MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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DEPRTMENT OF FRESHMAN ENGINEERING

academic year	2021-22
year & semester	I B.Tech I SEM
regulation	MLRS-R20
branch	CSM, CSD, CSI, IT, EEE
course code	2020008
course name	Engineering chemistry
course faculty	Dr.K.Sureshbabu,K.venkataswamy,G.Bhagyalaxmi,B.Kumaraswamy, Z.T.Anitha krupanidhi, S.Swetha,M.Krishnaveni,

PART-A (short answer questions)			
UNIT-1Molecular structure and Theories of bonding			
sno	**question**	**course outcome**	**bloom's taxonomy**
1.	Differentiate atomic and molecular orbital	CO1	analyze
2.	Calculate the bond order of N_2, O_2, C0	CO1	analyze
3.	Explain the effect of doping on conductance	CO1	Remember
4.	Differentiate bonding and anti bonding molecular orbitals	CO1	analyze
5.	Write note on atomic orbital and molecular orbital	CO1	apply
6.	Draw the shapes of d-orbitals	CO1	understand
7.	Mention the applications of CFT	CO1	apply
8.	Describe p-type semi conductors	CO1	apply
9.	Describe n-type semiconductors	CO1	apply
10.	Write about intrinsic and extrinsic semi conductors	CO1	remember
11.	State the formation of Li_2 molecule	CO1	Understand
12.	Write about conductors, semiconductors and insulators	CO1	apply
13.	Write the molecular electronic configuration for CO,N_2,O_2	CO1	remember
14.	What are the postulates of CFT	CO1	apply
15.	Write a note on band structures of solids	CO1	remember
16.	What do you understand by LCAO method ?	CO1	understand
17.	Write about postulates of MOT theory	CO1	apply
18.	why sigma bond is stronger than pi-bond	CO1	analyze

PART-B(long answer questions)

UNIT-1Molecular structure and Theories of bonding

sno	question	course outcome	bloom's taxonomy
1.	Write about molecular orbital theory	CO1	remember
2.	Draw the energy level diagram for CO-molecule ,find out magnetic property and bond order	CO1	understand
3.	Explain molecular orbital energy level diagram for N2 molecule with neat diagram,findout the magnetic behaviour and bond order	CO1	apply
4.	Explain molecular orbital energy level diagram for O2 molecule find out the magnetic behaviour and bond order	CO1	apply
5	Construct pi-molecular orbital diagram of 1,3 butadiene	CO1	apply
6	illustrate the crystal field splitting in octahedral complexes	CO1	understand
7	explain about splitting of d-orbitals in tetrahedral geometry with diagram	CO1	apply
8	explain about splitting of d-orbitals in square planar geometry with diagram	CO1	apply

PART-A (SHORT ANSWER QUESTIONS)

UNIT-II:WATER AND ITS TREATMENT

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	What is temporary hardness? Which salts cause temporary hardness to water?	CO2	Remember
2.	What is Permanent hardness? Which salts cause permanent hardness to water?	CO2	Remember
3.	How is temporary hardness can be removed?	CO2	Apply
4.	What is Sedimentation?	CO2	Remember
5.	Write the specifications of potable water.	CO2	Understand
6.	How can we regenerate cation and anion exchange resins in Ion exchange process?	CO2	Remember
7.	Define priming and foaming	CO2	Remember
8.	Why EDTA method is also called as Complexometric method?	CO2	Apply
9.	Write about the sludge causes, preventions	CO2	Remember
10.	What is break point chlorination?	CO2	Remember
11.	What is the principle involved in Reverse Osmosis Method?	CO2	Understand
12.	Give the different units of hardness of water.	CO2	Apply
13.	What is Caustic Embrittlement?	CO2	Remember
14.	What is Calgon? Write the reaction involved in Calgon conditioning	CO2	Remember
15.	What is filteration process	CO2	Apply
16.	How does chlorination and ozonisation helps in the disinfection process explain with reactions	CO2	Remember

