St. Xavier's Sr. Sec. School
Delhi-54

Final Examination in CHEMISTRY
Std. 11

23-2-2017

M. Marks : 70
Time : 3 hrs.

Roll No:

| Total printed pages | : | 03 |
| Total printed questions | : | 26 |

General Instructions:
i)   Question numbers 1 to 5 carry 1 mark each.
ii)   Question numbers 6 to 10 carry 2 marks each.
iii)   Question numbers 11 to 22 carry 3 marks each.
iv)   Question number 23 carry 4 marks.
v)   Question numbers 24 to 26 carry 5 marks each.
vi)   Use log tables if necessary.

1.   What are Lewis bases? Give an example.   1

2.   Give the cell representation for the electrochemical reaction,
          $Cu + 2Ag^+ \rightarrow Cu^{2+} + 2Ag$ 1

3.   Name the group 2 element which shows diagonal relationship with Aluminium.   1

4.   What is inert pair effect?   1

5.   Define molarity.   1

6.   Give IUPAC name for the following compounds:

a) $CH_3 - \underset{\underset{NO_2}{|}}{CH} - CH_2 - \underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_3$ b) $CH_3 - CO - CH_2 - CH_2 - CH_2 - COOH$ 2

7.   Draw the structures of following compounds: 2
a)   Hex-3-en-1-oic acid   b)   4-Hydroxy-3-methoxybenzaldehyde

8.   Give one chemical reaction each to illustrate the following: 2
a)   Decarboxylation   b)   peroxide effect
                                   (OR)
-OH group in phenol is ortho-para directing and activating. Explain with the help of resonance structures.

9.   Complete the following reactions: 2
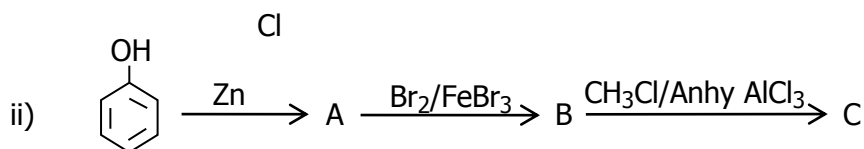a) $Mg + N_2 \rightarrow$ b) $LiNO_3 \xrightarrow{\Delta}$

10. Explain the following: 2
    a) Boron does not form B^{3+} ions.
    b) Carbon shows catenation but silicon does not.

11. Ethyl acetate is formed by the reaction between ethanol and acetic acid

    $$CH_3COOH_{(l)} + C_2H_5OH_{(l)} \rightleftharpoons CH_3COOC_2H_{5(l)} + H_2O_{(l)}$$

    a) At 293K, if one starts with 1.00 mol of acetic acid and 0.18 mol of ethanol there is 0.171 mol of ethyl acetate in the final equilibrium mixture. Calculate the equilibrium constant.
    b) Starting with 0.5 mol of ethanol and 1 mol of acetic acid, 0.214 mol of ethyl acetate is found after sometime. In which direction reaction will proceed to attain equilibrium 3

12. a) Explain the effect of:
    i) Increasing temperature   ii) decreasing pressure
    on the equilibrium.

    $$N_2 + 3H_2 \rightleftharpoons 2NH_3 + 92.4KJ$$

    b) Chemical equilibrium is dynamic in nature. Explain. 3

13. a) Calculate the pH of 0.03M HCl solution.
    b) Lead chloride has a solubility product of 1.75×10^{-5} at 298K. Calculate its solubility at this temperature. 3

14. a) The standard electrode potentials of a few metals are given

    Al(-1.66V), Cu(+0.34V), Li(-3.05V), Ag(+0.80V), Zn(-0.76V)

    Arrange the metals in the increasing order of reducing power.

    b) Is it safe to stir 1M $AgNO_3$ solution with copper spoon? Explain. 3
    $(E^o{}_{Ag^+/Ag} = 0.80V, E^o{}_{Cu^{2+}/Cu} = 0.34V)$

15. Give the mechanism of nitration of benzene. 3

16. In Dumas method for estimation of nitrogen 0.30g of an organic compound gave 50ml of nitrogen collected at 300K and 715 mm pressure. Calculate the percentage composition of nitrogen in the compound. (Aqueous tension at 300K is 15mm, atomic mass of Nitrogen=14) 3

    (OR)
    a) Identify the type of isomerism shown by CH_3CH_2OH. Give the formula of the isomer.
    b) What are free radicals? Give the order of stability of free radicals.
    c) The boiling points of alkanes decrease with branching. Explain.

