Code No: 151AF **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech I Year I Semester Examinations, March/April - 2023
CHEMISTRY
(Common to EEE, CSE, IT, CSIT, ITE, CE(SE), CSE(CS), CSE(DS), CSE(N), CSD)
Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Define the term ligand. Give examples.	[2]
b)	Calculate the bond order N_2.	[3]
c)	What is calgon conditioning? Write the reaction involved.	[2]
d)	How many grams of $FeSO_4$ dissolved per litre gives 210.5 ppm of hardness.	[3]
e)	Give two factors affecting the rate of corrosion.	[2]
f)	What is electro less plating? Explain briefly.	[3]
g)	How is aspirin synthesized? Write its applications.	[2]
h)	What is optical activity? Write the number of Enantiomers possible for Lactic Acid.	[3]
i)	What is the role of TMS(Tetramethylsilane) in NMR spectroscopy?	[2]
j)	Methane does not absorb IR radiations. Why?	[3]

PART - B

(50 Marks)

2.a) Explain the crystal field splitting of *d*-orbital's in Square planar complexes.
b) Draw and explain the $\pi -$ molecular orbital's of Benzene molecule. [5+5]

OR

3.a) What is Crystal Field Theory? Write the salient features of CFT.
b) Discuss the crystal field splitting of *d*-orbital's in tetrahedral complexe. [5+5]

4.a) Write the causes and effects and preventive methods for caustic Embrittlement in boiler feed water.
b) Write the principle involved in Reverse osmosis? Explain the desalination of Brackish water by Reverse Osmosis method. [5+5]

OR

5.a) What are the specification of Potable water? Write two methods of disinfection of Drinking water.
b) A water sample on analysis gave the following data.
$CaSO_4$ = 60 mg/l, $Mg(HCO_3)_2$ = 74 mg/l, $CaCl_2$ = 24 mg/l, NaCl = 5mg/l, $MgCl_2$= 20mg/l. Calculate Temporary, Permanent and Total hardness in degree Clark units. [5+5]

6.a) Explain with a neat diagram the construction and working of Calomel electrode.
b) What is cathodic protection? Discuss the sacrificial anodic method of protection of metals. [5+5]

OR

7.a) Describe the construction and working of Lithium ion battery.
b) Write the mechanism of electrochemical corrosion by taking the example rusting of iron. [5+5]

8.a) Explain the terms : Geometrical isomerism and Diastereomers with examples.
b) Discuss the mechanism of Markownikoff and anti Markownikoff's addition reaction of HBr to propene. [5+5]

OR

9.a) What is Grignard reagent? Discuss the mechanism of addition of Grignard reagent to on carbonyl compounds.
b) Discuss the reduction of carbonyl compounds by using $LiAlH_4$ and $NaBH_4$ reagents. [5+5]

10.a) Write the principle of UV-Visible spectroscopy. What type of compounds absorb UV- radiations? Give examples.
b) Write the stretching frequencies of the following functional groups in IR spectroscopy.
i) R-CHO ii) $R\text{-}CH_2NH_2$ iii) R--OH [5+5]

OR

11.a) How do you distinguish the following compounds, cis-stilbene and Trans stilbene Compounds by UV spectroscopy:
b) Write the principle of H^1NMR spectroscopy. Write the important application of NMR spectroscopy. [5+5]

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