



**ANANDALAYA**  
**Second Pre-Board Examination**  
**Class : XII**

Subject: CHEMISTRY  
Date : 06/01/2016

M.M: 70  
Time: 3 Hours

- (i) All questions are compulsory.
- (ii) Marks for each question are indicated against it.
- (iii) Question numbers 1 to 5 are very short-answer questions and carry 1 mark each.
- (iv) Question numbers 6 to 10 are short-answer questions and carry 2 marks each.
- (v) Question numbers 11 to 22 are also short-answer questions and carry 3 marks each.
- (vi) Question number 23 is value based question and carry 4 marks.
- (vii) Question numbers 24 to 26 are long-answer questions and carry 5 marks each.
- (viii) Use Log Tables, if necessary, Use of calculators is **not allowed**.

- |           |  |   |
|-----------|--|---|
| 1         | Arrange the following compounds in an increasing order of their solubility in water:<br>$\text{C}_6\text{H}_5\text{NH}_2$ , $(\text{C}_2\text{H}_5)_2\text{NH}$ , $\text{C}_2\text{H}_5\text{NH}_2$  | 1 |
| 2         | Define: 'Electrophoresis'.   | 1 |
| 3         | Crystalline solids are anisotropic in nature. What does this statement mean?   | 1 |
| 4         | Write the IUPAC name of the following compound:<br>$(\text{CH}_3)_3\text{CCH}_2\text{Br}$  | 1 |
| 5         | Draw the structure of 3-methylbutanal.   | 1 |
| 6         | Determine the values of equilibrium constant ( $K_C$ ) and $\Delta G^\circ$ for the following reaction:<br>$\text{Ni(s)} + 2\text{Ag}^+(\text{aq}) \longrightarrow \text{Ni}^{2+}(\text{aq}) + 2\text{Ag(s)}$ , $E^\circ = 1.05 \text{ V}$<br>( $\text{IF} = 96500 \text{ C mol}^{-1}$ ) | 2 |
| <b>OR</b> |  |   |
|           | A solution of $\text{Ni}(\text{NO}_3)_2$ is electrolysed between platinum electrodes using a current of 5 amperes for 20 minutes .What mass of Ni is deposited at the cathode? (atomic mass of Ni = 58.7 u)  |   |
| 7         | Distinguish between 'rate expression' and 'rate constant' of a reaction.   | 2 |
| 8         | Assign reasons for the following:<br>(i) Copper (I) ion is not known in aqueous solution.<br>(ii) Actinoids exhibit greater range of oxidation states than lanthanoids.  | 2 |
| 9         | Explain the following giving one example for each:<br>(i) Reimer-Tiemann reaction.<br>(ii) Friedel Craft's acetylation of anisole  | 2 |
| 10        | How would you obtain<br>(i) Picric acid (2, 4, 6-trinitrophenol) from phenol,<br>(ii) 2-Methylpropene from 2-methylpropanol?   | 2 |
| 11        | The chemistry of corrosion of iron is essentially an electrochemical phenomenon.<br>Explain the reactions occurring during the corrosion of iron in the atmosphere.  | 3 |
| 12        | Describe the following giving one example for each:<br>(i) Detergents<br>(ii) Food preservatives<br>(iii) Antacids   | 3 |

- 13 Explain how the phenomenon of adsorption finds application in each of the following processes: 3
- Production of vacuum
  - Heterogeneous catalysis
  - Froth Floatation process
- OR**
- Define each of the following terms:
- Micelles
  - Peptization
  - Desorption
- 14 Complete the following chemical equations: 3
- $\text{MnO}_4^- + \text{C}_2\text{O}_4^{2-} + \text{H}^+ \longrightarrow$   
heat
  - $\text{KMnO}_4 \longrightarrow$
  - $\text{Cr}_2\text{O}_7^{2-} + \text{H}_2\text{S} + \text{H}^+ \longrightarrow$
- 15 (a) Draw the structure of  $\text{XeF}_2$  molecule 3  
 (b) State reasons for each of the following:
  - The N – O bond in  $\text{NO}_2^-$  is shorter than the N – O bond in  $\text{NO}_3^-$
  - $\text{SF}_6$  is kinetically an inert substance
- 16 Metallic gold crystallises in fcc lattice and has a density of  $19.3 \text{ g cm}^{-3}$ . Calculate the radius of gold atom. (At. Mass of Au=197) 3
- 17 Write the name, stereochemistry and magnetic behaviour of the following: 3  
 (At.nos. Mn = 25, Co = 27, Ni = 28)
  - $\text{K}_4[\text{Mn}(\text{CN})_6]$
  - $[\text{Co}(\text{NH}_3)_5\text{Cl}] \text{Cl}_2$
  - $\text{K}_2[\text{Ni}(\text{CN})_4]$
- 18 (a) What are biodegradable polymers? 3  
 (b) Write the structure of monomers of each of the following:
  - Bakelite
  - Nylon 6
- 19 Describe the principle behind each of the following processes: 3
  - Vapour phase refining of a metal.
  - Electrolytic refining of a metal.
  - Recovery of silver after silver ore was leached with NaCN.
- 20 The following results have been obtained during the kinetic study of the reaction: 3
- $$2\text{A} + \text{B} \longrightarrow \text{C} + \text{D}$$

