



Dnyansagar Coaching Classes, A'nagar

Std. - XII

IIIst Preliminary

Time - 2 hrs

Sub- Chemistry-I

Max Marks - 40

(Physical & Inorganic chemistry)

- Note :-**
- All questions are compulsory
 - Give balanced equation & Draw neat and labelled diagram whenever necessary.
 - Use of Log table is allowed.

Q.1. Select and write the most appropriate answer from given alternatives in each sub question. (08)

- Which inorganic precipitate acts as a semipermeable membrane-
 - Tetracyanonickelate
 - Barium oxalate
 - Nickel phosphate
 - Copper ferrocyanide
- Hess's law deals with
 - Changes in heat of reaction
 - Rate of reaction
 - Equilibrium constant
 - Influence of pressure on volume
- The highest oxidation state of manganese is given by
 - K_2MnO_4
 - $KMnO_4$
 - MnO_2
 - Mn_2O_3
- A catalyst increases rate of reaction by
 - Decreasing enthalpy
 - Decreasing internal energy
 - Decreasing activation energy
 - Increasing activation energy
- Which element is the end product of every natural radioactive series!
 - Pb
 - Sn
 - C
 - Bi
- A solution of NaCl in contact with atmosphere has a pH of about -
 - 3.5
 - 5
 - 7
 - 14
- The following half reactions occur in galvanic cell
 $Fe^{3+} + e \longrightarrow Fe^{2+} ; E^0 = 0.77V$
 $MnO_4^- + 8H^+ + 5e \longrightarrow Mn^{2+} + 4H_2O ; E^0 = 1.49V$
 - 3.60 V
 - 0.72 V
 - 2.26 V
 - 7.2 V
- In order to decompose 9g of water 142.5kJ of heat is required. Hence enthalpy of formation of water is
 - 142.5 KJ
 - + 142.5KJ
 - 283 KJ
 - + 285 KJ

Q 2. Attempt any ONE of the following : (02)

- What are the limitations of Arrhenius acid base theory.
- What is salt bridge? Give its functions.

B) Attempt any ONE of the following. (02)

- State and explain Raoult's law.
- Define buffer solution? write its application.

C) Attempt any ONE of the following. (02)

- i) Give the application of kirchoff's equation and Hess's Law.
- ii) Draw the following diagrams. (any one)
 - a) Daniell cell a) Maximam Work done

D) Attempt any ONE of the following. (02)

- i) Give the characteristics of radio activity.
- ii) What is electrochemical equivalent ? Give the relationship between E.C.E. and chemical equivalent.

Q. 3 A) Attempt any ONE of the following. (03)

- i) Define a freezing point of a liquid. Explain the phenomenon of super cooling of a liquid.
- ii) Explain chlorine is powerful oxidising agent while sodium is powerful reducing agents.

B) Answer any ONE of the following. (03)

- i) What is mass defect ? obtain mathematical expression for mass defect.
- ii) Define instantaneous rate. Explain it graphically.

C) Answer the following (02)

Cu salts are blue while Zn salts are white.

Q. 4 A) Answer the following. (04)

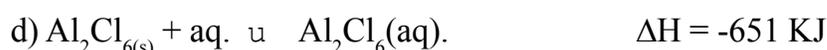
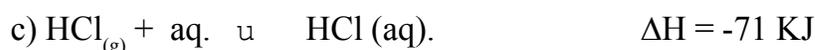
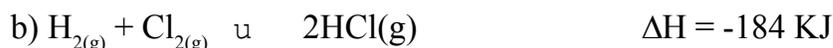
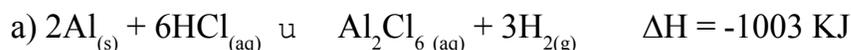
- i) Describe the construction and working of a calomel electrode.

B) Answer any ONE of the following. (04)

- i) Derive an expression for the work done when an ideal gas expands isothermially and reversibly from a vol. of $v_1 \text{ dm}^3$ to $v_2 \text{ dm}^3$.
- ii) a) Define the following term.
 - i) Artificial radioactivity ii) Electro plating
- b) Distinguish between isotopes & isobars.

Q.5. A) Solve any ONE of the following. (04)

- i) Calculate the hydrolysis constant, the degree of hydrolysis & PH of 0.1 M. NH_4Cl solution. (Given - K_b of $\text{NH}_4\text{OH} = 1.8 \times 10^{-5}$, $k_w = 1 \times 10^{-14}$)
- ii) Calculate the heat of formation of anhydrous AlCl_3 from the following data.



B. Solve any TWO of the following. (04)

- i) How much time will be required to collect $2.3 \times 10^{-3} \text{ kg}$ of chromium by electrolysis from CrCl_3 if a current of 0.8 ampere is used. (Given at w.t.of Cr = 52)
- ii) A weak monobasic acid dissociates to the extent of 2.2% in its 0.1 M solution calculate the P^{H} and P^{OH} of the solution.
- iii) For the reaction $2\text{N}_2\text{O}_5(g) \rightleftharpoons 4\text{NO}_2(g) + \text{O}_2(g)$ if the concentration of NO_2 increases by $3.0 \times 10^{-3} \text{ mol L}^{-1}$ in six seconds then what is the rate of reaction ?