

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
 - (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
- (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

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Or

- (a) Write postulates of Crystal field theory. Explain the magnetic behaviour of $[\text{Fe}(\text{CN})_6]^{4-}$ on the basis of Crystal field theory. (CO1) 3
- (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.

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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

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(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



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