

## CHEMISTRY - II YEAR

### LAQ's: (8 Marks)

1. Give the applications of Kohlrausch's law of independent migration of ions. (Ch.no 3, Q.No. 48)
2. Discuss the effect of temperature on the rate of a reaction. Derive necessary equations in this context. (Ch.no 3, Q.No. 46)
3. How is ammonia manufactured by Haber's process? Explain the reactions of ammonia with  
 a)  $ZnSO_{4(aq)}$                       b)  $CuSO_{4(aq)}$                       c)  $AgCl_{(s)}$  (Ch.no 6, Q.No. 53)
4. Explain in detail the manufacture of sulphuric acid by contact process. (Ch.no 6, Q.No. 42)
5. How is ozone prepared from oxygen? Explain its reaction with  
 a) Pbs                      b) KI                      c) Hg                      d) Ag (Ch.no 6, Q.No. 32)
6. How is chlorine prepared by electrolytic method? Explain its reaction with  
 a) NaOH                      b)  $NH_3$  under different conditions (Ch.no 6,, Q.No. 40)
7. How are  $XeF_2$ ,  $XeF_4$  and  $XeF_6$  prepared? Explain their reaction with water? Discuss their structures? (Ch.no 6, Q.No. 28)
8. Explain the mechanism of Nucleophilic bimolecular substitution ( $S_N^2$ ) reaction with one example. (Ch.no 11, Q.No. 23)
9. With a suitable example write equations for the following: (Ch.no 12, Q.No. 28)  
 i) Kolbe's reaction    ii) Reimer-Tiemann reaction    iii) Williamson's ether synthesis    (iv) Esterification reaction
10. Describe the following (Ch.no 12, Q.No. 66)  
 i) Acetylation                      ii) Cannizzaro reaction                      iii) Cross aldol condensation    iv) Decarboxylation
11. Complete the following conversions: Aniline to i) Fluorobenzene    ii) Cyanobenzene (Ch.no 13, Q.No. 32)
12. Explain the following terms. Give an example of the reaction in each case.  
 i) Cyanohydrin    ii) Acetal    iii) Semicarbazone    iv) Aldol    v) Hemiacetal    vi) Oxime (Ch.no 12, Q.No. 56)
13. How are the following conversions carried in not more than two steps?  
 i) Ethanol to 3 - hydroxybutanal                      ii) Bromobenzene to 1 - Phenylethanol  
 iii) Benzaldehyde to  $\alpha$  - Hydroxyphenylacetic acid    iv) Benzaldehyde to benzophenone (Ch.no 13, Q.No. 65)
14. Explain following with examples ?  
 i) Sandmeyer reaction                      (ii) Gatterman reaction                      (iii) Friedel -Crafts reaction    (iv) Hinsberg's reaction

### SAQ's: (4 Marks)

1. Derive Bragg's equation. (Ch.no 1, Q.No. 38)
2. Calculate the efficiency of packing in case of a metal body centered cubic crystal? (Ch.No. 1, Q.No. 27)
3. Describe the two main types of semi conductors and contrast their conduction mechanism. (Ch.No. 1, Q.No. 31)
4. What is meant by positive deviations from Raoult's law and how is the sign of  $\Delta_{mix} H$  related to positive deviation from Raoult's law? (Ch.no 2, Q.No. 31)
5. A solution of glucose in water is labeled as 10% w/w. What would be the molality of the solution? (Ch.no 2, Q.No. 25)
6. If the osmotic pressure of glucose solution is 1.52 bar at 300K. What would be its concentration if  $R = 0.083L \text{ bar mol}^{-1} K^{-1}$ ? (Ch.no 2, Q.No. 36)
7. Vapour pressure of water at 293K is 17.535mm Hg. Calculate the vapour pressure of the solution at 293K when 25g of glucose is dissolved in 450g of water. (Ch.no 2, Q.No. 37)
8. What are galvanic cell? Explain the working of a galvanic cell with a neat sketch taking Daniel cell as example. (Ch.no 3, Q.No. 33)
9. What are fuel cells ? How are they different from galvanic cell? Give the construction of  $H_2, O_2$  fuel cell. (Ch.No. 3, Q.No. 44)
10. What is metallic corrosion? Explain it with respect to iron corrosion. (Ch.No. 3, Q.No. 45)
11. Give the different types of batteries and explain the construction and working of each type of battery. (Ch.No. 3 Q.No. 49)
12. State and explain Nernst equation with the help of a metallic electrode and a non-metallic electrode. (Ch.no 3, Q.No. 35)
13. What is electrolysis? Give Faraday's first law of electrolysis. (Ch.no 3, Q.No. 41)
14. What is half-life ( $t_{1/2}$ ) of a reaction? Derive an equation which describes the effect of rise of temperature (T) on the rate constant (k) of a reaction. (Ch.no 3, Q.No. 39)
15. Describe the salient features of the collision theory of reaction rates of bimolecular reactions. (Ch.no 3, Q.No. 42)
16. What is "molecularity" of a reaction ? How is it different from the 'order' of a reaction? Name one bimolecular and one trimolecular gaseous reaction? ( Ch.No.3, Q.No.35)
17. Describe an integrated rate equation for a first order reaction? ( Ch.No.3, Q.No.37)

