R18

Code No: 152AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech I Year II Semester Examinations, February - 2025
CHEMISTRY
(Common to CE, ME, ECE, EIE, MCT, MIE, PTM, CSE(AI&ML), CSE(IOT), TTE, AI&DS, AI&ML)

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 bonding, antibonding and non-bonding molecular orbitals.	[2]
b)	What is a valence and conduction band?	[3]
c)	Distinguish between temporary hardness and permanent hardness.	[2]
d)	Give a detailed account on the sterilization or disinfection of water by ozone.	[3]
e)	What is the significance of electroless plating?	[2]
f)	What is an electrochemical series? Give its applications.	[3]
g)	Give the mechanism of Grignard additions on carbonyl compounds.	[2]
h)	Discuss anti Markownikoff's give an example.	[3]
i)	What type of nuclei give NMR spectra?	[2]
j)	Define Beer Lambert's Law.	[3]

PART - B

(50 Marks)

2.a) Give the crystal field splitting pattern of d-orbitals in tetrahedral geometry.
b) Discuss briefly the molecular orbital theory. [5+5]

OR

3.a) What are the salient features of crystal field theory?
b) Draw the molecular orbital energy level diagram of O_2 and F_2 and explain their magnetic nature and bond order. [5+5]

4.a) What is hardness of water? How is it estimated by complexometric method?
b) What is desalination? Describe the Reverse Osmosis process for softening of hard water. [5+5]

OR

5.a) What are the common boiler troubles? Explain about Caustic embrittlement.
b) What are coagulants? How they removes impurities from water explain with suitable examples. [5+5]

6.a) Derive Nernst equation for EMF of a cell. Mention its applications.
b) What is corrosion and explain the theory of chemical corrosion. [5+5]

OR

7.a) What is reversible battery? Describe the construction and working of a lead acid storage battery with the reactions occurring during charging and discharging.
b) What is cathodic protection? Explain the sacrificial anodic method. [5+5]

8.a) Give the structure, preparation and uses of Paracetamol.
b) Explain the mechanism of S_N2 reaction with suitable example. What is the molecularity of the reaction? [5+5]

OR

9.a) Explain dehydro halogenation of alkylhalide.
b) Explain the conformational analysis of n-butane with potential energy diagram. [5+5]

10.a) What is Nuclear magnetic resonance spectroscopy? Give its applications.
b) What are selection rules in electronic spectroscopy? Give their significance. [5+5]

OR

11.a) Describe the principle of UV spectroscopy.
b) Explain the applications of IR spectroscopy. [5+5]

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