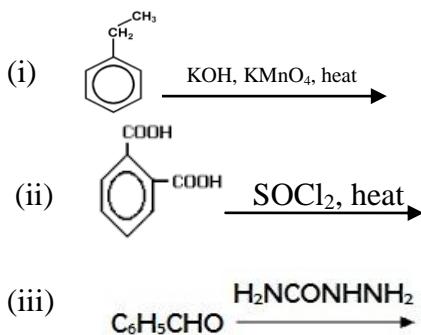
Experiment	[A] M	[B] M	Initial rate of formation of D / M min <sup>-1</sup>
I	0.1	0.1	$6.0 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$
II	0.3	0.2	$7.2 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$
III	0.3	0.4	$2.88 \times 10^{-1} \text{ mol L}^{-1} \text{ min}^{-1}$
IV	0.4	0.1	$2.4 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$

Determine the rate law and the rate constant for the reaction.

- 21 Answer the following: 3
- Haloalkanes easily dissolve in organic solvents, why?
  - What is known as a racemic mixture? Give an example.
  - Of the two bromo derivatives,  $C_6H_5CH(CH_3)Br$  and  $C_6H_5CH(C_6H_5)Br$ , which one is more reactive in  $S_N1$  substitution reaction and why?
- 22 (a) Explain why an alkylamine is more basic than ammonia. 3  
 (b) How would you convert
  - Aniline to nitrobenzene
  - Aniline to iodobenzene ?
- 23 A person consumes only milk for six months. His gums started bleeding after few days. 4
  - Name the vitamin whose vitamin deficiency causes this disease.
  - Why is this vitamin taken regularly in diet?
  - Name two fat soluble vitamins
  - What values about the health are ignored by the person?
- 24 (a) Differentiate between molarity and molality for a solution. How does a change in temperature influence their values? 5  
 (b) Calculate the freezing point of an aqueous solution containing 10.50g of  $MgBr_2$  in 200 g of water. (Molar mass of  $MgBr_2$  = 184 g and  $K_f$  for water = 1.86  $Kkgmol^{-1}$ )
- OR**
- (a) Define the terms osmosis and osmotic pressure. Is the osmotic pressure of a solution a colligative property? Explain.  
 (b) Calculate the boiling point of a solution prepared by adding 15.00 g of NaCl to 250.0 g of water. ( $K_b$  for water = 0.512  $Kkgmol^{-1}$ , Molar mass of NaCl = 58.5 g)
- 25 (a) Give chemical tests to distinguish between 5
  - Propanal and propanone,
  - Benzaldehyde and acetophenone.
- (b) How would you obtain
  - But-2-enal from ethanal,
  - Butanoic acid from butanol,
  - Benzoic acid from ethylbenzene?

**OR**

- (a) Describe the following giving chemical equations:  
 (i) Cannizzaro reaction  
 (ii) Decarboxylation
- (b) Complete the following chemical equations:



26 (a) Explain the following:

5

- (i)  $\text{NF}_3$  is an exothermic compound whereas  $\text{NCl}_3$  is not.
- (ii)  $\text{F}_2$  is most reactive of all the four common halogens.

(b) Complete the following chemical equations:

- (i)  $\text{C} + \text{H}_2\text{SO}_4$  (conc)  $\rightarrow$
- (ii)  $\text{P}_4 + \text{NaOH} + \text{H}_2\text{O} \rightarrow$
- (iii)  $\text{Cl}_2 + \text{F}_2$  (excess)  $\rightarrow$

**OR**

(a) Account for the following:

- (i) The acidic strength decreases in the order  $\text{HCl} > \text{H}_2\text{S} > \text{PH}_3$
- (ii) Tendency to form pentahalide decreases down the group in group 15 of the periodic table.

(b) Complete the following reactions:

- (i)  $\text{P}_4 + \text{SO}_2\text{Cl} \rightarrow$
- (ii)  $\text{XeF}_2 + \text{H}_2\text{O} \rightarrow$
- (iii)  $\text{I}_2 + \text{HNO}_3$  (conc)  $\rightarrow$