

Code No: 152AB

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, August - 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) Write the molecular orbital electronic configurations of  $O_2$ . [2]
- b) How can we recover exhausted ion exchange resins? [2]
- c) What is battery? And discuss the types of batteries. [2]
- d) Define the terms enantiomers and diastereomers. [2]
- e) What are the conditions for molecule to be IR active? [2]
- f) Define conductors and semi conductors on the basis of Band theory [3]
- g) A sample of hard water contains the following dissolved salts per litre.  
 $Ca(HCO_3)_2 = 16.4$  mgs,  $Mg(HCO_3)_2 = 14.6$ mgs,  $CaCl_2 = 11$  mgs,  
 $MgSO_4 = 12$ mgs,  $CO_2 = 44$ mgs and  $CaSO_4 = 13.6$  mgs.  
Calculate temporary and permanent hardness of water in ppm and in degree Clarke. [3]
- h) Explain how nature of metals effects the rate of corrosion [3]
- i) What are stereoisomers, and what is optical activity? [3]
- j) What do you mean by absorbance and transmittance? [3]

**PART-B**

**(50 Marks)**

- 2.a) Explain the crystal field theory for the square planar complexes of transition metals.
  - b) Draw the molecular orbital energy diagram of  $F_2$  molecule. Calculate its Bond order and predict its magnetic behavior.
  - c) Explain  $\pi$  molecular orbital diagram of 1,3-butadiene. [4+3+3]
- OR**
- 3.a) What is doping agent? Explain how the dopant will effect the conductivity of semi conductors.
  - b) Discuss the reasons for crystal field splitting of d-orbitals. Explain the splitting of d-orbitals in octahedral complexes.
  - c) Discuss the assumption of molecular orbital diagram. [4+3+3]
- 4.a) Discuss the principle involved in EDTA method? Explain Estimation of hardness of water by complex metric method.
  - b) 0.28 g of  $CaCO_3$  was dissolved in dil.HCl and the solution made up to one litre with distilled water. 100 ml of the above solution required 28 ml of EDTA solution for titration. 100ml of the water sample required 33 ml of same EDTA solution for titration. After boiling, 100ml of this water, cooling, filtering and then titration required 10ml of EDTA solution. Calculate the temporary and permanent hardness in water.
  - c) Write a brief account on break-point chlorination. [4+3+3]

