

BIT SINDRI
Engineering Chemistry-I
B. Tech. Second Semester
First Mid Semester Examination 2019

Time allotted: $1\frac{1}{2}$ hrs

Max. Marks: 20

Answer any five questions.

All Questions carry equal marks

All the Questions in Question No.1 are multiple choices with one correct answer

- Q.1. (i) The orbitals which have same no. of nodes are: (a) 1s, 2p (b) 3p, 3d (c) 2s, 3p (d) 3s, 4d
(ii) Which one of the following pairs of species has the same bond order?
(a) CO, NO (b) O₂, NO⁺ (c) CN⁻, CO (d) N₂, O₂⁻
(iii) Which one of the following ligand is capable of forming a low spin as well as high spin Complex? (a) CO (b) F⁻ (c) NH₃ (d) CN⁻
(iv) Which of the following is true about the charge acquired by p-type semiconductors?
(a) positive (b) neutral (c) negative (d) depends on concentration of p impurity

Or

What do you know about the dual character of matter? Derive de-Broglie equation for microscopic particles.

- Q.2. Derive Schrodinger wave equation for the wave mechanical model of an atom and discuss its application to hydrogen atom.
- Q.3. Prove that the Energy associated with the motion of the particle in a one-dimension box is quantized.
- Q.4. Draw molecular orbital diagram of HCl. Write down the Electronic configuration and Bond order of NO⁺ and NO⁻.
- Q.5. Describe Crystal field splitting in complexes and write about the tetrahedral complexes.
- Q.6. Describe band structure of conductor and semiconductor. Explain n-type and p-type Semiconductors.
- Q.7. Write notes on any two of the following:
(a) Huckel rule of aromaticity
(b) Molecular Spectroscopy
(c) Heisenberg Uncertainty Principle