## Aimstutorial intermediate chemistry important question

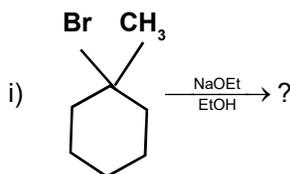
18. Calculate the emf of the cell with the cell reaction  $\text{Ni}_{(s)} + 2\text{Ag}^+ (0.002\text{M}) \rightarrow \text{Ni}^{2+} (0.160\text{M}) + 2\text{Ag}_{(s)}$   $E_{\text{cell}}^{\circ} = 1.05 \text{ V}$ .  
(Ch.no 3, Q.No. 60)
  19. What are different types of adsorption? Give any four differences between characteristics of these different types.  
(Ch.no 4, Q.No. 105)
  20. What is catalysis? How is catalysis classified? Give two example for each type of catalysis.  
(Ch.no 4, Q.No. 110)
  21. How are colloids classified on the basis of interaction between dispersed phase and dispersion medium?  
(Ch.No. 4, Q.No. 119)
  22. What are micelles? Discuss the mechanism of micelles formation and cleaning action of soap?  
(Ch.No.4, Q.No.153)
  23. What are emulsions? How are they classified? Describe the application of emulsions. (Ch.No.4, Q.No.155)
  24. Define Gold number. (Ch.no 4, Q.No. 139)
  25. Explain Zone refining (Ch.no 5, Q.No. 28)
  26. Giving examples to differentiate roasting and calcination. (Ch.no 5, Q.No. 32)
  27. Explain the extraction of zinc from zinc blende. (Ch.no 5, Q.No. 41)
  28. Explain the purification of sulphide ore by froth floatation method? (Ch.No.5, Q.No.37)
  29. How is copper extracted from copper pyrites? (Ch.No.5, Q.No.40)
  30. Explain the structures of (a)  $\text{BrF}_5$  and (b)  $\text{IF}_7$ . (Ch.no 6, Q.No. 33)
  31. What are interhalogen compounds? Give some examples to illustrate the definition. How are they classified?  
(Ch.no 6, Q.No. 36)
  32. What is lanthanoid contraction? What are the consequences of lanthanoid contraction?  
(Ch.no 7, Q.No. 76)
  33. Describe the preparation of potassium dichromate from iron chromite ore. (Ch.no 7, Q.No. 78)
  34. Give the geometrical shape of the following complex entities. (i)  $[\text{Co}(\text{NH}_3)_6]^{3+}$  (ii)  $[\text{Ni}(\text{CO})_4]$  (iii)  $[\text{PtCl}_4]^{2-}$  and (iv)  $[\text{Fe}(\text{CN})_6]^{4-}$ .  
(Ch.No.7, Q.No.87)
  35. Using IUPAC norms write the systematic names of the following (i)  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  (ii)  $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NH}_2\text{CH}_3)]\text{Cl}$  (iii)  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  (iv)  $[\text{NiCl}_4]^{2-}$   
(Ch.No.7, Q.No.93)
  36. Discuss the nature of bonding and magnetic behaviour in the following coordination entities on the basis of valence bond theory.  
(Ch.No.7, Q.No.104)
- |                                    |                            |                                                  |                            |
|------------------------------------|----------------------------|--------------------------------------------------|----------------------------|
| i) $[\text{Fe}(\text{CN})_6]^{4-}$ | (ii) $[\text{FeF}_6]^{3-}$ | (iii) $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$ | (iv) $[\text{CoF}_6]^{3-}$ |
|------------------------------------|----------------------------|--------------------------------------------------|----------------------------|
37. Explain Wemer's theory of coordination compounds with suitable examples. (Ch.no 7, Q.No. 86)
  38. Write the names and structures of the monomers of the following polymers  
(Ch.No 8, Q.No. 41)

