

Kendriya Vidyalaya Sangathan

Silchar Region

Class – XII

Term – 2 Sample paper

Subject – Chemistry

Maximum marks – 35

Time allowed – 2 hrs.

GENERAL INSTRUCTIONS:

Read the following instructions carefully.

1. There are 12 questions in this question paper with internal choice.
 2. SECTION A - Q. No. 1 to 3 are very short answer questions carrying 2 marks each.
 3. SECTION B - Q. No. 4 to 11 are short answer questions carrying 3 marks each.
 4. SECTION C- Q. No. 12 is case based question carrying 5 marks.
 5. All questions are compulsory.
 6. Use of log tables and calculators is not allowed
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Section A

1. Identify the name reaction which is involved in the following conversions?
 - a) Ethanal to But-2-enal
 - b) propan-2-one to propane. [1+1]
2. Define molar conductivity? What is its S.I unit? [2]
3.
 - a) Give a chemical test to distinguish between phenol and ethanol.
 - b) Which one is more acidic between phenol and *p*-nitro phenol? [1+1]

Section B

4. Assign reasons for the following:
 - a) Most of the transition metals and their compounds possess catalytic properties.
 - b) Transition metals have high enthalpy of atomization
 - c) Cu^+ salts are colourless whereas Cu^{2+} salts are coloured. [1+1+1]
5. Give reason for the following:
 - a) Chemisorption first increases with increase in temperature then decreases after passing through a maximum point.
 - b) Lyophilic sols are more stable than lyophobic sols.
 - c) Delta is formed at the junction of sea and river water. [1+1+1]
6. Give reasons:
 - a) Aniline does not undergo Friedel craft's reaction.
 - b) Direct nitration of Aniline yields a significant amount of *meta* derivative also.
 - c) Aniline is less basic than ammonia. [1+1+1]

OR

- a) Distinguish between aniline and methyl amine.

- b) Convert aniline to phenyl isocyanide.
c) Compare the basicity of aniline and N-methyl aniline. [1+1+1]

7. An organic compound A, having a characteristic odour, on treatment with NaOH forms two compounds B and C. Compound B has a molecular formula C_7H_8O which on oxidation gives back compound A. Compound C is sodium salt of an acid. C, when heated with soda lime, yields an aromatic hydrocarbon D. Deduce structures of A,B,C and D. [3]

OR

- a) Prepare ethyl amine using 'Gabriel Phthalimide' synthesis using a suitable starting material.
b) What will happen when ethyl amine is reacted with sodium nitrite in presence of HCl? [2+1]

8. Calculate EMF of the following cell at 298K
 $2 Cr(s) + 3 Fe^{2+} (0.1M) \longrightarrow 2 Cr^{3+} (0.01M) + 3 Fe(s)$
Given $E^0_{(Cr^{3+}/Cr)} = -0.74 V$ & $E^0_{(Fe^{2+}/Fe)} = -0.44 V$ [3]

9. Write the IUPAC name of $K_3[CoF_6]$ & using VBT predict the shape of the coordination entity and also find out hybridisation of central metal ion in coordination entity. [3]

OR

- a) Explain why $[Ni(CN)_4]^{2-}$ is diamagnetic.
b) Draw the structure of $Fe(CO)_5$
c) On the basis of crystal field theory, write the electronic configuration for d^4 ion if $\Delta_o < P$ [1+1+1]

10. Account for the following:

- a) Why is Cr^{2+} reducing and Mn^{3+} oxidising when both have d^4 configuration?
b) Cu^{2+} salts are stable in aqueous solution, though it has $3d^9$ valence sub-shell electronic configuration.
c) Third ionisation enthalpy of 'Mn' is very high. [1+1+1]

OR

- a) Transition elements can show variable oxidation states. Why?
b) Mention one consequence of 'Lanthanoid Contraction'
c) Calculate its spin only magnetic moment of Cr^{3+} ion. [1+1+1]

11. Give example of the following reaction.

- a) Cannizzaro Reaction
b) Wolff Kishner Reduction
c) HVZ reaction. [1+1+1]

Section C

12. Read the passage given below and answer the questions that follow.

Chemical kinetics is the study of chemical reactions with respect to reaction rates, effect of various variables, rearrangement of atoms and formation of intermediates. The rate of a reaction is concerned with decrease in concentration of reactants or increase in the concentration of products per unit time. It can be expressed as instantaneous rate at a particular instant of time and average rate over a large interval of time. A number of factors such as temperature, concentration of reactants, catalyst, affect the rate of a reaction. Mathematical representation of rate of a reaction is given by rate law. It has to be determined experimentally and cannot be predicted. Order of a reaction with respect to a reactant is the power of its concentration which appears in the rate law equation. The order of a reaction is the sum of all such powers of concentration of terms for different reactants. Rate constant is the

proportionality factor in the rate law. Rate constant and order of a reaction can be determined from rate law or its integrated rate equation. Molecularity is defined only for an elementary reaction. Its values are limited from 1 to 3 whereas order can be 0, 1, 2, 3 or even a fraction. Molecularity and order of an elementary reaction are same.

- a) A first order reaction takes 40 minutes for 30% decomposition. Calculate half-life period.
- b) What is the order of the reaction if rate constant of the reaction is $3 \times 10^{-4} \text{ s}^{-1}$?
- c) A reaction is second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is i) doubled ii) reduced to half?

OR

Write two differences between order and molecularity.

[2+1+2]
