CHEMISTRY MODEL QUESTIONS-2016-17

ONE MARK QUESTIONS

1 . HF is kept in wax coated bottles why?
2. Give an example of a) Micelles system and b) Macromolecular colloid.
3. Give reasons: NO_2 is paramagnetic while N_2O_4 is diamagnetic.
4. Why it is necessary to wash the precipitate with water before estimating it quantitatively?
5. Explain why vitamin C cannot be stored in our body?
6. What is meant by shape selective catalysis?
7. What type of semiconductor is obtained when Si is doped with As.
8. What is meant by 'limiting molar conductivity?'
9. Define the Activation Energy of a reaction.
10. What is difference between a mineral and ore?
11. What is meant by lanthanoid contraction?
12. What is smelting.
13 .Bleaching action of chlorine is permanent .Why
14. Molecularity never exceeds three. Why
15. What is electro osmosis?
16. What is chelating ligand?
17. Illustrate the geometrical isomers of
    (a) $Pt(NH_3)_4Cl_2$
18. Activation energy never became zero Why
19. What are the advantages of Fuel cell?
20. Bithional is added to soap why?
21. A compound contains two types of atoms X and Y. It crystallises in a cubic lattice with atom X at the comers of the unit cell and atoms Y at the body centers. What is the simplest possible formula of this compound?
22. Arrange the following according to increasing order of reactivity .Give reason.
    Propanone, Propanal, Benzaldehye, Acetophenone
23. How will you distinguish?
    (1)Propanal and Propanone
    (2) Benzaldehye, Acetophenone
24. The spin only magnetic moment of $[MnBr_4]^{2-}$ is 5.9 BM. Predict the geometry of the complex ion.
25. a) What are isotonic solutions

TWO MARK QUESTIONS

26. Explain ferro and anti-ferromagnetic material with example.
27 What are the difference between antiseptic and disinfectant?
28. Give reasons: The order of basicity of the following compounds in (i) gaseous phase and (ii) in
Aqueous solution $(CH_3)_3N$ $(CH_3)_2$ NH ,CH_3NH_2
29. Account for the following:
(a) Aniline does not undergo Friedel Crafts alkylation.
(b) Although – NH2 group is an ortho and para-directing group, nitration of aniline gives along with ortho & para-derivatives meta-derivation also.
30 State the following:-
    (i) Henry's law about partial pressure of a gas in mixture.
    (ii) Raoult's law in its general form in reference to solutions.

31. What do you understand by the 'order of a reaction'? Identify the reaction order from each of the following units of reaction rate constant :
(i) L^{-1}mol s^{-1} (ii) L mol^{-1} s^{-1}

32. Describe the principle involved in each of the following processes:
(a) Vapour phase refining of a metal (b) Zone refining of metal

33. Complete the following reactions :
(i) MnO_4^- (aq.)+$S_2O_3^{--}$(aq.) + $H_2O(l)$ ------->
(ii) $Cr_2O_7^{--}$ (aq.)+ Fe^{2+} (aq.)+ H^+ (aq.) ------>

34 Explain the following with suitable reason:
(i) Cu(I) is not stable in an aq. solution.
(ii) Unlike Cr^{3+}, Mn^{2+}, Fe^{3+}& subsequent other M^{2+} ions of the 3d series of the elements , the 4d and 5d series metals generally do not form stable cationic species

35. How would you account for the following?
(i) Transition metals are in general act as good catalyst.
(ii) Zr and Hf have similar size

36. Which compound in each of the following pair will react faster in S_N2 reaction with OH^- and why?
(i) CH_3Br or CH_3I (ii) $(CH_3)_3CCl$ orCH_3Cl.

THREE MARK QUESTIONS

37. What mass of NaCl must be dissolved in 65.0 g of water to lower the freezing point of water by 7.5°C ? The freezing point depression constant (K_f) for water is 1.86 C/m. Assume Van't Hoff factor for NaCl is 1.87
(Molar mass of NaCl = 58.5 g/mol).