(i) Buna-S	(ii) Buna-N	(iii) Dacron	(iv) Neoprene.
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  39. Write the names and structures of the monomers used for getting the following polymers.  
(Ch.no 8, Q.No. 40)

i) Polyvinyl chloride	ii) Teflon	iii) Bakelite	iv) Polystyrene
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  40. Write notes on Proteins. (Ch.no 9, Q.No. 65)
  41. Explain the structures of DNA and RNA. (Ch.no 9, Q.No. 67)
  42. Write notes on the functions of different hormones in the body. (Ch.no 9, Q.No. 68)
  43. Write a brief note on the structure of glucose (Ch.no 9, Q.No. 47)
  44. Write notes on vitamins. (Ch.no 9, Q.No. 56)
  45. What are analgesics? How are they classified? Give examples? (Ch.no 10, Q.No. 51)
  46. Write notes on antiseptics and disinfectants. (Ch.no 10, Q.No. 56)
  47. What are biodegradable and non-biodegradable detergents? Give one example for each. (Ch.no 10, Q.No. 62)
  48. Write notes on the following (i) Artificial sweetening agents (ii) Food preservatives (iii) Antioxidants in food.  
(Ch.no 10, Q.No. 69)
  49. Give the equations for the preparation of phenol from Cumene. (Ch.no 12, Q.No. 13)
  50. Write the mechanism of hydration of ethene to yield ethanol. (Ch.no 12, Q.No. 14)
  51. Predict the alkenes that would be formed in the following reactions and identify the major alkene



(Ch.no 11, Q.No. 16)

52. How will you carry out the following conversions?

i) Ethane to bromomethane

ii) Toluene to benzyl alcohol

(Ch.no 11, Q.No. 17)

## Aimstutorial intermediate chemistry important question

### INTEXT QUESTIONS:

1. Explain how much portion of an atom locate at  
 i) Corner                                      ii) Body - centre of a cubic unit cell is part of its neighbouring unit cell (Ch.no 1, Q.No. 13)
2. Calculate : (a) Molality      (b) Molarity and (Ch.no 2, Q.No. 5)  
 (c) mole fraction of KI if the density of 20% (mass/mass) aqueous KI is 1.202 g mL.
3. Why is N<sub>2</sub> less reactive at room temperature? (Ch.no 6, Q.No. 3)
4. Why is helium used in diving apparatus? (Ch.no 6, Q.No. 32)
5. Why cannot vitamin C be stored in our body? (Ch.no 9, Q.No. 6)
6. Arrange the following in increasing order of their basic strength (Ch.no 13, Q.No. 4)
  - i) C<sub>2</sub>H<sub>5</sub>, NH<sub>2</sub>, C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>, NH<sub>3</sub>, C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>NH<sub>2</sub> and (C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>NH
  - ii) C<sub>2</sub>H<sub>5</sub>NH<sub>2</sub>, (C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>NH, (C<sub>2</sub>H<sub>5</sub>)<sub>3</sub>N, C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>
  - iii) CH<sub>3</sub>NH<sub>2</sub>, (CH<sub>3</sub>)<sub>2</sub>NH, (CH<sub>3</sub>)<sub>3</sub>N, C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>, C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>NH<sub>2</sub>

### SOLVED PROBLEMS:

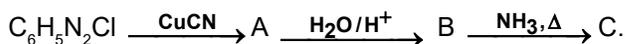
7. For NaCl, HCl and NaAc are 126.4, 425.9 and 91.0 S cm<sup>2</sup> mol<sup>-1</sup> respectively. Calculate  $\Lambda^{\circ}$  for HAc. (Ch.no 3, Q.No. 8,9,10)
8. The conductivity of 0.001028 mol L<sup>-1</sup> acetic acid is 4.95 x 10<sup>-5</sup> S cm<sup>-1</sup>. Calculate its dissociation constant if  $\Lambda^{\circ}_m$  for acetic acid is 390.5 S cm<sup>2</sup> mol<sup>-1</sup>.
9. A solution of CuSO<sub>4</sub> is electrolysed for 10 minutes with a current of 1.5 amperes. What is the mass of copper deposited at the cathode?