17.	Write about the scales causes, preventions	CO2	Remember

PART-B(LONG ANSWER QUESTIONS)

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	What are the steps involved in the treatment of potable water? Explain.	CO2	Understand
2.	Discuss the ion exchange process for softening of water with neat diagram	CO2	Understand
3.	Explain about Reverse Osmosis process with neat diagram.	CO2	Understand
4.	Write a note on Complexometric titrations used for Estimation of hardness of water by EDTA.	CO2	Remember
5.	What is hardness of water? Give the types of hardness and write the units of hardness	CO2	Understand
6.	Write a notes on the following (a)Calgon conditioning (b)Phosphate conditioning.	CO2	Remember
7.	A sample of hard water contains 14.6grams of $Mg(HCO_3)_2$ and 9.5grams of $MgCl_2$ and 13.6 grams of Caso. What is the permanent, temporary and total hardness of water.	CO2	Analyze

PART-A (SHORT ANSWER QUESTIONS)

UNIT-III: ELECTROCHEMISTRY AND CORROSION

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	What is single electrode potential and standard electrode potential	CO3	Remember
2.	What is EMF of cell? How the emf of cell is calculated?	CO3	Remember
3.	Write about the galvanizing and its applications	CO3	Remember
4.	What is Standard electrode potential?	CO3	Remember
5.	Write Nernst equation	CO3	Understand
6.	Differentiate Primary and Secondary cells?	CO3	Analyze
7.	What is tinning and write the applications	CO3	Remember
8.	Draw the calomel electrode with a neat diagram	CO3	Understand
9.	Define a battery? How are they classified?	CO3	Remember
10.	Define electrochemical series	CO3	Remember
11.	Define corrosion? Give causes of corrosion	CO3	Remember
12.	What is Waterline corrosion	CO3	Remember
13.	State pilling Bed worth rule	CO3	Understand
14.	Write the effects of corrosion	CO3	Understand
15.	What is meant by sacrificial anode?	CO3	Remember
16.	What is impressed current cathodic protection?	CO3	Remember
17.	Calculate the electrode potentials of electrochemical cell Zn^{+2}/ Zn	and Cu^{+2}/ Cu are -0.76V and +0.34 V respectively.	CO3	Analyze

18.	Differentiate chemical and electrochemical corrosion?	CO3	Analyze

PART-B (LONG ANSWER QUESTIONS)

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	Describe the construction and working of calomel electrode?	CO3	Analyze
2.	Explain the construction and functioning of lead-acid cell and give its applications	CO3	Understand
3.	What is Electrochemical cell? Explain the construction and reactions of electrochemical cell with a neat diagram?	CO3	Remember
4.	Write a brief account on the construction and working of glass electrode	CO3	Remember
5	Derive Nernst equation and Explain How Nernst equation is useful in calculating the electrode potential?	CO3	Analyze
6	write about lithium cell reactions and applications	CO3	Remember
7	Interpret Lithium-ion cell reactions and applications	CO3	Apply
8	What is electrochemical series? Give its applications	CO3	Remember
9	What are reference electrodes? Explain the construction and working of Quinhydrone electrode?	CO3	Remember
10	Describe the electrochemical theory of corrosion?	CO3	Analyze
11	Explain about chemical theory of corrosion?	CO3	Understand
12	Explain factors effecting of corrosion?	CO3	Understand
13	Write a note on electroplating? Give its applications.	CO3	Understand
14	Explain the mechanism of Electro chemical corrosion and explain the mechanism of rust formation in acidic and neutral medium	CO3	Understand
15	Write the following types of corrosion1)galvanic corrosion2)pitting corrosion	CO3	Understand

PART-A (SHORT ANSWER QUESTIONS)

