NEP CSE B.Tech – Ist Sem 2024-25

Roll No. ..... Total Pages : 4

BT–1/D-24 **41068**

ENGINEERING CHEMISTRY

Paper–B24–BSC–104

Time Allowed : 3 Hours] [Maximum Marks : 70

Note : All questions are compulsory. The question carrying **ten** marks in each unit shall have a choice in attempting any of the **one** option.

UNIT–I

1. State Pauli exclusion principle. (CO1) 2½

2. (a) Bond energy of NO is 623 KJ/mol whereas that of NO^+ is 1049 KJ/mol. Justify on the basis of Molecular orbital theory. (CO1) 3

   (b) Write different types of Aromatic compounds with examples. (CO1) 2

3. (a) Why Band theory for solids is so called? Explain the classification of Solids on the basis of Band theory. (CO1) 6

   (b) Differentiate between bonding and anti-bonding molecular orbitals. (CO1) 4

Or

(a) Write postulates of Crystal field theory. Explain the magnetic behaviour of $\left[Fe(CN)_6\right]^{4-}$ on the basis of Crystal field theory. (CO1) 7

(b) Describe p-type semiconductors. (CO1) 3

UNIT–II

4. In which spectroscopic technique, the substance under examination is not recovered unchanged and why? (CO2) 2½

5. Define scattering of Electromagnetic radiations. Also give its significance. (CO2) 5

6. Explain the following : (CO2) 5,5

(a) Principle of NMR spectroscopy.

(b) Factors affecting the Vibrational frequency in IR spectroscopy.

Or

Write notes on the following : (CO2) 6,4

(a) Magnetic Resonance Imaging.

(b) Diffraction of Electromagnetic radiations.

UNIT–III

7. Define the Thermodynamically reversible process. (CO3) 2½

8. Define the Entropy and give its significance. Also prove that Entropy change in an irreversible process is always greater than zero. (CO3) 5

9. Define following terms with suitable example- Eutectic mixture and Eutectic point, Degree of freedom, triple point, melting point. (CO3) 10

Or

(a) Draw the phase diagram and Water system and explain it. (CO3) 6

(b) Derive Gibbs-Duhum equation and give its significance. (CO3) 4

UNIT–IV

10. Define the Cell potential. Write reduction potential of Zn. (CO4) 2½

11. Explain the Water line corrosion : (CO4) 5

12. (a) Define the Wet corrosion. Explain the Rusting of Iron. (CO4) 6

(b) Explain the Caustic embrittlement. (CO4) 4

Or

(a) Explain the Cathodic protection method of prevention of corrosion. (CO4) 4

(b) Explain oxidation corrosion and liquid metal corrosion. (CO4) 6