

B.Sc. Semester - 2 (CBCS) Examination
March/April- 2019 (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 questions.**(4)**

- (1) In which defect density changes?
- (2) What is F-centre?
- (3) Define: Chelate ligands
- (4) Which reagent is used for the gravimetric estimation of nickel?

Q.1 (B) Answer any one questions.**(2)**

- (1) Write a note on extrinsic semi-conductor.
- (2) Explain: Ionization isomerism.

Q.1 (C) Answer any one question**(3)**

- (1) What is limiting radius ratio? Give the usefulness of limiting radius ratio.
- (2) Explain Ambidentate ligands.

Q. 1 (D) Answer any one question.**(5)**

- (1) Derive Max-Born equation for the calculation of lattice energy.
- (2) What is geometrical isomer? Explain geometrical isomerism in co-ordination number-6.

Q. 2 (A) Answer the following questions.**(4)**

- (1) What is the atom per unit cell for body centered cubic lattice?
- (2) Write the Bragg's equation for diffraction of X-rays.
- (3) Write the electronic configuration of Cr and Cu.
- (4) Which transition metal is used as a catalyst in Haber process of ammonia?

Q. 2 (B) Answer any one question.**(2)**

- (1) Why Cu^{+2} is paramagnetic while Cu^{+1} is diamagnetic?
- (2) State the difference between crystalline solid and amorphous solid.

Q. 2 (C) Answer any one question.**(3)**

- (1) Explain the spectral properties of transition metal complexes.
- (2) Explain Miller indices.

Q. 2 (D) Answer any one question.**(5)**

- (1) Prove that $[\text{NiCl}_4]^{-2}$ is paramagnetic whereas $[\text{Ni}(\text{CN})_4]^{-2}$ is diamagnetic.
- (2) Explain the internal structure of NaCl by X-ray diffraction method.

Q. 3 (A) Answer the following four questions.**(4)**

- (1) How many rings are present in Bicyclo[2.1.0]pentane ?
- (2) Draw structure of Bicyclo[1.1.1]pentane
- (3) Name the following structure,



- (4) Give reaction of cyclobutane with H_2/Ni

Q. 3 (B) Answer any one question. (2)

- (1) Write ring opening reactions of cyclopropane.
- (2) Write two methods for the preparation of small ring compounds

Q. 3 (C) Answer any one question. (3)

- (1) Discuss types of strain in the molecule which affects the stability of the conformation
- (2) Discuss classification of small ring compounds based on the number of carbon atoms that are common between the two rings.

Q. 3 (D) Answer any one question. (5)

- (1) Discuss the stability of various conformations of butane with its energy level diagram.
- (2) Explain Baeyer strain theory for the cyclic compounds and write its limitations.

Q. 4 (A) Answer the following four questions. (4)

- (1) Name the reagents for Friedel Craft alkylation.
- (2) Which of these are activating and deactivating group. $-R$, $-NR_3^+$
- (3) Which of this is meta director? Cl , $-COCH_3$, CH_3 ,
- (4) Which of these will show resonance effect? $-OH$, $-CH_3$

Q. 4 (B) Answer any one question. (2)

- (1) Differentiate between activating and deactivating groups.
- (2) State the differences between aromatic and antiaromatic?

Q. 4 (C) Answer any one question. (3)

- (1) Write criteria for Aromaticity.
- (2) Discuss effect of halogen substituent on electrophilic aromatic substitution reaction.

Q. 4 (D) Answer any one question. (5)

- (1) Draw Resonance structures of the intermediates formed when Nitrobenzene is attacked by an electrophile 'E' at all the possible positions and discuss their stability.
- (2) Discuss bromination of benzene with mechanism.

Q. 5 (A) Answer the following four questions. (4)

- (1) Define: Degree of hydrolysis.
- (2) Explain the chemical nature of solution of CH_3COONa .
- (3) Define: Solubility product.
- (4) Write one example of strong electrolyte and weak electrolyte.

Q. 5 (B) Answer any one question. (2)

- (1) State the name of factors affects the degree of dissociation.
- (2) Derive the equation of pH for acidic buffer solution.

Q. 5 (C) Answer any one question. (3)

- (1) Find out the Hydrolysis constant and pH for 0.1 M CH_3COONa solution. ($K_a = 1.85 \times 10^{-5}$)
- (2) Explain the common ion effect.

Q. 5 (D) Answer any one question. (5)

- (1) Define the buffer solution and discuss the mechanism of buffer solutions.
- (2) Derive the equation of hydrolysis constant, degree of hydrolysis and pH for the salt of weak acid and strong base.