UNIT-IV: Stereochemistry, Reaction mechanism, Synthesis of drug molecules

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	Give the Different elements of symmetry	CO4	Apply
2.	What are Grignard reagents? Give one example.	CO4	Understand
3.	write note on optical activity	CO4	Apply
4.	What is antimarkownikoff" rule	CO4	Remember
5.	What are diastereomers? Give example.	CO4	Remember
6.	Define substitution and addition reactions	CO4	Remember
7.	What is E1 elimination	CO4	Remember
8.	Differentiate between enantiomers and diastereomers	CO4	Understand
9.	Write the applications of paracetamol	CO4	Remember

10.	State markownikoff rule	CO4	Understand
11.	Mention the representations of 3-D structures	CO4	Remember
12.	Write note on elements of symmetry	CO4	Understand
13.	Define enantiomers	CO4	Remember
14.	Give an example for position, chain isomerism	CO4	Understand
15.	What is saytzeff rule	CO4	Remember
16.	Write a short note on Chirality	CO4	Remember
17.	How the oxidation of alcohols with $KMnO_4$	CO4	Apply
18.	Write rection for synthesis of Aspirin	CO4	Remember

PART-B (LONG ANSWER QUESTIONS)

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	Write the preparation and applications of paracetamol	CO4	Remember
2.	State Anti Markovnikov's rule with example	CO4	APPLY
3.	What are enantiomers write their characteristics	CO4	Remember
4	Write the preparation and applications of Aspirin	CO4	Understand
5	Explain the sequence rules for assigning absolute configuration	CO4	Understand
6	Explain Markownikoff's rule with example.	CO4	Understand
7	Explain SN^1 Reaction mechanism with example	CO4	Understand
8	Explain the conformational analysis of n-butane With potential energy diagram	CO4	Understand
9	Explain the reactions of reduction of carbonyl compounds using $LiAlH_4$	CO4	Understand
10	Explain AntiMarkownikoff's rule with example.	CO4	Understand
11	Explain SN^2 Reaction mechanism with example	CO4	Understand

PART-A (SHORT ANSWER QUESTIONS)

UNIT-V: SPECTROSCOPIC TECHNIQUES AND ITS APPLICATIONS

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	Give two applications of MRI	CO5	Remember
2.	Calculate number of fundamental vibrations for CO_2, C_6H_6	CO5	Understand
3.	Define spectroscopy. Mention its types	CO5	Apply
4.	Which Spectra is Called Vibrational Spectra?. Why?	CO5	Analyse
5.	What are the characteristics of TMS	CO5	Remember
6.	Calculate number of NMR signals for CH_3-CH_2-OH, CH_3-OH,	CO5	Understand

7.	Define auxochrome and chromophore with example	CO5	Remember
8.	Calculate number of fundamental vibrations for HCN,CH$_4$	CO5	Understand
9.	Write the difference between Stretching and Bending Vibrations	CO5	Remember
10.	Mention the applications of NMR Spectroscopy	CO5	Apply
11.	Draw the Electromagnetic radiation spectrum	CO5	Remember
12.	Draw the electronic transitions in electronic spectroscopy	CO5	Remember
13.	Write the differences between Stretching and Bending Vibrations	CO5	Remember
14.	What is MRI ? How is it useful	CO5	Remember
15.	Wrie about chemical shift	CO5	Analyse

PART-B (LONG ANSWER QUESTIONS)

SNO	QUESTION	Course Outcome	Bloom's Taxonomy
1.	Explain shielding and deshielding of protons in NMR spectroscopy and principle of NMR Spectroscopy	CO5	Remember
2.	Write the applications of UV-VISIBLE Spectroscopy Write selection rules of UV-VISIBLE Spectroscopy	CO5	Remember
3.	What is MRI and Write the applications of MRI scanning	CO5	Apply
4	Discuss the different vibrations in IR Spectroscopy and selection rules of Spectroscopy	CO5	analyse
5	Discuss Chemical Shift of The Protons In NMR Spectroscopy	CO5	analyse
6	Explain the electronic transitions in electronic spectroscopy	CO5	Understand
7	Interpret different shifts of absorbance and intensity in UV spectroscopy	CO5	Apply