M	CO3	L6
	b	Discuss the various factors affecting rate of corrosion.	4M	CO3	L3

<center>OR</center>

7	a	Explain the construction and working of lead acid battery. Write down the reactions taking place during charging and discharging.	6M	CO3	L5
	b	Write a short note on the following (i) Galvanic Corrosion ii) Waterline Corrosion	4M	CO3	L3

8	a	Differentiate between SN1&SN2 reactions.	6M	CO4	L2
	b	What is LAH? Write down product of below reaction Cyclohexanone + LAH $\rightarrow$	4M	CO4	L1

<center>OR</center>

9	a	Illustrate synthesis and medicinal applications of Aspirin (Analgesic)	6M	CO4	L3
	b	Differentiate between Enantiomers and Diastereomers.	4M	CO4	L2

10	a	Discuss the principle and selection rules of rotational spectroscopy.	4M	CO5	L6
	b	Write a short note on the following (i) Applications of NMR (ii) MRI	6M	CO5	L3

<center>OR</center>

11	a	List the various applications of vibrational spectroscopy.	4M	CO5	L4
	b	Write a short note on the following (i) Chemical Shift (ii) Spin-Spin splitting.	6M	CO5	L3

CO : Course Outcomes

BL : Bloom's Taxonomy Levels   L 1 : Remembering   L 2 : Understanding

L 3 : Applying   L 4 : Analysing

L 5 : Evaluating   L 6 : Creating

<center>*****</center>

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. II Sem Supply End Examinations, January-2024
Engineering Chemistry
Common to   CE, ME, AIML, CSG, ECE, CSD

Time: 3 Hours   Max. Marks: 70

Note
i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

****

PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	Derive the bond order of N_2 molecule.	2M	CO1	L4
	b	Draw the Π molecular orbital of butadiene.	2M	CO1	L3
	c	Identify break point of chlorination? State its significance.	2M	CO2	L3
	d	What are the specification of potable water?	2M	CO2	L1
	e	What is electrochemical series and write its applications.	2M	CO3	L1
	f	Differentiate primary and secondary batteries with suitable examples.	2M	CO3	L2
	g	Define enantiomers and give one example.	2M	CO4	L1
	h	Differentiate between structural and stereo isomers	2M	CO4	L1
	i	Write the principle of Lambert Beer's Law.	2M	CO5	L1
	j	Predict the Woodword-fieser rule.	2M	CO5	L6

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Write the energy level diagram for O_2 and calculate the bond order and magnetic properties.	5M	CO1	L3
	b	Define Atomic & molecular orbitals? Explain the Linear combination of atomic orbitals (LCAO) into molecular orbitals.	5M	CO1	L2
		OR			
3	a	Explain crystal field splitting of transition metal ion d- orbital octahedral complexes.	5M	CO1	L2
	b	Write the energy level diagram for N_2 and calculate the bond order and magnetic properties.	5M	CO1	L3
4	a	Explain the principle of EDTA method? Describe the	6M	CO2	L5

		estimation of hardness of water by EDTA method.			
	b	A Sample of hard water contains the following dissolved salts per litre. $CaCl_2$=111mgs, $CaSO_4$=13.6mgs, $Ca(HCO_3)_2$=16.2mgs, $Mg(HCO_3)_2$=14.6mgs, silica=40mgs, Turbidity=10mgs. Calculate the temporary, permanent and total hardness of water in ppm	4M	CO2	L4

OR

5	a	Explain the purification of water by ion exchange process and give its advantages and disadvantages.	6M	CO2	L5
	b	Summarize a short note on the following a) Calgon conditioning b) Colloidal conditioning	4M	CO2	L2
6	a	Explain the construction of Quinhydrone electrode and write determination of pH using Quinhydrone electrode.	6M	CO3	L5
	b	Write a short note on the following (i) Sacrificial anodic protection method (ii) Electroplating.	4M	CO3	L2

OR

7	a	Explain the electrochemical theory of wet corrosion and give its mechanism.	6M	CO3	L3
	b	Discuss the lead-acid battery with reactions occurring during discharge.	4M	CO3	L6
8	a	Explain the Markownikoff's rule with examples.	4M	CO4	L5
	b	Develop the synthesis of Grignard reagent? Write the applications of Grignard reagent.	6M	CO4	L3

OR

9	a	Develop the synthesis of Paracetamol and write any two medicinal properties?	5M	CO4	L6
	b	Explain the conformational isomers of n-Butane.	5M	CO4	L5
10	a	Discuss the principle and selection rules of vibrational spectroscopy.	4M	CO5	L6
	b	Summarize a short note on the following (i) Chemical Shift (ii) Spin-Spin splitting.	6M	CO5	L2

OR

11	a	List the various applications of electronic spectroscopy.	4M	CO5	L4
	b	Explain the following (i) Applications of NMR (ii) MRI	6M	CO5	L2

CO : Course Outcomes

BL : Bloom's Taxonomy Levels

L 1 : Remembering	L 2 : Understanding
L 3 : Applying	L 4 : Analysing
L 5 : Evaluating	L 6 : Creating

*****