



St. Xavier's Sr. Sec. School

Delhi-54

Pre Board Examination 2017

Set 1

Std. 12
03-01-2017

CHEMISTRY

Max. Marks : 70
Time : 3 hrs.

General Instructions:-

- i) All questions are compulsory.
- ii) Question numbers 1 to 5 carry one marks each.
- iii) Question numbers 6 to 10 carry two marks each.
- iv) Question numbers 11 to 22 carry three marks each.
- v) Question number 23 is a value based question carrying four marks.
- vi) Question numbers 24 to 26 carry five marks each.
- vii) Use log tables, if necessary.

1. What type of stoichiometric defect is shown by AgCl? 1
2. Give an example of 'water in oil' and 'oil in water' emulsion. 1
3. Write a chemical reaction for the preparation of aspirin from phenol. 1
4. Which divalent metal ion has maximum paramagnetic character among the first transition series? 1
5. Write the structure of 1-Chloro-4-ethyl cyclohexane. 1
6. i) Write down the IUPAC name of the complex: $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$
ii) Write the formula for the complex: Potassium tetrachloridonickelate(II). 2
7. Derive the relationship between relative lowering of vapour pressure and mole fraction of a volatile liquid.

(OR)

- i) Some liquids on mixing forms azeotropes. What are azeotropes?
- ii) What are ideal solutions? Give an example. 2
8. Give a simple chemical test to distinguish between following pairs of compounds:
 - i) Aniline and N-methylaniline
 - ii) Acetophenone and Benzophenone 2



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9. Rate constant ' K ' of a reaction varies with temperature ' T ' according to the equation,

$$\log K = \log A - \frac{E_a}{2.303 R} \left(\frac{1}{T} \right)$$

where E_a is the activation energy. When a graph is plotted for $\log K$ vs $\frac{1}{T}$, a straight line with a slope of -4250 K is obtained. Calculate E_a for the reaction. $R=8.314 \text{ JK}^{-1} \text{ mol}^{-1}$.

10. What happens when

- PCl_5 is heated?
- H_3PO_3 is heated?

Write the reaction involved.

2

11. Calculate the mass of a non-volatile solute (molar mass 40 g/mol) which should be dissolved in 114 g octane to reduce its vapour pressure to 80% . Molar Mass of Octane= 114 g/mol . 3

12. Write the names and structures of the monomers of the following polymers:

- | | | | |
|-----------|-------------|--------------|---|
| a) Buna-S | b) Neoprene | c) Nylon 6,6 | 3 |
|-----------|-------------|--------------|---|

13. Illustrate the following name reactions:

- | | | |
|------------------------|-------------------------|---|
| a) Cannizzaro reaction | b) Clemmensen reduction | |
| c) Swarts reaction | | 3 |

14. a) Write the hybridization and shape of the following complexes:

- | | |
|--------------------------|-------------------------------------|
| i) $[\text{CoF}_6]^{3-}$ | ii) $[\text{Ni}(\text{CN})_4]^{2-}$ |
|--------------------------|-------------------------------------|

(Atomic number of $\text{Co}=27$, $\text{Ni}=28$)

- b) Out of NH_3 and CO , which ligand forms a more stable complex with a transition metal and why? 3

15. The edge length of unit cell of a metal having molecular mass 75 g/mol is 5\AA , which crystallizes in a cubic lattice. If the density is 2 g/cc , then find the radius of the metal atom. 3

16. Give reason:

- | | |
|---|---|
| a) Ethyl iodide undergoes SN_2 reaction faster than ethyl bromide. | |
| b) 1-Chloro butane has higher boiling point than 2-Chloro butane. | |
| c) Grignard reagent should be prepared under anhydrous conditions. | 3 |



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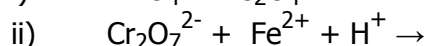
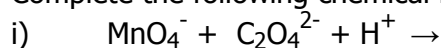
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take him to the doctor and wanted to give medication on his own. Upasana insists that her father should not give medicines to her brother on his own but should take him to a doctor.

- i) Mention the values shown by Upasana.
- ii) Why did his body started itching?
- iii) Why should not medicines be taken without consulting doctors?
- iv) What are analgesics?

4

24. a) Complete the following chemical reaction:



b) Give reason for the following:

i) Mn^{2+} is much more resistant than Fe^{2+} towards oxidation.

ii) Many of the transition elements are known to form interstitial compounds.

iii) The second and the third transition series elements have almost similar atomic radii.

(OR)

Assign reason for the following:

- i) The enthalpies of atomization of transition elements are high.
- ii) The transition metals and many of their compounds act as good catalyst.
- iii) From element to element, the actinoid contraction is greater than the lanthanoid contraction.
- iv) Scandium ($Z=21$) does not exhibit variable oxidation state and yet it is regarded as a transition element.
- v) Cu(I) ion is not known in aqueous solution.

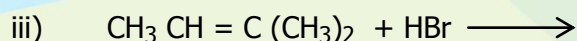
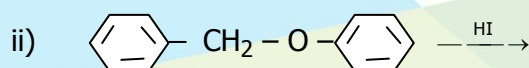
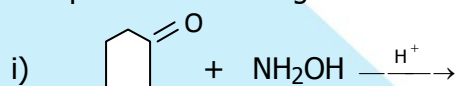
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25. a) Arrange the following in the increasing order of property indicated against each set.

i) Benzoic acid, 4-Nitro benzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxy benzoic acid (Acidic Strength)

ii) $\text{C}_2\text{H}_5\text{OH}$, $(\text{CH}_3)_2\text{NH}$, $\text{C}_2\text{H}_5\text{NH}_2$ (Increasing order of boiling point)

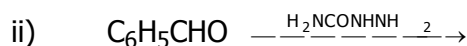
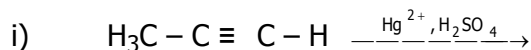
b) Complete the following reactions:





(OR)

a) Write the final products in each of the following reaction:



b) Two moles of organic compound A on treatment with a strong base gives two compounds B and C. Compound B on dehydrogenation with Cu gives A.

Acidification of C yields Carboxylic acid D with molecular formula of CH_2O_2 .

Identify the compound A, B, C and D and write all chemical reactions involved. 5

26. a) Resistance of a conductivity cell filled with 0.1 mol/L KCl solution is 100Ω . The resistance of the same cell when filled with 0.02 mol/L KCl solution is 520Ω . Calculate the conductivity and molar conductivity of 0.02 mol/L KCl solution.

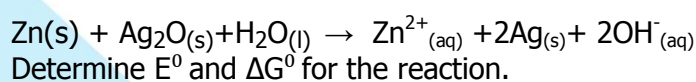
The conductivity of 0.1 mol/L KCl solution is $1.29 \times 10^{-2} \Omega^{-1} \text{cm}^{-1}$.

b) Calculate the cell potential of a hydrogen electrode in contact with a solution whose pH is 10.

(OR)

a) Define molar conductivity of a solution and explain how molar conductivity changes with change in concentration of solution for a weak and strong electrolyte.

b) In the button cell widely used in watches, the following reaction takes place:



$$E^0_{\text{Zn}^{2+}/\text{Zn}} = -0.76 \text{ V}, \quad E^0_{\text{Ag}^+/\text{Ag}} = -0.80 \text{ V}$$

-X-X-X-X-X-

5