



CAMBRIAN PUBLIC SCHOOL

KANKE ROAD, RANCHI

REVISION ASSIGNMENT

Subject: Chemistry (043)

Class: XII

SOLUTION

- 1) Henry's law constant (K_h) for the solution of methane in benzene at 298 K is 4.27×10^5 mm Hg. Calculate the solubility of methane in benzene at 298 K under 760 mm Hg.
- 2) State Raoult's law for the solution containing volatile components. Write two differences between an ideal solution and a non-ideal solution.
- 3) Calculate the molarity of 9.8% (w/w) solution of H_2SO_4 , if the density of the solution is 1.02 g mL^{-1} (Molar mass of H_2SO_4 = 98 g mol^{-1})
- 4) Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at 25 C, assuming that it is completely dissociated.
- 5) Explain why on addition of 1mol glucose to 1 litre water the boiling point of water increases. Henry's Law constant for CO_2 in water is 1.67×10^8 Pa at 298K. Calculate the number of moles of CO_2 in 500mL of soda water when packed under 2.53×10^5 Pa at the same temperature.

ELECTROCHEMISTRY

- 1) Calculate the emf of the cell in which the following reaction takes place.
 - a. $Ni(s) + 2Ag(0.002M) \rightarrow Ni^{2+}(0.160M) + 2Ag(s)$
 - b. Given that $E^\circ_{cell} = 1.05V$
- 2) Express the relation among the conductivity of solution in the cell, the cell constant and resistance of solution in the cell.
- 3) State and explain Kohlrausch law of independent migration of ions. Write its two applications.
- 4) The resistance of a conductivity cell filled with 0.1M KCl solution is 100Ω . If the resistance of the same cell when filled with 0.02M KCl solution is 520Ω . Calculate the conductivity and molar conductivity of 0.02M KCl solution conductivity of 0.1M KCl solution is 1.29 Sm^{-1}
- 5) State the product of electrolysis obtained on the Cathode and the anode in the following cases.
 - a) A dilute solution of H_2SO_4 . With platinum electrode.
 - b) An aqueous solution of $AgNO_3$ with silver electrodes

CHEMICAL KINETICS

- 1) A reaction is 2nd order with respect to reactant how is its rate affected if the concentration of the reactant is
 - a) doubled
 - b) reduced to half.
- 2) Show that in case of first order reaction the time required for 99.9% of the reaction to complete is 10 times that required for half of the reaction to take place.
- 3) What is Pseudo first order of reaction? Give one example of such reaction.
- 4) The half life for decay of radioactive C^{14} is 5730 years. An Archaeological artifact containing wood had only 80% of the C^{14} found in a living tree. Estimate the age of the sample.

- 5) The rate of reaction becomes 4 times when the temperature changes from 293 K to 313 K. Calculate the energy of activation (E_a) of the reaction. ($R = 8314 \text{ JK}^{-1} \text{ mol}^{-1}$ $\log 4 = 0.6021$)

d and f-block Elements

- 1) Complete the following Chemical Equation:
 - a) $\text{Fe}^{3+} + \text{I}^- \longrightarrow$
 - b) $\text{CrO}_4^{2-} + \text{H}^+ \longrightarrow$
- 2) What is meant by Lanthanoid contraction?
- 3) Explain the following dissertations:
 - a) Many of the transition elements are known to form interstitial compounds.
 - b) There is a general increase in density from titanium ($z = 22$) to copper ($z = 29$).
 - c) The members of the actinoid series exhibit a larger number of oxidation states than the corresponding members of the lanthanoid series.
- 4) Discuss the relative stability in aqueous solution of +2 oxidation state among the elements: Cr Mn, Fe and Co. How would you justify these situations?
- 5) Assign reason for the following:
 - a) The enthalpies of atomization of transition elements are high.
 - b) The transition metals and many of their compounds act as good catalyst.
 - c) From element to element, the actinoid contraction is greater than the lanthanoid contraction.
 - d) The E^0 value for the $\text{Mn}^{3+}/\text{Mn}^{2+}$ couple is much positive than that of $\text{Cr}^{3+}/\text{Cr}^{2+}$
 - e) Scandium ($Z = 21$) does not exhibit variable oxidation state and yet it is regarded as a transition element

Co-ordination Compound

- 1) Using IUPAC norms, write the systematic names of the following:
 - a) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
 - b) $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NH}_2\text{CH}_3)]\text{Cl}$
- 2) Explain with two examples for each of the following: Co-ordination entity, ligand, coordination number, coordination polyhedron, homoleptic and heteroleptic.
- 3) What is meant by crystal field splitting energy? On the basis of crystal field theory, write the electronic configuration of d^4 in terms of t_{2g} and e_g in an octahedral field when:
 - a) $\Delta_o > P$
 - b) $\Delta_o < P$
- 4) Using IUPAC norms, write the formulae for the following complexes:
 - a) hexaaquachromium (III) chloride
 - b) Sodium trioxalatoferrate (III)
- 5) Square planar complexes with coordination number of four exhibit geometrical isomerism whereas tetrahedral complexes do not. Why?
