

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 O₂. [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 N₂ 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(HCO₃)₂=16.8mg/L, MgSO₄=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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