### VSAQ's: (2 Marks)

1. What is Schottky, defect? (Ch.no 1, Q.No. 15)
2. What is Frenkel defect? (Ch.no 1, Q.No. 16)
3. State Henry's law. (Ch.no 2, Q.No. 10)
4. What are isotonic solutions? (Ch.no 2, Q.No. 14)
5. Write the Nernst equation for the EMF of the cell Ni(s) / Ni<sup>2+</sup> (aq) // Ag<sup>+</sup> (aq) / Ag. (Ch.no 3, Q.No. 11)
6. How is Gibbs energy (G) related to the cell emf (E) mathematically? (Ch.no 3, Q.No. 14)
7. What is half-life of a reaction? Illustrate your answer with an example. (Ch.no 3, Q.No. 21)
8. What are pseudo first order reaction? Give one example. (Ch.no 3, Q.No. 24)
9. Give the signs of  $\Delta$  &  $\Delta S$ , when ammonia gas gets adsorbed on charcoal. (Ch.no 4, Q.No. 15)
10. Which zeolite catalyst is used to convert alcohols directly into gasoline? (Ch.no 4, Q.No. 41)
11. What are micelles? Give one example. (Ch.no 4, Q.No. 58)
12. What is critical micelle concentration [CMC] and Kraft temperature (T<sub>K</sub>)? (Ch.no 4, Q.No. 65)
13. What is dialysis? How is dialysis can be made fast? (Ch.no 4, Q.No. 69)
14. What is coagulation? (Ch.no 4, Q.No. 85)
15. Why is adsorption always exothermic (Ch.no 4, Q.No. 14)
16. Give the signs of  $\Delta H$  and  $\Delta S$ , When ammonia gas gets adsorbed on charcoal. (Ch.no 4, Q.No. 15)
17. Define flocculation value. (Ch.no 4, Q.No. 86)
18. State Hardy-Schulze rule. (Ch.no 4, Q.No. 87)
19. What is an emulsifying agent? (Ch.no 4, Q.No. 93)
20. Give the composition of the following alloys. (Ch.no 5, Q.No. 13)
  - i) Brass    ii) Bronze    iii) German Silver
21. What is matte? Give its composition. (Ch.no 5, Q.No. 18)
22. What is blister copper? Why is it so called? (Ch.no 5, Q.No. 19)
23. What is inert pair effect? (Ch.no 6, Q.No. 12)
24. A mixture of Ca<sub>3</sub>P<sub>2</sub> and CaC<sub>2</sub> is used in making Holme's signal - Explain. (Ch.no 6, Q.No. 22)
25. What is tailing of mercury? How is it removed? (Ch.no 6, Q.No. 16)
26. Explain the reactions of Cl<sub>2</sub> with NaOH. (Ch.no 6, Q.No. 15)
27. What is aqua regia? Write its reactions with gold and platinum. (Ch.no 6, Q.No. 18)
28. Describe the molecular shape of I<sub>3</sub><sup>-</sup>. (Ch.no 6, Q.No. 30)
29. What is mischmetal? Give its composition and uses. (Ch.no 7, Q.No. 47)
30. CuSO<sub>4</sub> · 5H<sub>2</sub>O is blue in colour where as anhydrous CuSO<sub>4</sub> is colourless. Why? (Ch.no 7, Q.No. 58)
31. What is Ziegler-Natta catalyst? (Ch.no 8, Q.No. 21)
32. What is PDI (Poly dispersity Index)? (Ch.no 8, Q.No. 28)
33. What is vulcanization of rubber? (Ch.no 8, Q.No. 29)
34. What is biodegradable polymer? Give one example of biodegradable polyester (Ch.no 8, Q.No. 31)
35. What do you understand by invert sugars? (Ch.no 9, Q.No. 14)

**Aimstutorial intermediate chemistry important question**

36. What is Zwitter ion? Give an example. (Ch.no 9, Q.No. 18)  
37. Define the term chemotherapy? (Ch.no 10, Q.No. 3)  
38. What are antagonists and agonists? (Ch.no 10, Q.No. 9)  
39. What are antacids? Give example. (Ch.no 10, Q.No. 11)  
40. What are disinfectants? Give example. (Ch.no 10, Q.No. 22)  
41. What is tincture of iodine? What is its use? (Ch.no 10, Q.No. 26)  
42. What are artificial sweetening agents? Give example. (Ch.no 10, Q.No. 30)  
43. What are food preservatives? Give examples. (Ch.no 10, Q.No. 35)  
44. How are synthetic detergents better than soaps? (Ch.no 10, Q.No. 42)  
45. Give the reagents used for the preparation of phenol from chlorobenzene. (Ch.no 11, Q.No. 4)  
46. Give structure of A, B and C in the following reaction (Ch.no 13, Q.No. 8)



47. What is HVZ reaction. Give example.  
48. Although electron gain enthalpy of fluorine is less negative as compared to chlorine, fluorine is a stronger oxidising agent than chlorine. Why? (Ch.no 6, Q.No. 15)

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