



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.

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|---|---|---|
| 1 | Arrange the following compounds in an increasing order of their solubility in water:
$C_6H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$ | 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:
$(CH_3)_3CCH_2Br$ | 1 |
| 5 | Draw the structure of 3-methylbutanal. | 1 |
| 6 | Determine the values of equilibrium constant (K_C) and ΔG° for the following reaction:
$Ni(s) + 2Ag^+(aq) \longrightarrow Ni^{2+}(aq) + 2Ag(s)$, $E^\circ = 1.05 V$
($IF = 96500 C mol^{-1}$) | 2 |
| OR | | |
| A solution of $Ni(NO_3)_2$ 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:
(i) Copper (I) ion is not known in aqueous solution.
(ii) Actinoids exhibit greater range of oxidation states than lanthanoids. | 2 |
| 9 | Explain the following giving one example for each:
(i) Reimer-Tiemann reaction.
(ii) Friedel Craft's acetylation of anisole | 2 |
| 10 | How would you obtain
(i) Picric acid (2, 4, 6-trinitrophenol) from phenol,
(ii) 2-Methylpropene from 2-methylpropanol? | 2 |
| 11 | The chemistry of corrosion of iron is essentially an electrochemical phenomenon. Explain the reactions occurring during the corrosion of iron in the atmosphere. | 3 |
| 12 | Describe the following giving one example for each:
(i) Detergents
(ii) Food preservatives
(iii) Antacids | 3 |

- 13 Explain how the phenomenon of adsorption finds application in each of the following processes: 3
- (i) Production of vacuum
 - (ii) Heterogeneous catalysis
 - (iii) Froth Floatation process

OR

Define each of the following terms:

- (i) Micelles
 - (ii) Peptization
 - (iii) Desorption
- 14 Complete the following chemical equations: 3
- (i) $\text{MnO}_4^- + \text{C}_2\text{O}_4^{2-} + \text{H}^+ \xrightarrow{\text{heat}}$
 - (ii) $\text{KMnO}_4 \longrightarrow$
 - (iii) $\text{Cr}_2\text{O}_7^{2-} + \text{H}_2\text{S} + \text{H}^+ \longrightarrow$
- 15 (a) Draw the structure of XeF_2 molecule 3
 (b) State reasons for each of the following:
 - (i) The N – O bond in NO_2^- is shorter than the N – O bond in NO_3^-
 - (ii) SF_6 is kinetically an inert substance
- 16 Metallic gold crystallises in fcc lattice and has a density of 19.3 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)
 - (i) $\text{K}_4[\text{Mn}(\text{CN})_6]$
 - (ii) $[\text{Co}(\text{NH}_3)_5\text{Cl}] \text{Cl}_2$
 - (iii) $\text{K}_2[\text{Ni}(\text{CN})_4]$
- 18 (a) What are biodegradable polymers? 3
 (b) Write the structure of monomers of each of the following:
 - (i) Bakelite
 - (ii) Nylon 6
- 19 Describe the principle behind each of the following processes: 3
 - (i) Vapour phase refining of a metal.
 - (ii) Electrolytic refining of a metal.
 - (iii) 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



Experiment	[A] M	[B] M	Initial rate of formation of D / M min^{-1}
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
- (i) Haloalkanes easily dissolve in organic solvents, why?
 - (ii) What is known as a racemic mixture? Give an example.
 - (iii) 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
- (i) Aniline to nitrobenzene
 - (ii) Aniline to iodobenzene ?

- 23 A person consumes only milk for six months. His gums started bleeding after few days. 4
- (a) Name the vitamin whose deficiency causes this disease.
 - (b) Why is this vitamin taken regularly in diet?
 - (c) Name two fat soluble vitamins
 - (d) 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 = $1.86 \text{ K kg mol}^{-1}$)

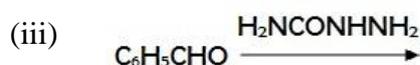
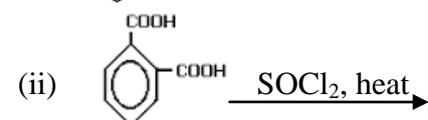
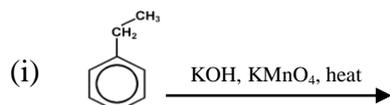
OR

- (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 = $0.512 \text{ K kg mol}^{-1}$, Molar mass of NaCl = 58.5 g)
- 25 (a) Give chemical tests to distinguish between 5
- (i) Propanal and propanone,
 - (ii) Benzaldehyde and acetophenone.
- (b) How would you obtain
- (i) But-2-enal from ethanal,
 - (ii) Butanoic acid from butanol,
 - (iii) 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:
- (i) NF_3 is an exothermic compound whereas NCl_3 is not.
 - (ii) F_2 is most reactive of all the four common halogens.
- (b) Complete the following chemical equations:
- (i) $\text{C} + \text{H}_2\text{SO}_4 (\text{conc}) \rightarrow$
 - (ii) $\text{P}_4 + \text{NaOH} + \text{H}_2\text{O} \rightarrow$
 - (iii) $\text{Cl}_2 + \text{F}_2(\text{excess}) \rightarrow$

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) $\text{I}_2 + \text{HNO}_3(\text{conc}) \rightarrow$