

Solution

- Explain why equimolar aqueous solution of sodium chloride and sodium sulphate are not isotonic?
- Define:- (i) Molality, (ii) Abnormal molecular mass, (iii) Vant Hoff's factor (iv) Ideal non ideal solution, (v) positive and negative deviation.
- State Henry' law and give its two application.
- Which solution has higher concentration 1 molar or 1 molal solution f same solute? Give reason.
- Calculate the freezing point of solution when 1.8 gm of mgcl₂. Was dissolved in 40 gm of water assuming MgCl₂ undergo complete ionization (k_f for water = 1.86 K kg mol⁻¹)
- Calculate the boiling point of solutions prepared by adding 15 gm of Nacl to 250 gm of water. (K_b for water = 0.512 K kg mol⁻¹)

Electrochemistry

- Give a brief account of corrosion and its mechanism:
- Define:- (i) Kohlrausch law, (ii) Faraday is first law of electrolysis.
- What type of battery is lead storage battery? Write the anode and cathode reactions and the overall reactions occurring in a lead storage battery.
- The E.M.F of a cell corresponding to the reactions

$$\text{Zn}(s) + 2\text{H}^+_{(aq)} \rightarrow \text{Zn}^{2+}_{(0.1M)} + \text{H}_2(g, 1\text{atm})$$
 Is 0.28 volt at 25°C. Write the half cell reactions and calculate the pH of the solution at hydrogen electrode.
- The molar conductivity of acetic solution at infinite dilution is 390.7 ohm⁻¹ cm² mol⁻¹. Calculate the molar conductivity of 0.01M acetic acid solution, given that the dissociation const. of acetic acid is 1.8×10^{-5} .

Chemical Kinetics

- Differentiate between order and molecularity of the reaction:
- A first order reaction takes 20 min for 25% decomposition. Calculate the time when 75% of the raction will be decomposed.
- (i) Define activation energy and threshold energy.
 (ii) Can a reaction have negative activation energy?
 (iii) What is the order of reaction whose rate constant has the same units as the rate of reaction.
- The following rate data were obtained at 303K for following reaction:

$$2\text{A} + \text{B} \rightarrow \text{C} + \text{D}$$

Exp.	[A] mol litre ⁻¹	[B] mol litre ⁻¹	Initial rate
I	0.1	0.1	6×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.4×10^{-2}

What is the rate law? What is the order with respect to each reactant and overall order?

Surface Chemistry

- Define:- (i) Coagulation, (ii) Electrophoresis, (iii) Zeta potential, (iv) Tyndall effect.
- Explain with suitable example. (a) Aerosol, (b) Hydrosol, (c) Alcosol.
- (i) Give the expression of Freundlich isotherms.
 (ii) Define shape selective catalysis and give one example.

- (iii) Write one similarity between physisorption and chemisorption:
19. Differentiate between multimolecular colloids and macro molecular colloids.
20. Give one example of oil in water and water in oil.

General Principles And Process Of Isolation Of Elements

21. Differentiate between:-
 (i) Minerals and ores.
 (ii) Pig Iron and Cast Iron
 (iii) Roasting and Calcination.
22. What is role of silica in the metallurgy of copper?
23. Describe a method for refining of nickel.
24. What is the role of depressant in froth floatation process? Give an example.
25. What is vapour phase refining?

P-Block Elements

26. (i) The electrom gain enthalpy with negative sign for oxygen (-141 KJ mol⁻¹) is less than that of sulphur (-200KJ mol⁻¹).
 (ii) Why H₂S is more acidic than H₂O?
 (iii) SF₆ is known but 8H₆ is not known. Explain
 (iv) Xenon does not form fluorides such as XeF₃ and XeF₅. Why?
 (v) XeF₂ has straight linear structure and not a bent structure. Why?
27. Why do noble gases have comparatively large atomic size?
28. Draw the structure of XeF₂, XeO₄, XeO₂F₂, XeOF₂.

D-Block Elements

29. Why do transition elements show variable oxidation states?
30. Zn, Cd, and Hg are soft metal and low m.p. why?
31. (i) Mn shows the highest oxidation state of +7 with oxygen but with fluorine it shows the highest oxidation state +4.
 (ii) Actinoids show irregular in their electronic configuration.
32. Actinoid contraction is greater than lanthanoid contraction. Why?
33. Compare the chemistry of actinoids with that of lanthanoids with special reference to (i) electronic configuration. (ii) oxidation state (iii) Atomic and Ionic size & (iv) Chemical reactivity.

