Code No: 151AF **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year I Semester Examinations, May/June - 2019
CHEMISTRY
(Common to EEE, CSE, IT)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	What is band structure of solids.	[2]
b)	How is portable water disinfected by ozonation?	[2]
c)	What is standard electrode potential?	[2]
d)	What is specific rotation?	[2]
e)	What is nuclear magnetic resonance?	[2]
f)	Give the molecular energy diagrams of O_2.	[3]
g)	What is Caustic embrittlement?	[3]
h)	Why small anodic area undergo intense corrosion?	[3]
i)	Explain Grignard addition on carbonyl compounds.	[3]
j)	State and explain Lambert-Beer law.	[3]

PART-B

(50 Marks)

2.a) Explain the bond order in N_2 molecule.
b) Discuss briefly the molecular orbital theory?
c) Give the crystal field splitting pattern of d-orbitals in octahedral geometry. [3+4+3]

OR

3.a) What are the differences between bonding and antibonding orbitals?
b) What are the salient features of crystal field theory?
c) Give the crystal field splitting pattern of d-orbitals in tetrahedral geometry. [3+4+3]

4.a) Explain the principle involved in the complexometric method of determination of the hardness of water.
b) Explain the disinfection of water by Chlorination.
c) Give the Ion-exchange process for softening of hard water. [4+3+3]

OR

5.a) What are the disadvantages of boiler corrosion? Explain how such corrosion is prevented.
b) What is hardness of water? Give the various units of hardness.
c) Calculate the temporary, permanent and total hardness of water sample containing following impurities:
$Mg(HCO_3)_2$=16.8mg/L, $MgSO_4$=24.0mg/L and NaCl = 58.5 mg/L. [3+4+3]

6.a) Describe the construction and working of standard calomel electrode.
b) What is corrosion? Explain the theory of chemical corrosion.
c) Derive Nernst equation. [4+3+3]

OR

7.a) What is a battery? Explain the functioning of Li ion battery.
b) Explain the factors affecting the rate of corrosion.
c) What is electrochemical series? Give its applications. [4+3+3]

8.a) Describe the conformational isomers of n-butane.
b) Explain the mechanism of dehydro halogenation of alkylhalides.
c) Discuss reduction of carbonyl compounds using $LiAlH_4$. [4+3+3]

OR

9.a) Write the possible optical isomers in tartaric acid.
b) Explain the nucleophilic substitution reaction mechanism.
c) Discuss oxidation mechanism of alcohols using $KMnO_4$. [3+4+3]

10.a) What is meant by shielding and deshielding of a proton nucleus?
b) Explain the principle of UV spectroscopy.
c) Explain the applications of IR spectroscopy. [3+4+3]

OR

11.a) Explain the principle of NMR spectroscopy.
b) Why methane does not absorb IR energy.
c) What are different electronic excitations in UV spectroscopy? [4+3+3]

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