

Code No: 152AN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, August - 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) Describe the hybridization of  $\pi$ -molecular orbitals in butadiene. [2]
- b) Write the units of hardness of water. [2]
- c) Define the principle of glass electrode. [2]
- d) Describe Markonikoff's rule. [2]
- e) Discuss the principle of electronic spectroscopy. [2]
- f) Explain crystal field splitting of d-orbitals in tetrahedral geometry. [3]
- g) Discuss with one example each about temporary hardness and permanent hardness. [3]
- h) Describe redox reaction in lithium cell. [3]
- i) Describe the Grignard reaction with ketones. [3]
- j) Write a note on MRI. [3]

**PART-B****(50 Marks)**

- 2.a) Write molecular orbital energy level diagram of  $N_2$  molecule.
  - b) Describe crystal field splitting of d-orbitals in octahedral geometry.
  - c) Discuss effect of doping on conductance. [4+3+3]
- OR**
- 3.a) Write crystal field splitting of d-orbitals in square planar geometry.
  - b) Discuss hybridization of  $\pi$ - molecular orbitals in benzene. [5+5]
- 4.a) Describe phosphate conditioning.
  - b) Explain the complexometric method of estimation of hardness of water.
  - c) Describe disinfection of water by chlorination. [3+5+2]
- OR**
- 5.a) Describe colloidal conditioning.
  - b) Explain desalination of water.
  - c) What are the causes and effects of hardness of water? [2+4+4]
- 6.a) Write Nernst equation.
  - b) Describe the principle and applications of Lead-Acid battery.
  - c) Discuss factors affecting the rate of corrosion. [2+4+4]

**OR**

- 7.a) Write a note on cathodic protection.  
b) Discuss water-line and pitting corrosion.  
c) Describe the construction and working of calomel electrode. [3+4+3]
- 8.a) Define the terms enantiomers and diastereomers with appropriate examples.  
b) Discuss the mechanism of  $S_N^2$  reaction with suitable example.  
c) Describe the mechanism of oxidation of alcohol with  $KMnO_4$ . [3+4+3]
- OR**
- 9.a) Explain the term stereoisomers with appropriate example.  
b) Discuss the mechanism of reduction of ketone with  $NaBH_4$ .  
c) Write conformational structures of n-butane. [3+4+3]
- 10.a) Describe the principle of vibrational and rotational spectroscopy.  
b) Explain chemical shift. [5+5]
- OR**
- 11.a) Discuss basic concepts of NMR spectroscopy.  
b) Write the applications of electronic spectroscopy. [5+5]

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