Co-ordination Compounds

34. Draw the structures of [Co(NH₃)₆]³⁺, [Ni(CN)₄]²⁻ and [Ni(CO)₄] write the shape of complexes and hybridisation of atomic orbitals of the transition metal in each case.
35. Give the evidence that [CO(NH₃)₅Cl]SO₄ and [CO(NH₃)₅SO₄]Cl are ionisation Isomers.
36. Define crystal field splitting energy of the basis of crystal field theory, write the electronic configuration for d⁴ ion if D₀ < P.
37. Write IUPAC names of the complex (i) K[BF₄] (ii) [Fe(C₂H₅)₂] (iii) [Mn₂(CO)₁₂]

Haloalkane And Haloarens

38. The C-Cl bond length in chlorobenzene is shorter than C-Cl bond length in CH₃-Cl. Why?
39. The dipole moment of chlorobenzene is lower than that of cyclohexyl chloride. Why?
40. Write the structure of alkene formed by dehydrohalogenation of 1-bromo-1-methycyclohexane with alcoholic KOH.
41. Give a brief account of the following with one example of each.
 (i) Swarts reaction, (ii) Finkelstein reaction. (iii) Sandmeyer reaction.

Alcohol Phenol And Ether

42. Write the mechanism of hydration ethene to form ethanol.
43. Name the reagents in the following
 (i) Oxidation of a primary alcohol to an aldehyde.
 (ii) Bromination of phenol to 2, 4, 6 – tribromophenol.
 (iii) Butan – 2 – one to butan – 2 – ol.
44. Write equations of the following reactions:
 (i) Friedel crafts reaction – Alkylation in Anisole
 (ii) Nitration of Anisole.
 (iii) Friedel – craft & acetylation of anisole.
45. Describe the following:
 (i) Kolbe's reaction
 (ii) Teimer – Tiemarin reaction.
 (iii) Caupling reaction

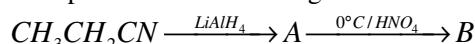
Aldehyde, Ketone and Carboxylic acids

46. Write chemical reactions to effect of the following transformation.
 (i) Butan – 1 – ol to butanoic acid.
 (ii) Benzyl alcohol to phexyle ethanoic acid
 (iii) 3 - Nitro bromo benzene to 3 – nitrobenzoic acid.
47. (i) What is Fehling solution?
 (ii) $O_2N - CH_2 - COOH$ has lower Pka value than CH_3COOH . Why?
 (iii) Predict the product of the following reaction.
 $CH_3COONa \xrightarrow[\text{CaO}]{\text{NaOH}} ?$
48. (i) What is vinegar?
 (ii) Formic acid reduce Tollens reagent but acetic acid does not.
49. How will you convert:
 (i) Propanone to Propan 2 – ol.
 (ii) Benzal dehyde to m – nitrobenzaldehyde
 (iii) Benzal dehyde to 3 – phenylpropan 1- ol.
50. Write short notes on the following
 (i) Decarboxylation reaction
 (ii) Hunsdiecker reaction.
51. Give at least one chemical test to distinguish between
 (i) Phenol and benzoic acid
 (ii) Acetic acid and acetone.
 (iii) Acetic acid and acetaldehyde.
 (iv) Benzal dehyde and benzoic acid.

Organic Chemistry Containing Nitrogen

52. Account for the following:-
 (i) Ethyl amino is soluble in water whereas aniline is not.
 (ii) Aniline does not undergo friedel craft reaction.
 (iii) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.
53. Write short notes on the following:
 (i) Carbylamine reaction
 (ii) Hofmann bromide reaction

- (iii) Coupling reaction.
54. Complete the following



Biomolecules

55. What are reducing and non reducing sugar?
56. What are the hydrolysis product of
(a) Sucrose, (b) Lactose.
57. Why cannot vitamin C be stored in our body?
58. Define the following as related to proteins:
(i) Peptide Bond, (ii) Primary structure, (iii) Denaturation.
59. What happens when D – Glucose is treated with the following reagents?
(a) HI, (b) Bromine water, (c) HNO_3
60. Write the important structural and functional difference between RNA and DNA.

Polymers

61. Give the difference between addition polymers and condensation polymers with examples.
62. How can you prepared.
(a) Nylon 66
(b) Nylon 6.10
(c) Terylene
(d) Buna N and Buna S
(e) Neoprene
(f) Natural rubber

Chemistry in everyday life

63. Why do we require artificial sweetening agents?
64. What is tincture of Iodine? What is its use?
65. What are food preservatives?
66. What is meant by the term broad spectrum antibiotics? Explain.