Long Questions (XI Chemistry)

1. Explain the paramagnetic and diamagnetic behavior of O_2 and N_2 by using MOT.
2. What is **hybridization**? Explain the hybridization in C_2H_6 **and** C_2H_4**.**
3. What are the causes of boiling point elevation? Why it is considered as a colligative property? Derive a relation to find out molecular mass of the solute.
4. How **Vander Waal's** corrected the general gas equation?
5. Define **Hess's law**. How **Born Haber's cycle** can be used to find out the lattice energies of ionic compounds. Explain your answer with reference to NaCl.
6. Define **hydrogen bonding** and **London dispersion forces**. Write down three applications of hydrogen bonding?
7. Define **Raoult's** law. Give its three different mathematical forms.
8. Define the following terms
   i. **Enzyme**   ii. **Activated complex**   iii. **Activation energy**
9. Define first law of thermodynamics and Prove that **W = -PΔV**
10. Differentiate between the following terms
    i. Hydration and hydrolysis   ii. solution and colloid
11. What are the properties of cathode rays?
12. What is the molar mass of 134g of a gas at -730C? The pressure of the gas is 10 atm and its volume is 5 dm3.
13. Explain SP_3 hybridization with reference to CH_4 molecule.
14. Why there is difference in the structure of CO_2 and SO_2. Although the molecular formula is same?
15. Write the postulates of Kinetic molecular theory.
16. Find out a relationship between Kp and Kc.
17. What is common ion effect? What are its applications?
18. What is SHE? Write down its importance.
19. Define first law of thermodynamics and Prove that ΔH=qp
20. Define and explain leveling effect.
21. Why depression in freezing point, of a solution, occurs? Derive an equation to
22. Find out the molecular mass of the solute.
23. Give only three daily examples of osmosis/ reverse osmosis.
24. NH_3 gas can be prepared by heating two solids NH_4Cl and $Ca(OH)_2$.
25. If a mixture containing 100 g of each solid is heated. Calculate the no of g of NH_3 produced.
26. What is a limiting reagent? How does it control rate of a reaction?
27. Discuss three energy rules used for filling of electrons in atomic orbitals?
28. Describe Raoult's law. How does this law discuss the ideality of a solution?
29. Derive Vander Waal's equation for calculating the P of real gases?
30. Explain the metallic bond in the light of different theories. Also explain the major properties of metals with reference to metallic bond.
31. Derive Arrhenius equation to show the relationship of Ea with T.
32. What is electro chemical series? Give its any three applications.

33. What is catalysis? Write down specific properties and types of catalysts?
34. Derive Vander Waal's equation for calculating the P of real gases?
35. Explain the metallic bond in the light of different theories. Also explain the major properties of metals with reference to metallic bond.
36. Give graphical explanation for elevation of boiling point of solution. Describe one method to determine the boiling point elevation of a solution.
37. Define and explain quantum numbers.
38. Derive the Bohrs equation to calculate the radius of nth orbit of hydrogen atom
39. What are the steps to identify the limiting reactant?
40. Write down the six properties of Cathode Rays.
41. Differentiate between hydrophilic and hydrophobic solutions.
42. Derive an equation to find out the depression in freezing point of solutions.
43. Derive an equation to find out the elevation in boiling point of solution.
44. What is solubility?. How it is affected by temperature?
45. What are the methods to prevent corrosion of metals?
46. What is electrochemistry? Explain the structure and functions of dry cell in detail.
47. What is fuel cell? How does it works and what are the advantages of fuel cells?
48. What is the difference between oxidation and reduction?. Also define oxidizing and reducing agent.
49. What are colloids? Explain the types of colloids.
50. What is the method to find out the lattice energy of ionic compounds? Find out the lattice energy of NaCl by using this method.
51. What is buffer solution? How it can be used to maintain the pH of a solution?
52. Derive a relation between pKa and pKb.
53. Explain in detail salt hydrolysis.
54. What is the effect of temperature and concentration on an exothermic reaction at equilibrium?
55. What is common ion? Write the industrial application of common ion.
56. How we can increase the yield of ammonia on industrial scale as the reaction of ammonia is reversible reaction?
57. What are the postulates of kinetic molecular theory?
58. Derive a relation between all the gas laws. How this equation can be used to find out the densities of the gases?
59. What is Graham's law of diffusion? Prove experimentally that gases with low molecular weights diffuse faster.
60. What quantum numbers? What is the application of principle and azimuthal quantum numbers?
61. Why nitrogen is diamagnetic while oxygen is diamagnetic?. Explain with reference to molecular orbital theory.
62. What are the applications of liquid crystals?
63. Derive a relation between Ka and Kb.
64. Derive a relation between Kp and Kx.
65. Derive a relation between Kx and Kn.