

B.Sc. Semester - 2 (CBCS) Examination
July-2025 (OLD COURSE)
CHEMISTRY (CORE)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que.1(A) Answer the following questions. (04)**
1. Define: Coordination number.
 2. What is n-type conductor?
 3. Which type of complex show inner shell complex give at least two?
 4. Define: Stoichiometric defect in ionic crystal.
- Que.1(B) Answer the following question. (Any One) (02)**
1. Give Difference between n-type and p-type semiconductors.
 2. Write short note on chelate ligands.
- Que.1(C) Answer the following question. (Any One) (03)**
1. Derive the r^+/r^- ratio for tetrahedral structure.
 2. Explain Werner's theory.
- Que.1(D) Answer the following question. (Any One) (05)**
1. What is geometrical isomer? Explain it with appropriate examples.
 2. Discuss Born-Haber cycle with example.
- Que.2(A) Answer the following questions. (04)**
1. Write any one reaction of alkanes.
 2. Give only two examples for Anti aromatic compound.
 3. Write Diel's Alder reaction.
 4. Arrange stability order of following compounds: Aromatic, Anti-aromatic and Non-aromatic.
- Que.2(B) Answer the following question. (Any One) (02)**
1. Explain chemical properties of cycloalkane.
 2. Give only reactions of nitration and halogenation of benzene.
- Que.2(C) Answer the following question. (Any One) (03)**
1. What is aromaticity? Explain Huckels rule with examples.
 2. Explain wurtz's and simmons smith reaction.
- Que.2(D) Answer the following question. (Any One) (05)**
1. Explain Friedel-Crafts acylation reaction with it mechanism.
 2. Explain Baeyer's strain theory and its limitations.
- Que.3(A) Answer the following questions. (04)**
1. Write Henderson-Hassel batch equation.
 2. Define: Degree of hydrolysis.
 3. What is Basic buffer solution, give one example.
 4. Define: Unit cell.
- Que.3(B) Answer the following question. (Any One) (02)**
1. Deduce the relation between K_h , K_w & K_b .
 2. Describe the ionic product of water.
- Que.3(C) Answer the following question. (Any One) (03)**
1. Describe the dissociation constant of weak acid.
 2. Explain Intercept law of Miller with figures of (d_{100} , d_{110} , d_{111}).

- Que.3(D) Answer the following question. (Any One) (05)**
1. Write the application of solubility and solubility product.
 2. Discuss the internal structure of NaCl by X-ray diffraction methods.
- Que.4(A) Answer the following questions. (04)**
1. Draw structure of Bicyclo[3.2.0] heptane.
 2. Arrange cyclopropane, cyclobutane and cyclopentane in increasing order of their angle strain.
 3. Define term: crystal lattice.
 4. Define: Atomic radii.
- Que.4(B) Answer the following question. (Any One) (02)**
1. Discuss Huckel's rule with suitable example.
 2. Write a note on catalytic properties of 3d-block elements.
- Que.4(C) Answer the following question. (Any One) (03)**
1. Explain sulphonation reaction of benzene.
 2. Derive the r^+/r^- ratio for square planer lattice.
- Que.4(D) Answer the following question. (Any One) (05)**
1. Explain hybridization, shape and spin only magnetic momentum of $[\text{NiCl}_4]^{-2}$.
 2. Discuss conformations of n-Butane.
- Que.5(A) Answer the following questions. (04)**
1. Define: Strong electrolytes
 2. Give any two examples for non-electrolytes.
 3. How many total number of atom present per unit cell in FCC?
 4. Write only equation of Miller indices.
- Que.5(B) Answer the following question. (Any One) (02)**
1. Write factor affecting on degree of dissociation.
 2. Determine the inter planner spacing between 212 planes of a cubic lattice having length $4.5\text{\AA}$.
- Que.5(C) Answer the following question. (Any One) (03)**
1. Find out the degree of hydrolysis and pH for $0.25\text{M NH}_4\text{Cl}$ solution, $K_b=1.77\times 10^{-5}$.
 2. Derive equation of pH of strong acid and weak base salt.
- Que.5(D) Answer the following question. (Any One) (05)**
1. Describe the common ion effect.
 2. Explain Bragg's X-ray diffraction method for the internal analysis of crystal.
