Code No: 152AB **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, May - 2019
CHEMISTRY
(Common to CE, ME, ECE, EIE, MCT, MMT, AE, MIE, PTM)

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 are the differences between atomic and molecular orbitals? [2]
b) What is Calgon? Write the reaction involved in Calgon conditioning. [2]
c) Define standard electrode potentials. [2]
d) Write the reaction involved in the addition of HBr to Propene in the presence of peroxide. [2]
e) Explain why CO_2 is IR active. [2]
f) What do you understand by Linear combination of atomic orbitals? [3]
g) What is the significance of breakpoint chlorination in the treatment of municipal water? [3]
h) Why galvanised sheets are not advised in making utensils? [3]
i) Define Enantiomers, and give example. [3]
j) Give any two selection rules for rotational spectroscopy. [3]

PART-B **(50 Marks)**

2.a) Draw the molecular orbital diagram O_2 molecule and predict the magnetic behaviour of it.
b) Discuss the salient features of Crystal field theory and explain the crystal field splitting of transition metal ion d-orbitals in square planar geometries. [5+5]

OR

3.a) Explain the band structure of solids. Discuss how the doping influences the conductance of them.
b) Draw neatly, the molecular orbital diagrams of Butadiens and Benzene. [5+5]

4.a) Explain how brackish water can be desalinated by reverse osmosis method with the help of a diagram.
b) A sample of water on analysis contains 4.2 mg/ L of magnesium bicarbonate, 12.0 mg/L of magnesium sulphate, 16.2 mg/L of calcium bicarbonate, 22 mg/L of calcium chloride and 13.6 mg/L of calcium sulphate. Calculate the total, permanent and temporary hardness of the sample and express them in degree Clark and degree French. [5+5]

OR

5.a) Explain Ion exchange method for softening water.
b) What are the specifications of potable water? [5+5]

6.a) What is electrochemical series? Explain its applications with suitable examples.
b) What is Cathodic protection? Explain sacrificial anode method? [5+5]

OR

7.a) How pH of a solution is determined by Glass electrode? Discuss.
b) Write a detailed note on electroless plating of Nickel. [5+5]

8.a) Explain the Markownikoff's rule with suitable example. Why this rule is failed during the addition of HBr in the presence of a peroxide?
b) Write the synthetic methods for Paracetamol and Aspirin. Give their pharmaceutical applications. [5+5]

OR

9.a) What are Conformational isomers? Discuss them with special reference to n-Butane. Give the potential energy diagram for the conformers.
b) Explain the mechanism of S_N1 and S_N2 reactions. [5+5]

10.a) Describe various modes of electronic transitions when a molecule absorbs in UV-Visible region.
b) Explain the principle involved in NMR spectroscopy. [5+5]

OR

11.a) Write a note on Chemical Shift.
b) Give an account of various fundamental vibrations. [5+5]

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