17. Predict A, B and C in the following reactions: 3
    i) $CH_3 - CH_2 - CH - CH_3 \xrightarrow{\text{alc KOH}} A \xrightarrow{\text{HBr}} B \xrightarrow{\text{Na}} C$

ii) [benzene ring with OH group] $\xrightarrow{\text{Zn}}$ A $\xrightarrow{\text{Br}_2/\text{FeBr}_3}$ B $\xrightarrow{\text{CH}_3\text{Cl/Anhy AlCl}_3}$ C

18. Give reason for the following: 3
    a)   Magnesium does not impart flame colouration.
    b)   Alkali metals have low melting and boiling points.
    c)   Lithium differs in its properties from the rest of the members of the group.

19.   a)   Why $PbCl_4$ is less stable than $SnCl_4$?
    b)   How would you explain the lower atomic radius of Gallium as compared to Aluminium.

    c)   Complete the reaction: $H_3BO_3 \xrightarrow{\Delta}$ 3

20.   Calculate the concentration of nitric acid in moles per litre in a sample which has a density, 1.41g/ml and mass percent of nitric acid in it being 69%.   (Atomic mass N=14, H=1, O=16)

3

21.   a)   Among the second period elements, the actual ionization energies are in the order

            Li < B < Be < C < O < N < F < Ne.

          Explain why   i)   Be has higher ionization enthalpy than B.
                    ii)   Oxygen has lower ionization enthalpy than nitrogen and fluorine.
    b)   Define electronegativity.   3

22.   a)   Which of the following has largest and smallest size?
          Mg, Mg^{2+}, Al, Al^{3+} (At. No. Mg=12, Al=13)
    b)   Give general electronic configuration of d-block elements. Also give the orbital electronic configuration of $_{29}Cu$.   3

23.   The process of electrolysis has immense industrial applications like electrorefining of metals, electrolysis, etc. The principle is used for electroplating also.
    a)   What is an electrolytic cell?
    b)   Name the electrode which carry negative charge.
    c)   Can graphite be used as an electrode? Why?
    d)   Give one difference between electrolytic cell and electrochemical cell.   4

24.   a)   Explain the order of stability of carbocations, giving reason.
    b)   How the presence of carbon in an organic compound be detected?
          Give reaction for the process.
    c)   In Sulphur estimation 0.157g of an organic compound gave 0.4813g of barium sulphate. What is the percentage of sulphur in the compound?

(Atomic No. Ba=137, S=32, O=16).

(OR)

a) Explain resonance effect with the help of an example.

b) Give one example each for the following reactions:

   i) Nucleophilic substitution   ii) Electrophilic addition reaction

c) In carius method of estimation of halogen, 0.15g of an organic compound gave 0.12 of AgBr. Find the percentage of bromine in the compound.
   (Atomic Mass Ag=108, Br=80)   5

25. a) Complete the following reactions:

   i)
   CH_3

   con. H_2SO_4 →

   ii) $CH_3 COO Na + H_2O$ —electrolysis→
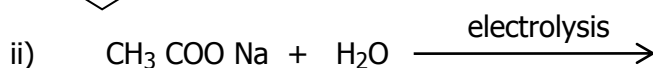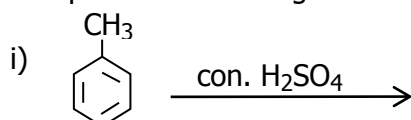
b) The reductive ozonolysis of an alkene gave butanone and ethanal.
   Give the structure and IUPAC name of alkene.

c) How to convert ethyne to but-1-yne. Give chemical equation.

(OR)

a) Give a chemical test to distinguish between but-1-yne and but-2-yne.

b) How to bring about following conversions?
   i) Benzene to p-nitrobromobenzene
   ii) But-1-ene to butan-2-ol

c) What are Grignard reagents? How are they prepared? Give an example.   5

26. a) Give molecular orbital configuration, calculate bond order and predict magnetic nature of O_2. (Atomic No. O=8)

b) Explain sp^3d hybridization with the help of an example.

(OR)

a) Explain the shape of the following molecules on the basis of VSEPR theory

   (i) SF_6 (ii) NH_3

b) Arrange the following molecules in the increasing order of bond angle.
   H_2O, H_2S, H_2Se, H_2Te

c) Give the molecular orbital configuration of N_2 and calculate its bond order.
   (Atomic No. N=7, S=16)   5

-x-x-x-x-x-x-