38. Copper crystallises with fcc unit cell .if the radius of Copper atom is 127.8 pm, calculate the density of copper metal. (Atomic Mass of Cu = 63.55 &Avogadro No. = 6.02x 10^{23} mol^{-1})

39. Give reasons:
i. Phenol has higher boiling point than toluene.
ii. Unlike phenols, alcohols are easily protonated.

40. Write a note on:
i. Hoffmann bromamide reaction
ii. Sandmayers reaction

41. i. NaCl on heating in an atmosphere of Na becomes yellow in colour why
ii. Give the co-ordination number of atoms in ccp and bcc structures.

42.(a) Which is more effective in causing the coagulation of arsenic sulphide sol .Explain the rule behind it.

(a) NaCl (b) $CaCl_2$ (c) $Al_2(SO_4)_3$

43.Draw the structure of

(a) ClF_3 (b) BrF_5 (c) XeF_4 (d) $XeOF_6$

44. What are the differences between DNA and RNA

45. Give the mechanism of preparation of ethyl alcohol from ethene by acid catalysed hydration.

46. Although p-hydroxy benzoic acid is less acidic than benzoic acid, o-hydroxy benzoic acid is Sometimes more acidic than benzoic acid. Why?

47. Complete the following reactions:
a) $XeF_4 + SbF_6 \longrightarrow$
b) $XeF_4 + O_2F_2 \longrightarrow$
c) $XeF_4 + H_2O \longrightarrow$

48. Differentiate natural and vulcanized rubber.

49. If N_2 gas is bubbled through water at 293 K, then how many millimoles of N_2 gas would dissolve in 1 litre of water? Assume that N_2 exerts a partial pressure of 0.987bar. Given that Henry's law constant for N_2 at 293 K is 76.48 *k*bar.

50.a) Define coordination isomerism.

b) What is meant by linkage isomerism?

c) What is ionisation isomerism?

51. a) Why H_2S is less acidic than H_2Te?

b) Why Ozone is used for purifying air in crowded places such as cinema halls, tunnels, etc.

52. What are the difference between order and molecularity?

53. Define the following term: a) Rate law. b) Order of a reaction.

54. The thermal decomposition of HCOOH is a first order reaction with a rate constant of 2.4 x $10^{-3}s^{-1}$ at a certain temperature. Calculate how long will it take for three-fourth (3/4) of initial quantity of HCOOH to decompose?

55 Explain what is observed when:

(i) An electric current is passed through a sol.

(ii) A beam of light is passed through a sol.

(iii) An electrolyte (say NaCl) is added to ferric hydroxide sol.

56. How would you account for the following?

(a) NF_3 is an exothermic compound but NCl_3 is not.

(b) The acidic strength of compounds increases in the order: $PH_3 < H_2S < HCl$.

(c) SF_6 is kinetically inert.

57. Write the name, state of hybridization, the shape & magnetic behaviour of the following complexes.

(a) $[Cr(NH_3)_4Cl_2]Cl$ (b) $[Co(en)_3]Cl_3$ (c) $K_2[Ni(CN)_4]$

58. Explain the concentration of Galena.

59. State Kohlrausch law of independent migration of ions. Write an expression for the molar conductivity of Acetic acid at infinite dilution according to Kohlrausch law.

60. Write the order of the following reaction. Also derive an expression for the integrated equation.

$$C_2H_5OOCCH_3 + H_2O \longrightarrow C_2H_5OH + CH_3COOH$$

61. Copper crystallizes with fcc unit cell. if the radius of Copper atom is 127.8 pm , Calculate the density of copper metal .(Atomic Mass of Cu = 63.55&Avagadro No. = 6.02x 10^{23} mol^{-1})

62. When a chromite ore (A) is fused with sodium carbonate in free excess of air and the product is dissolved in water, a yellow solution of compound (B) obtained. When this yellow solution is treated with sulphuric acid compound (C) crystallizes from the solution. When compound (C) is treated with KCl orange crystals of (D) crystallize out. Identify A to D and explain the reaction.

63. (a)Transitional elements act as catalyst. Why

(b).Transitional elements form large no.of complexes. Why

64.(a) Chemisorption first increases and then decreases with temperature. Why.

(b) Explain Freundlich adsorption isotherm.

65. Explain the mechanism of enzyme catalysis.

66. Suggest method to refine zirconium .Explain the process.

67. A solution containing 3.24 g of a non-volatile and non-electrolyte solute and 200 g water boils at a temperature 0.130^{0} higher than the boiling point of pure water. What is the molar mass of the solute? Boiling point elevation constant for water is 0.52 K Kg/mol..

