

**B.Sc. Semester - 2 (CBCS) Examination****March/April- 2018****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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Q. 1 (A) Answer the following questions. (4)

- (1) The primary and secondary valencies of central metal in the complex  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  are.....and.....respectively.
- (2) Write any one example of chelate ligand.
- (3) What is the co-ordination number of  $\text{Na}^+$  and  $\text{Cl}^-$  in  $\text{NaCl}$ ?
- (4) Which compound shows both Schottky and Frenkel defect?

Q.1 (B) Answer any one question. (2)

- (1) Draw the geometrical isomer of  $[\text{Rh}(\text{Py})_3(\text{Cl})_3]$ .
- (2) Differentiate: n-type and p-type semiconductors.

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

- (1) Write short note on ionization isomerism.
- (2) Derive the  $r^+/r^-$  ratio for tetrahedral structure.

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

- (1) Discuss Born-Haber cycle with example.
- (2) What is geometrical isomer? Explain geometrical isomerism in complexes with the co-ordination number 4.

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

- (1) What is the relation between edge lengths of monoclinic system?
- (2) What is the number of atom per unit cell in BCC?
- (3) What is the electronic configuration of Cu?
- (4) Write the equation for calculation of magnetic moment of 3d transition metal.

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

- (1) Explain Miller indices.
- (2) Which metals are present in Brass and Bronze?

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

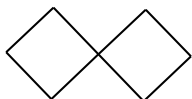
- (1) Give the difference between amorphous and crystalline solid.
- (2) Explain color properties of transition metal complexes.

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

- (1) Prove that structure of  $[\text{NiCl}_4]^{2-}$  is tetrahedral whereas  $[\text{Ni}(\text{CN})_4]^{2-}$  is square planar.
- (2) Explain: Bragg's law and X-ray diffraction.

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

- (1) Arrange cyclopropane, cyclobutane and cyclopentane in increasing order of their angle strain.
- (2) Give nomenclature of following organic compound.



- (3) Draw structure of Bicyclo[3.2.0] heptane  
(4) Common ring systems contain .....number of ring atoms.

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

- (1) Give two preparations of cycloalkanes (reactions only).  
(2) Define and give example of bridged ring system.

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

- (1) Explain different types of strains prevailing in conformations of molecule.  
(2) Give addition reactions of cyclopropane and cyclobutane.

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

- (1) Discuss Baeyer strain theory with limitations.  
(2) Explain conformations of n-Butane.

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

- (1) Name characteristic organic chemical reactions of benzene.  
(2) Arrange aromatic, nonaromatic and antiaromatic compounds in increasing order of stability.  
(3) Give name of effects through which groups can withdraw electrons from the benzene ring.  
(4) How many  $\pi$  electrons are present in [8] Annulene

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

- (1) Give reactions only Nitration and sulphonation of benzene.  
(2) Discuss Huckel's rule with suitable example

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

- (1) Explain Bromination of Benzene with mechanism.  
(2) What are electron donating and withdrawing groups? Give two examples of each.

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

- (1) Draw and discuss stabilities of all the possible resonance structures of the intermediates which may be formed when Nitrobenzene is attacked by an electrophile 'E' at ortho, para and meta position.  
(2) Halogens are orthopara directors. Discuss in detail.

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

- (1) Write the name of any two sparingly soluble salts.  
(2) State any one difference between electrolyte and non-electrolyte solution.  
(3) Define: Degree of hydrolysis.  
(4) Define: Solubility product.

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

- (1) Why the solution of  $\text{FeSO}_4$  is acidic?  
(2) Explain Buffer capacity.

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

- (1) Calculate the hydrolysis constant and pH of 0.5 M  $\text{CH}_3\text{COONa}$  solution. ( $K_a = 1.74 \times 10^{-5}$ )  
(2) Discuss the application of solubility product.

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

- (1) Derive the equation of hydrolysis constant, degree of hydrolysis and pH for the salt of strong acid and weak base.  
(2) State the types of buffer solution and derive equations to calculate their pH.

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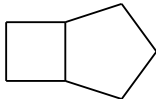
Bhakta Kavi Narsinh Mehta University

B.Sc. Examination: Semester - 02

March/April-2018

Subject: Chemistry Paper Code No.:Core

Answer Key

- Q. 1 (A) Answer the following questions. 1 Mark
- 1) 3 & 6
  - 2) EDTA, ethylenediamine, glycinate, oxalato...
  - 3) 6 & 6
  - 4) AgBr
- Q.1 (B) Answer any one questions. 2 Marks
- Q. 1(C) Answer any one questions. 3 Marks
- Q. 1(D) Answer any one question. 5 Marks
- Q. 2 (A) Answer the following questions. 1 Mark
- 1)  $a \neq b \neq c$
  - 2) Two (2)
  - 3)  $[\text{Ar}] 3d^{10}4s^1$
  - 4)  $\mu = \sqrt{n(n+2)} \text{ B.M.}$
- Q.2 (B) Answer any one questions. 2 Marks
- Q. 2(C) Answer any one questions. 3 Marks
- Q. 2(D) Answer any one questions. 5 Marks
- Q. 3 (A) Answer the following four questions. 1 Mark
- 1) cyclopentane < cyclobutane and < cyclopropane
  - 2) spiro[3,3] heptane
  - 3)
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- 4) 5, 6, 7
- Q.3 (B) Answer any one questions. 2 Marks
- Q.3 (C) Answer any one questions. 3 Marks
- Q.3 (D) Answer any one questions. 5 Marks
- Q. 4 (A) Answer the following four questions. 1 Mark
- 1) Electrophilic aromatic substitution reaction
  - 2) Antiaromatic < nonaromatic < aromatic
  - 3) Inductive, resonance, hyperconjugation
  - 4) Eight (8)
- Q.4 (B) Answer any one questions. 2 Marks
- Q.4 (C) Answer any one questions. 3 Marks
- Q.4 (D) Answer any one questions. 5 Marks
- Q. 5 (A) Answer the following four questions. 1 Mark
- 1) AgCl, AgBr, etc.
- Q. 5 (B) Answer any one from the two questions. 2 Marks
- Q. 5 (C) Answer any one questions. 3 Marks
- 1)  $K_h = 5.74 \times 10^{-10}$  &  $\text{pH} = 11.79$
- Q. 5 (D) Answer any one questions. 5 Marks