Second PUC Question Paper-MARCH/APRIL -2008
CHEMISTRY

PART-A
Note: i) answer all the questions. 10x1=10

1. Write the reaction which occurs in zone of combustion in the blast furnace during extraction of iron.
2. Name the first compound of a noble gas prepared by Bartlett.
3. Out of cobalt and zinc salts, which is attracted in the magnetic field ?
4. What is the pH of 0·5 M sulphuric acid ?
5. Why is the osmotic pressure of sodium chloride solution higher than glucose solution ?
6. Between aluminium chloride and potassium chloride, which one is required in minimum concentration to coagulate gold sol ?
7. Name the crystal lattice in sodium chloride crystal.
8. Write the IUPAC name of $(CH_3)_3N$
9. Name the substance to decolourise an oil.
10. What type of linkage is present between the polypeptide chains of Insulin ?

PART – B
Note: i) Answer any ten questions.
ii) Each question carries two marks. 10 × 2 = 20

11. At low temperature carbon monoxide is a better reducing agent than carbon. Explain with the help of Ellingham diagram.
12. Write the energy level diagram of Lithium molecule. Indicate the magnetic property of it.
13. What is Chiral carbon atom ? Write the structure of α D (+) Lactic acid.
14. Calculate the time required to liberate 56 cm^3 of hydrogen at STP, if 5 amperes of current flows.
15. What is the action of potassium hydroxide on potassium dichromate ?
16. Write the Haworth structure of a non-reducing sugar.
17. Define gold number. Why is Gelatin added to gold sol ?
18. What is the radius ratio-range of a BCC crystal ? Mention its coordination number and geometry.
19. Why do transition metals form complex compounds ?
20. Give a reaction to show that glucose contains
    i) five – OH groups
    ii) six carbon atoms in a straight chain.
21. 3 g of urea is dissolved in 9 g of water. Calculate the relative lowering of vapour pressure.
22. Identify the reagents A, B, C and D in the following conversions :

$$C_2H_6 \xrightarrow{A} CH_3CH_2Cl \xrightarrow{B} CH_3CH_2OH \xrightarrow{C} CH_3COOH \xrightarrow{D} CH_4$$

PART – C
I. Answer any two of the following questions : 2 × 5 = 10

23. a) Describe Parke's process of desilverisation of lead.
    b) Write the IUPAC names of the following :

i) $[Cu(NH_3)_2(H_2O)_2]Cl_2$

ii) $Na_3[Fe(Ox)_3]$.

24. a) Write the electronic configuration of oxygen molecule. Calculate the bond order. Between oxygen molecule and hydrogen molecule which is more stable and why ?
    b) What is a ligand ? Give an example of polydentate ligand. 3 + 2

25. a) How is pure potassium dichromate manufactured from chromite ore ?
b) Name a metal which shows photoelectric effect. 4 + 1

II. Answer any three of the following questions : 3 × 5 = 15

26. a) Explain the mechanism of sulphonation of Benzene.
b) What happens when acetaldehyde is treated with dil. NaOH solution ? Write the equation. 3 + 2
27. a) Write the equations for the following reactions :
i) Dry distillation of calcium acetate and calcium benzoate.
ii) Acetic acid is treated with phosphorus pentachloride.
iii) Phenol is treated with dil. Nitric acid.
b) Mention any two differences between mesomeric effect and inductive effect. 3 + 2
28. a) Explain the mechanism of S_N1 reaction.
b) Give a reaction to show that benzene contains three double bonds. Mention a test to indicate that these double bonds are different from those of alkenes. 3 + 2
29. a) What happens when Benzaldehyde is treated with strong solution of sodium hydroxide ? Explain the mechanism involved in the reaction.
b) What are drying oils ? What are the causes of it ? 3 + 2

III. Answer any three of the following questions: 3 × 5 = 15

30. a) For the first order reaction A → products, the initial concentration of A was found to be 9 mol/dm^3. After 30 minutes, the concentration was reduced to 4·5 mol/dm^3. Calculate the time required for 80% completion of the reaction.
b) The unit of velocity constant of a reaction is mol/dm^3/s. What is the order of the reaction ? 3 + 2
31. a) Explain the buffer action of a basic buffer solution.
b) For a process $H_2O(l) \rightarrow H_2O(g)$, $\Delta H^o = 44$ kJ and $\Delta S^o = 118{\cdot}8 \times 10^{-3}$ kJ K^{-1}. Calculate the temperature at which water vapour and water are at equilibrium. 3 + 2
32. a) Write the mathematical form of Ostwald's dilution law. Calculate the dissociation constant of 0·01 M acetic acid if the degree of dissociation at 25°C is 0·02. Also calculate $[H^+]$ concentration.
b) Describe Bredig's arc method for preparation of gold sol. 3 + 2
33. a) Explain the construction and working of Daniel Cell.
b) What is spontaneous process ? Why is melting of ice a spontaneous process though it is endothermic ? 3 + 2
34. a) Write an equation which relates the rate constant and temperature of a reaction. Name the reaction.
b) State van't Hoff-Charles law and write its mathematical form.
c) Give an example for Psuedo first order reaction. 2 + 2 + 1

PART – D

D 1

IV. Answer any one of the following : 1 × 10 = 10

35. a) With the help of VBT explain the hybridisation in tetracarbonyl nickel. Indicate the magnetic property of it.
b) Define solubility product. The solubility product of barium sulphate is $1{\cdot}2 \times 10^{-10}$. Calculate the solubility of barium sulphate in water.
c) How do you convert methyl amine to methyl isocyanide ?
d) What is Zwitterion ? Write the structure of Zwitterion of alanine. 3 + 3 + 2 + 2
36. a) Calculate the change in standard free energy for the cell
$Mg|Mg^{2+}||Ag^+|Ag$.
$E^o_{Ag} = 0{\cdot}8$ V and $E^o_{Mg} = -2{\cdot}37$ V.
b) Explain the following reaction with equations :
i) Kolbe's reaction
ii) Perkin's reaction.
c) How is helium separated from the mixture of noble gases by Dewar's method ?
d) Write Nernst equation. 3 + 4 + 2 + 1