68. Using CFT draw the energy level diagram of CoF_6 and $Co(CN)_6$

69. A solution of copper sulphate is electrolysed for 10 minutes with a current of 1.5 A.What is the mass of copper deposited (At .wt of Cu =63.5)

70.(a).What are the difference between Physisorpton and chemisorption.

b.) Explain the effect of temperature on rate constant

71. A mixed oxide of iron and chromium FeOCr2O3 is fused with sodium carbonate in the presence of air to form a yellow coloured compound (A). On acidification the compound (A) forms an orange coloured compound (B) which strong oxidizing agent.

i. Identify the compound A and B.

ii. Write balanced chemical equation for each step.

72. An element X with an atomic mass of 60 g/mol has density of 6.23 g cm-3.

i. If the edge length of its cubic unit cell is 400 pm, then identify the type of cubic unit cell.

ii. Calculate the radius of an atom of this element.

73. How average rate different from instantaneous rate?

74.a) If a current of 1.50A was passed through an electrolytic cell containing AgNO3 solution with inert electrodes and the weight of Ag deposited was 1.50g, then how long did the current
flow?

75.a) What happens when D-glucose is treated with (i) HI (ii) HNO3

b) Name the disease of hardening of cornea in the eye. Which vitamin deficiency causes this?

76. Account for the following:

(a) What is misch metal.

(b) Highest oxidation state of a transition metal is witnessed in its oxide or fluoride only

(c) $La(OH)_3$ is more basic than $Lu(OH)_3$

77. Illustrate the splitting of degenerate d-orbital in a tetrahedral complex.

78.An optically active amino acid (A) can exist in three forms depending on the pH of the medium. If the molecular formula of (A) is $C_3H_7NO_2$ write

(i) Structure of compound (A) in aqueous medium. What are such ions called?

(ii) In which medium will the cationic form of compound (A) exist?

(iii) On alkaline medium, towards which electrode will the compound (A) migrate in electric field?

79. Explain the following observation:

a) Ferric hydroxide sol gets coagulated on addition of sodium chloride solution.

b) Cottrell smoke precipitator is fitted at the mouth of the chimney used in factories.

c) Physical adsorption is multilayered, while chemisorption is monolayered.

80.a) What is the role of Benzoyl peroxide in polymerization of ethane?

b) What are LDPE and HDPE? How are they prepared?

81.a) Give IUPAC name and draw the structure of $Ni(CO)_4$.

b) Why $(CoF_6)^{-3}$ form outer orbital complex while $(Co(CN)_6)^{-3}$ forms inner orbital complex?

c) Draw structure of (i) Mer-triamminetrichloridocobalt (III) and (ii) Fac – triaquatrinitro – N – Cobalt.

82. Account for the following:

(i) Among the halogens F_2 is the strongest oxidizing agent?

(ii) Fluorine exhibits only – 1 oxidation state whereas other halogens exhibit higher positive oxidation states also.

(iii) Acidity of oxo acid of chlorine is $HOCl < HOClO < HOClO_2 < HOClO_3$

83. Explain the following
a.) Etards reaction.
b) Gatterman reaction
c) Finkelstein reaction
84. Account for:
(a) Chlorine water has both oxidizing and bleaching properties
(b) H_3PO_2 and H_3PO_3 act as good reducing agents while H_3PO_4 does not.
85. (a) Write the monomers of (a) Nylon 66 (b) Bakelite (c) Teflon
(b)What are the difference between thermoplastic and thermosetting plastics?
86. Give reason.
a. Nitrogen does not forms pentahalides.
b. PCl_5 act as a chlorinating agent.
c. Sulphur in vapour form is paramagnetic in nature

