* N B J - 0 0 3 - 0 0 1 2 0 3 *

NBJ-003-001203 Seat No. _____

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

April / May – 2017

Chemistry : Paper - 201

(Old Course)

Faculty Code : 003

Subject Code : 001203

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

Instructions : (1) Question 1 contains 20 sub-questions of one mark each, all are compulsory.
(2) Question 2 and 3 carry 25 marks each with internal option.

1 Answer the following questions in short/single line. **20**

(1) NaCl has a FCC crystal. What is the coordination number of Na^+ in NaCl ?

(2) Is B_2 molecule paramagnetic or diamagnetic ?

(3) Phenol is heated with $CHCl_3$ and NaOH at 350 K. Give the name of the reaction.

(4) Give name of Hinsberg's reagent.

(5) Write Nernst equation for the following cell reaction

$$Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$$

(6) "It is only the absorbed light radiations that are effective in producing a chemical reaction." This is the statement of _____ (Fill blank)

(7) Complete the reaction

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{H^+(aa)} \_\_\_\_\_ + \_\_\_\_\_$$

(8) Which metal ion gives golden yellow colour flame in flame-test ?

(9) pH of pure water is _____ (fill blank)

(10) 1-Amino propane and 2-Amino propane are example of _____ isomerism. (fill blank)

(11) In CsCl $r^{+}_{Cs} = | 8 | pm\ r^{-}_{Cl^-} = 167\ pm$, calculate radius ratio of CsCl.

(12) Define : Bond order

(13) Give IUPAC name of $CH_3 - \underset{\underset{OH}{|}}{CH} - CH_3$

(14) Give name of $CH_3 - NH - CH_3$

(15) Define : Isomerism.

(16) Name the electrode where oxidation occurs in an electrochemical cell.

(17) The emission of light as a result of chemical action is called _____ (Fill blank)

(18) Which catalyst is used in Haber's process ?

(19) Which of metal ion give green reside in cobalt nitrate test ?

(20) Which salt of calcium and magnesium are responsible for permanent hardness of water ?

2 (a) Answer any three questions : **6**

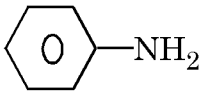
(1) Give full form of HCP and FCC arrangement.

(2) Describe BMO and ABMO.

(3) Write names only of types of isomerism.

(4) Write name of the following :

(a) CH_3-NH_2

(b) 

(5) Write structural formula of following :

(a) Dimethyl ether

(b) Diethyl ether

(6) Give only name of stoichiometric defects in ionic crystal.

(b) Answer any three questions : **9**

(1) Derive r^+/r^- value for trigonal lattice.

(2) Molecular orbital energy level diagram of N_2.

(3) Describe Dow process. (Industrial production of phenol)

(4) Discuss Hoffmann degradation of amide.

(5) Write short note on position isomerism.

(6) Describe Williamson synthesis of ether.

(c) Answer any two questions : **10**

(1) Discuss the bond order and magnetic property using molecular orbital energy level diagram of CO.

(2) Describe crystal structure of CsCl and ZnS.

(3) Write only reactions of Fries rearrangement and Kolbe-Schmitt reaction.

(4) Discuss Diazotization of aniline and reactions of diazonium salt.

(5) Explain : Optical isomerism and geometrical isomerism.

3 (a) Answer any three questions : **6**

(1) Write cell reaction for following cell

$$Al \,/\, Al^{3+}_{(aq.)} \,//\, Ni^{2+}_{(aq.)} \,/\, Ni$$

(2) Explain Stark-Einstein's law.

(3) Solubility of AgCl in water is 1×10^{-2} mole/lit. Calculate solubility product (K_{sp}) of AgCl.

(4) Give types of electrode (any two)

(5) Write two applications of catalysis.

(6) What is the standard unit of hardness of water ? Explain turbidity in short.

(b) Answer any three questions : **9**

(1) Write note on standard electrode potential.

(2) Write note on phosphorescence and fluorescence.

(3) What is catalysis ? Write types of catalysis.

(4) Write note on "common ion effect."

(5) Discuss total dissolved solids and total suspended solids.

(6) Describe types of cell.

(c) Answer any two questions : **10**

(1) Discuss Nernst equation for cell potential and write two applications of Nernst equation.

(2) What is quantum efficiency ? Give reasons for high and low quantum yield.

(3) Write note on :

(a) Charcoal test

(b) Borax bead test.

(4) Explain estimation method to determination of temporary hardness.

(5) Write note on :

(a) Enzyme catalysis

(b) Acid-base catalysis.
