

B.Sc. Semester - 2 (CBCS) Examination
June/July-2022 [OLD COURSE]
CHEMISTRY (CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

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

Q. 1 (a) Answer the following question. (4)

- (1) What is radius ratio?
- (2) Define: unit cell.
- (3) Geometrical isomerism is also known isomerism.
- (4) Define: Double salt

(b) Answer any one question (2)

- (1) Explain Frenkel defect.
- (2) Draw the geometrical isomer of $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$

(c) Answer any one question (3)

- (1) Show the derivation of the r^+/r^- value for square planar crystal lattice.
- (2) Write note on chelate ligands.

(d) Answer any one question (5)

- (1) Discuss Born-Haber cycle.
- (2) Explain π -acid ligand and Ambidentate ligand.

Q. 2 (a) Answer the following question. (4)

- (1) Which of Cr^+ or Cu^+ is expected to be colored?
- (2) Give the use of iron and zinc.
- (3) Calculate the number of atoms per FCC unit cell.
- (4) Give examples of Crystalline substances.

(b) Answer any one question (2)

- (1) Write the electronic configuration of Cr and Cu.
- (2) Write note on Metallic solid.

(c) Answer any one question (3)

- (1) Discuss the trend in an ionization potential of first transition series.
- (2) Give the difference between crystalline solid and amorphous solid.

(d) Answer any one question (5)

- (1) Write note on catalytic properties of first transition series element.
- (2) Discuss the internal structure of NaCl by X-ray diffraction data.

Q. 3 (a) Answer the following question. (4)

- (1) Define: vander-waals strain
- (2) Give one example of spiro compound with IUPAC name.
- (3) Define the term conformation.
- (4) Define: cyclic compound.

(b) Answer any one question (2)

- (1) Give any two methods for preparation of small ring cycloalkane.
- (2) Explain substituted reaction in cyclo propane.

(c) Answer any one question (3)

- (1) Write Simmons-Smith reaction for preparation of cycloalkane.
- (2) Give chemical properties of cycloalkane.

(d) Answer any one question (5)

- (1) Explain Baeyer's Strain theory and its limitations.
- (2) Explain conformational analysis with example of ethane.

Q. 4 (a) Answer the following question. (4)

- (1) Give any two examples of electron withdrawing group in resonance.
- (2) Define: Electrophilic aromatic substitution reaction.
- (3) Which reagent is use for sulphonation of benzene.
- (4) Give any two criteria for aromaticity.

(b) Answer any one question (2)

- (1) Explain aromaticity of [4] annulene and [6] annulene.
- (2) Explain general pattern of the SE^2 mechanism.

(c) Answer any one question (3)

- (1) Explain aromaticity of cyclopentadienyl ions.
- (2) Explain nitration of benzene with mechanism.

(d) Answer any one question (5)

- (1) Explain: electronic explanation for o-and p- directive influence.
- (2) Discuss Friedel-Crafts Acylation of benzene with mechanism.

Q. 5 (a) Answer the following question. (4)

- (1) Calculate the value of K_w at $25^\circ C$.
- (2) Define: Neutral solution
- (3) Write example of acidic buffer.
- (4) Define; Weak electrolytes

(b) Answer any one question (2)

- (1) Describe the factors affecting the degree of Dissociation.
- (2) Derive the equation for hydrolysis constant (K_h)

(c) Answer any one question (3)

- (1) Describe the relation between K_a and K_b .
- (2) Describe the dissociation constant of weak acid.

(d) Answer any one question (5)

- (1) Give the mechanism of buffer solution.
- (2) Describe the hydrolysis of salts and the pH of their solutions.