5MARKS QUESTIONS

87. An organic compound A(C_6H_6O) on reaction with NaOH and CO_2 at 400K gives a compound B which on acidification gives C .C on reaction with acetic anhydride gives a compound D ,which is a popular pain killer.Identify A,B,C and D.Write the reaction also.
88. An organic compound 'A' with molecular formula C_8H_8O gives positive DNP and iodoform tests. It does not reduce tollen's or fehling's reagent and does not decolourise water also. On oxidation with chromic acid (H_2CrO_4) it gives a carboxylic acid (B) with molecular formula $C_7H_6O_2$. Deduce the structure of A and B.
89. An unknown Aldehyde 'A' on reacting with alkali gives a β-hydroxy-aldehyde, which losses water to form an unsaturated aldehyde, 2-butenal. Another aldehyde B undergoes disproportionation reaction in the presence of conc. Alkali to form products C and D. C is an aryl alcohol with the formula C_7H_8O.
(i) Identify A and B.
(ii) Write the sequence of reactions involved.
(iii) Name the product when B reacts with zinc amalgam and hydrochloric acid.
90.a) An aldehyde X having molecular formula $C_{11}H_8O$ does not undergo self-aldol condensation, but gives benzaldehyde and two moles of Y on ozonolysis. The compound Y on oxidations gives oxalic acid. Identify X and Y.
b) A primary halide A having molecular formula C_4H_9Br react with hot alcoholic KOH to give compound B which react with HBr to form C, an isomer of A. When A react with Na metal, it gave a compound D having molecular formula C8H18 which was different than the compound when butyl bromide was reacted with Na. Give the structural formula of A and write equations for all the steps
91.a) Explain the term 'Effective collisions of molecules'
b) Give one example of Pseudo first order reaction.
c) If the rate of a reaction quadruples when the temperature changes from 293K to 313K. Calculate activation energy of the reaction assuming that it does not change with temperature.
92.Arrange the following according to increasing order of reactivity towards SN2 displacement by givingreason.
2 – bromopentane, 1 – bromopentone, 2-bromo-2-methylbutane

93.a) What happens when D-glucose is treated with (i) HI (ii) HNO3
b) Name the disease of hardening of cornea in the eye. Which vitamin deficiency causes this
(b) Highest oxidation state of a transition metal is witnessed in its oxide or fluoride only
(c) Zirconium and Hafnium exhibit similar properties.
94. Illustrate the splitting of degenerate d-orbital in a tetrahedral complex

95. a) An organic compound X ($C_3H_8O_2$) on treatment with Zn – Hg/HCl gets reduced to n-pentane. The compound X forms a dioxime with hydroxylamine and gives a positive iodoform test and Tollen's test. Identify the compound X and deduce its structure.

b) Convert the following:

i. Ethyl benzene to benzene

ii. Acetaldehyde to butane -1, 3-diol

iii. Acetone to propene

96(a) Draw the structures of following molecules

(i) H_3PO_4 (ii) $H_2S_2O_7$

(b) Complete the following reactions :

(i) $HgCl_2 + PH_3$ ---------->

(ii) $SO_3 + H_2SO_4$ ---------->

(iii) $XeF_4 + H_2O$ ---------->

97(a) what happens when :

(i) Cl_2 gas is passed through a hot conc. solution of NaOH.

(ii) SO_2 gas is passed through an aq. Solution of Fe (III) salt.

(b) Answer the following :

(i) What is the basicity of H_3PO_3 and why ?

(ii) Why does fluorine does not play the role of central atom in interhalogen compounds?

(iii) Why do noble gases have very low boiling points ?

98. A voltaic cell is set up at 25 ^oC with the following half cells :

Al / Al^{3+} (0.001 M) and Ni / Ni^{2+} (0.50 M)

Write an equation for the reaction that occur when the cell generate an electric current and determine the cell potential. ($E^o_{Ni^{2+}/Ni} = -0.25$ V and $E^o_{Al^{3+}/Al} = -1.66$ V)

99.The following rate data were obtained at 303K for the following reaction.

$$2A + B \longrightarrow C + D$$

Expt.	Conc.of A	Conc. of B	Initial rate of formation of D
1	0.1	0.1	6.0×10^{-3}
2	0.3	0.2	7.2×10^{-3}
3	0.3	0.4	2.88×10^{-2}
4	0.4	0.1	2.4×10^{-2}

1.) What is the order with respect to each reactant?

2.) What is the rate law?

3.) Calculate the rate constant.

4.) Write the unit

100. Explain the following reactions .

(a) Reimer-Tiemann reaction (c) Williamson's synthesis (d) Kolbe's reaction.