

Code No: 151AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, July - 2021

CHEMISTRY

(Common to EEE, CSE, IT, CSIT, ITE, CE(SE), CSE(CS), CSE(DS), CSE(Networks))

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

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- 1.a) Give the principles of LCAO.  
b) Give the molecular energy diagrams of  $N_2$  and  $F_2$ . [7+8]
- 2.a) Give the Salient features of CFT.  
b) Give the crystal field splitting pattern of d-orbitals in square planar and tetrahedral geometry. [7+8]
- 3.a) What is hardness of water? How is it estimated by complexometric method?  
b) Calculate the temporary and permanent hardness of the water sample containing  $MgCl_2=9.5mg/L$ ;  $Mg(HCO_3)_2=7.3mg/L$ ;  $Ca(HCO_3)_2=16.2 mg/L$ ;  $CaSO_4=13.6 mg/L$  and  $NaCl=58.5 mg/L$ . [8+7]
- 4.a) What are the specifications of potable water?  
b) Explain various steps involved in the treatment of potable water.  
c) What are the common boiler troubles? Explain about Caustic embrittlement. [5+6+4]
- 5.a) What is an electrochemical series? Give its applications.  
b) What is a secondary battery? Explain the functioning of lead-acid storage battery.  
c) In a cell, a silver rod is placed in a  $AgNO_3$  solution of 0.1M and another silver rod in 0.01 M  $AgNO_3$  solution at room temperature. Calculate the emf. [6+5+4]
- 6.a) What is corrosion? Explain the mechanism of electrochemical corrosion of Iron.  
b) What is cathodic protection? Explain the sacrificial anodic method. [8+7]
- 7.a) What is Chirality and optical activity? How are they related?  
b) What are enantiomers and diastereomers? Give examples for each.  
c) Give the structure, preparation and uses of Paracetamol. [6+5+4]
- 8.a) What is an electronic spectra? Explain its selection rules.  
b) Explain the principle and applications of vibrational and rotational spectroscopy.  
c) Write a note on magnetic resonance imaging. [5+6+4]

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