Sample Paper – 2013
Class – XII
Subject – Chemistry

GENERAL INSTRUCTIONS:

* Answer all the questions:

* Questions 1 to 8 carry one mark each. Answer them in one word or a sentence.

* Questions 9 to 18 carry 2 marks each. Answer them in 20 to 30 words.

* Questions 19 to 27 carry 3 marks each. Answer them in 40 to 50 words.

* Questions 28 to 30 carry 5 marks each. Answer them in 70 words.

* There is no overall choice. However there is internal choice in one question each of two mark and three marks questions. All 5 marks questions have internal choice.

* Calculator or any other electronic items are not allowed. However logarithm book may be used for calculations.

1. What is the number of atoms per unit cell in a body centered cubic structure ? (1)

2. Two liquid A and B boils at 145°C and 190°C respectively. Which of them has a higher vapour pressure at 80°C. (1)

3. Define molar conductivity. Write the unit of molar conductivity. (1)

4. What is meant by elementary reaction ? (1)

5. Give the IUPAC name of the compound $CHF_2CBrClF$. (1)

6. Give one chemical test to distinguish the following compounds. ethanol and phenol. (1)

7. Convert Benzene to m-nitroacetophenone. (1)

8. Mention a chemical property in which methanoic acid differs from aceticacid. (1)

9. State Henry's law of solubility of a gas in a liquid.Give the significance of Henry's law constant. (1+1)

10. A 5% solution (by mass) of cane sugar in water has freezing point of 271K.Calculate the freezing point of a   5% glucose in water if freezing point of pure water is 273.15K. (2)

11. How does molar conductivity vary with concentration for i)weak electrolyte and for

   ii) strong electrolyte. Give reason for these variation. (1+1)

12. Calculate the emf of the cell

 $Mg(s)/Mg^{2+}(0.01M) // Cu^{2+}(1 \times 10^{-3}M)/ Cu(s)$

 Given : $E° Cu^{2+}/ Cu(s) =+ 0.34$ V, $E° Mg(s)/Mg^{2+}= -2.36$ V. (2)

13. What are pseudo unimolecular reaction ? Give an example. (1+1)

14. A reaction is first order in A and second order in B :

   i) Write differential rate equation.

   ii) How is the rate affected on increasing the concentration of B three times? (1+1)

15. Explain the following terms :

   i) Hardy-schulze rule.

ii)Electrophoresis.   (1+1)

16. Explain what is observed when,

   i)The path of the light becomes visible when it is passed through As_2O_3 sol in water.

   ii)an electrolyte NaCl is added to ferric hydroxide sol.   (1+1)

17. What are essential and non-essential amino acids? Give two examples of each type ?

                OR

    What is the difference between a nucleoside and a nucleotide?   (1+1)

18. What is isoelectric point of aminoacid ? How does it help in the separation of amino acid?   (1+1)

19. Calculate the density of silver which crystallizes in the face-centered cubic structure. The distance

between the nearest silver atoms in this structure is 287 pm.(Molar mass of Ag =107.87 g mol^{-1},

N_A =6.02 x 10^{23} mol^{-1})   (3)

                OR

    Analysis shows that nickel oxide has formula $Ni_{0.98}O_{1.00}$. What fractions of the nickel exist as Ni^{2+}

and Ni^{3+}ions?

                                                                              (3)

20. The choice of a reducing agent in a particular case depends on thermodynamic factor. How far do

you agree with this statement ?Support your opinion with two examples.   (1+2)

21. Give reason for each of the following :

   i) Bond dissociation energy of F_2 is less than that of Cl_2.

   ii) Interhalogen compounds are strong oxidizing agents.

   iii) Suphur disappears when boiled with an aqueous solution of Na_2SO_3.   (1+1+1)

22. What is crystal field splitting energy ? How does the magnitude of Δ_o decide the actual configuration

of d- orbitals in a co-ordination entity ?   (1+2)

23. Primary alkyl halide(A) C_4H_9Br reacted with alcoholic KOH to give compound (B).Compound (B) is

    reacted with HBr to give(C) which is a isomer of (A).When (A) was reacted with sodium metal it gave

a compound (D)C_8H_{18} that was different than the compound when n-butyl bromide was reacted with

    sodium.Give the structural formula of (A) and write the equations for all the reactions.   (3)

24 . i) Write the mechanism of acid dehydration of ethanol to yield ethene.

    ii)Explain why o-nitro phenol more steam volatile than p-nitro phenol.   (1+2)

25. Give reason for the following :

   i) Primary amines are higher boiling point than tertiary amines .

   ii) Aliphatic amines are stronger bases than aromatic amines.

   iii)Amines are basic substances while amides are neutral.   (1+1+1)

26. i) What is meant by co-polymerisation ?Give an example.

   ii) Write the names and structures of monomer for getting the following polymers:

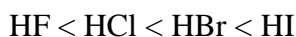   a) PVC b) PMMA   (2+1)

27. i)How are antiseptics distinguished from disinfectants ?Give two examples of each.

   ii)Which forces are involved in holding the drugs to the active site of enzyme?   (1+2)

28.a) Assign reasons for the following:

  i) In solid state PCl_5 behaves as an ionic species.

  ii) The acid strength of acids increases in the order

    HF < HCl < HBr < HI

  iii) SiF_6^{2-} is known but $SiCl_6^{2-}$ is not known.

   b) i) Draw the structure of XeF_2 molecule.

    ii) Write the outer electronic configuration of Cr atom. (z=24).   (3+2)

          (OR)

    a) Account for the followimg

    i) PH_3 has lower boiling point than NH_3.

    ii) Sulphur is a solid but oxygen is a gas at room temperature.

    iii) Phosphinic acid behaves as a monoprotic acid.

   b) Draw the structure of the following

  i) XeO_3 ii) $XeOF_4$ (3+2)

29. a) Assign reasons for the following:

  i) Transition metal ions are usually coloured

  ii) Transition elements and their compounds exhibit paramagnetic behaviour

  iii) Transition metals form an interstitial compounds

  b) What is the effect of increasing pH of a solution of potassium dichromate?   (3+2)

         (OR)

 a) Account for the following:

i) Transition elements exhibit higher enthalpies of atomization.

ii) Of the d_4 species, Cr_{2+} is strongly reducing while Manganese (III) is strongly oxidizing.

iii) Cobalt(III) is stable in aqueous solution but in the presence of complexing reagents, it is easily

oxidized.

  b) Write chemical equations for the reactions involved in the manufacture of potassium permanganate

from pyrolusite ore.   (3+2)

30. a) Describe the following reactions:
  i) Cannizaro reaction.
  ii) HVZ reaction
  iii) Rosenmunds reduction
  b) Give chemical test to distinguish between:
  i) Acetaldehyde and benzaldehyde
  ii) Benzaldehyde and benzoic acid.   (3+2)
       (OR)
  a) Write notes on:

i) Aldol condensation
ii) Clemmenson's reduction
iii) Decarboxylation.
b) How will you bring about the following conversions?
i) Benzene to Acetophenone.
ii) Propene to Acetone.   (3+2)