NBJ-003-1012004 Seat No. _____

B. Sc. (Sem. II) (CBCS) Examination

April / May – 2017

Chemistry - C-201

(New Course)

Faculty Code : 003

Subject Code : 1012004

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) There are five questions.

(2) In each question sub question (a) of 4 marks, all are compulsory.

(3) While sub question (b),(c), (d) each with internal options.

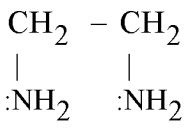
(4) Marks for each question are indicated against it.

1 (a) Write answer of following in short/single line. **4**

(1) Define : Semiconductor.

(2) Which equation is useful to calculate lattice energy of ionic solid ?

(3) Give name of :



(4) Draw cis and trans isomer form of

$[Pt\ (NH_3)_2\ Cl_2]$

(b) Answer in brief any one of following : **2**

(1) Write note on "Frenkel defect".

(2) Define coordination number with suitable example.

(c) Answer in detail any one of following : **3**

(1) Derive radius ratio in square plannar crystal.

(2) Draw geometric isomers of octahedral complex $[MCl_2(NH_3)_4]$

(d) Answer any one of following : **5**

(1) Explain Born Haber Cycle.

(2) Define Ligand. Explain types of ligands with suitable example.

2 (a) Write answer of following in short/single line. **4**

(1) What are transition elements ?

(2) Name any three elements of 3d transition series.

(3) Write Bragg's equation

(4) Unit cell

(b) Answer in brief any one of following : **2**

(1) Electronic configuration of Cr and Cu.

(2) Write law of symmetry.

(c) Answer in detail any one of following : **3**

(1) Why Cu^{2+} is paramagnetic while Cu^{+} is diamagentic ?

(2) Structure of NaCl.

(d) Answer any one of following : **5**

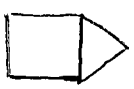
(1) Calculate spin only magnetic momentum of inner orbital and outer orbital complex of

$$\left[NiCl_4\right]^{2-}, \left[FeF_6\right]^{4-}, \left[Fe\left(CN_6\right)\right]^{4-}.$$

(2) Write note on powder method.

3 (a) Write answer of following in short/single line : **4**

(1) Give name of following structure :



(2) Which conformer is most stable for ethane ?

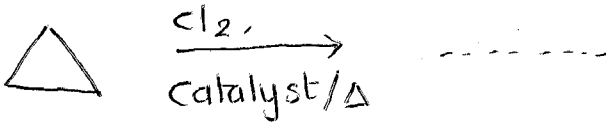
(3) Give the structural formula of Bicyclo [2,2,0] hexane.

(4) Give name of following structure :

(b) Answer in brief any one of following : **2**

(1) Give Newmann formula of staggerd and eclipsed ethane.

(2) Complete the following reaction and give name of product.



(c) Answer any one in detail of following : **3**

(1) What are cyclo alkane ? Give structural formula of cyclo butane and cyclo hexane.

(2) Write two methods of preparation of small ring cyclo alkane.

(d) Answer any one of following : **5**

(1) Write note on conformational analysis of ethane.

(2) Describe Baeyer strain theory and its limitations

4 (a) Write answer of following in short/single line. **4**

(1) Complete the reaction

$$\text{Benzene + Acetyl Chloride} \xrightarrow[-HCl]{\text{Anhydrous } AlCl_3} \ldots\ldots$$

(2) Give structural formula of benzene sulphonic acid

(3) Define : Aromaticity

(4) Give structural formula of cyclopentadienyl cation.

(b) Answer in brief any one of following : **2**

(1) How many π-electrons in Naphthalene ?

(2) Nitration of benzene

(c) Answer in detail any one of following : **3**

(1) Explain : Huckel's rule

(2) Give three example of meta directing group.

(d) Answer any one of following : **5**

(1) Explain Friedel-Craft alkylation with mechanism.

(2) Describe bromination of benzene with mechanism.

5 (a) Write answer of following in short/single line. **4**

(1) Define with suitable example "strong electrolyte".

(2) CH_3COONa is salt of _____ acid and _____ base (Fill blank)

(3) What is meant by the term degree of hydrolysis ?

(4) Solubility product (K_{sp})

(b) Answer in brief any one of following : **2**

(1) The pH of an aqueous solution is 4. Calculate its (OH^-) concentration

(2) The concentration of (H^+) in a sample is 3.8×10^{-2}M. Calculate pH

(c) Answer in detail any one of following : **3**

(1) Common ion effect.

(2) The solubility of AgCl in water at 25°C is 0.00179 gram/litre. Calculate K_{sp} of AgCl (Mol. wt. of AgCl = 143.5 g/mol.)

(d) Answer any one of following : **5**

(1) Derive the relation betweeen k_h, K_w, K_a and K_b for the salt of weak acid and weak base.

(2) Write note on "Buffer solution".