Chemistry Set-3, NEB Grade XII

Time : 3 hrs **Full marks : 75**
Pass marks : 27

Group 'A'

Attempt any fifteen questions.[15x2 = 30]

1. Why silver ores are leached with metal cyanides for the extraction of silver?
2. What is meant by condensation polymer? Write an example of it.
3. Write the open chain structure of glucose and fructose.
4. What is a transition element? Mention two of its important characteristics.
5. Write the action of mercury with aqua regia.
6. What is soap? How is soap obtained from fat?
7. Give the name of any two insecticides with their chemical formulae.
8. Write an example of Diazotisation reaction.
9. Why does nitrobenzene undergo electrophilic substitution reaction in meta position.
10. Predict the major products of the following rx^{n}

    i) $(CH_3CO)_2O \xrightarrow[\Delta]{LiAlH_4}$ ii) $(CH_3COO)_2Ca \xrightarrow{\Delta}$
11. How does methanol reacts with

    i) Ammonia ii) Conc. NaOH
12. What is Williamson's etherification reaction?
13. Why is phenol more acidic than aliphatic alcohol?
14. Convert 1-chloropropane into 2-chloropropane.
15. Write rate expression for the following reaction

    $2N_2O_5 \rightarrow 4NO_2 + O_2$
16. Predict the criteria of spontaneity in light of entropy change.
17. Calculate the standard enthalpy of formation of water in the following reaction:

    $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$, ΔH = -136 KCal.
18. Predict whether the following reaction will occur spontaneously or not. Why?

    $Pb^{2+} + 2Ag \rightarrow 2Ag^{+} + Pb$ given $\varepsilon^{\circ}_{Ag^{+}/Ag}$ = 0.80V, $\varepsilon^{\circ}_{Pb^{2+}/Pb}$ = -0.13V.
19. Water is a lewis base as well as Bronsted acid. Explain.
20. What are the requisites for a substance to be a primary standard?
21. C in C_2H_2 gets SP hybridization, why?
22. Why is nitro group called an ambident group?

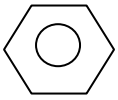
Group 'B'

Attempt any five questions. [5 x 5 = 25]

23. 4gm of NaOH was added to 20cc of 2N H_2SO_4 solution and the volume was diluted to one litre. Predict whether the dilute solution is acidic, basic or neutral and also calculate the resulting normality of the dilute solution in terms of g/litre.
24. Write any two applications of Hess's law. Heat of formation of ethyl alcohol, water and carbohydrate are -64.1 KCal, -68.5KCal and -95 Kcal. Calculate the heat of combustion of ethyl alcohol.
25. Describe Victor Meyer's method to distinguish primary, secondary and tertiary alcohols.
26. Laboratory preparation of formic acid.

27. Extraction of mercury from cinnabar.

28. Write the structure of organic compound A,B,C and in the following sequence of reactions.



$\xrightarrow[H_2SO_4]{HNO_3}$ A $\xrightarrow[Heat]{Sn/HCl}$ B $\xrightarrow[Heat]{CH_3Cl_3/KOH}$ C $\xrightarrow{H_2/Pd}$ D

Benzene

29. What is meant by electrochemical cell? Design a Galvanic cell in which the reaction takes place: $Zn(s) + 2Ag^+(aq) \rightarrow Zn^{2+}(aq) + 2Ag(s)$

Further predict:

a) Which of the electrode is negatively charged
b) The carriers of the current in the cell.
c) Individual reaction at each electrode.

Group 'C'

Attempt any two questions. [2x10= 20]

30. State solubility product principle. What is the proper condition of precipitation of salt from its solution? Explain application of the solubility product principle and common ion effect. What is the minimum volume of water required to dissolve 1 gm of calcium sulphate at 298k? (Given, solubility product (k_{sp}) for $CaSO_4$ = 9.1 x 10^{-6}).

31. Describe the preparation of pure and dry chloroform in the laboratory. Give its reaction upon:

a) Heated silver
b) Aq. KOH
c) aniline in presence of aqueous NaOH

32. A) Define the terms:

i) First order reaction
ii) Rate law
iii) Effective collision
iv) Activation energy
v) Half-life period of a reaction
vi) instantaneous rate

B) The following data are given for the reaction.

$2X + Y \rightarrow$ product (Z)

Exp. No.	[X] mol L^{-1}	[Y] mol L^{-1}	Rate of formation (Z) mol $L^{-1}s^{-1}$
1.	0.1	0.1	7 x 10^{-3}
2.	0.3	0.2	8.4 x 10^{-2}
3.	0.3	0.4	3.36 x 10^{-1}
4.	0.4	0.1	2.8 x 10^{-2}

i) Calculate the order of reaction with respect to X & Y.
ii) Half-life of rx^n with respect to X.
iii) The rate of formation of 'Z' when [X] = 0.6 mol L^{-1} & [Y] = 0.3 mol L^{-1}.