NEB-GRADE XII
2079 (2022)

Chemistry

Grade Increment (Supplementary) Examination

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Time: 3 hrs.   **Full Marks: 75**

Attempt **all** the questions.

Group 'A'   11×1=11

Rewrite the correct options of each questions in your answer sheet.

1. What is the normality of 0.3M phosphorous acid (H_3PO_3)
   A) 0.1   B) 0.3   C) 0.6   D) 0.9

2. The solubility product of CaF_2 is $3.4×10^{-11}$. What is its solubility in 0.01M solution of Naf.
   A) $3.4×10^{-7}$ *mol l^{-1}*   B) $3.4×10^{-5}$ *mol l^{-1}*
   C) $3.4×10^{-2}$ *mol l^{-1}*   D) 3.4 *mol l^{-1}*

3. What would be the value of rate constant (k) if the concentration of reactant is increased by 'X'
   A) $\ln \dfrac{k}{x}$ B) $\dfrac{k}{x}$ C) $k+x$ D) k

4. For the equilibrium rxn. $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

   Which of the following condition are correct
   A) $\Delta H = O, \Delta S < O$ B) $\Delta H < O, \Delta S < O$
   C) $\Delta H > O, \Delta S > O$ D) $\Delta H > O, \Delta S < O$

5. Fuctional Isomer of methoxy ethane is,
   A) propanol   B) propanal
   C) propanone   D) propane

6. Which of the following metal is leached by cyanide process
   A) Ag   B) Na   C) Al   D) Cu

7. Nitrobenzene on reduction with Sn/HCl gives:
   A) 1,3- dinitrobenzene   B) nitrobenzene
   C) O-dinitrobenzene   D) Aniline

Contd...

8. What is the nature of the solvent used during the preparation of Grignard reagent.
   A) alkyl hallide   B) ester   C) dry ether   D) heat

9. Alcohol react with sodium metal then it gives sodium alkoxide and hydrogen gas it indicates:
   A) Acidic nature of alcohol   B) Basic nature of alcohol
   C) Nutral nature of alcohol   D) Amphoteric nature of alcohol

10. Ethanamide is obtained from ethanoic acid by the reaction of
    A) Conc. H_2SO_4 B) P_2O_5 C) NH_3 D) Anhy.$AlCl_3$

11. The iron pipes carrying drinking water are covered with Zinc to prevent from rusting this process is called...
    A) allow formation   B) Electroplating
    C) Galvanization   D) Electrifying

Group 'B'   8×5=40

12. Concentration of sulphuric acid solution can be determined with titration with primary standard sodium carbonate solution.
    a) Na_2CO_3 is considered as primary standard why ?
    ii) Which chemical indicator is suitable for this titration
    iii) If 10 cc of H_2SO_4 is complectly neutralized by 17cc of decinormal Na_2CO_3, what is normality of H_2SO_4 ?   (1+1+3)
    Or
    Calculate the enthalpy change for the rxn.
    $H_2C=CH_2(g) + H_2(g) \rightarrow H_3C-CH_3(g)$ the bond energies of C-H, C-C, C = C and H - H are 99, 83, 147 and 104 KCal/mol respectively.   5

13. Define Zero-order reaction. The following data are given for the reaction 2x+y→Products.

Exp.No	[X] *mol l^{-1}*	[Y] *mol l^{-1}*	Initial rate *mol $l^{-1}s^{-1}$*
1	0.1	0.1	$7×10^{-3}$
2	0.3	0.2	$8.4×0^{-2}$
3	0.3	0.4	$3.36×10^{-1}$
4	0.4	0.1	$2.8×10^{-2}$

    Calculate: i) The order with respect to X & Y
    ii) Half life of reaction with respect to X.
    iii) Rate formation of product when [X] = 0.6 mol l^{-1} and Y = 0.3 mol l^{-1}

14. Write any three important features of transistion metal, Cu^+ ion is transition metal but can't give colour why ?   (3+2)

Contd...

15. Copper II Sulphate crystals are commonly known as blue vitrol.
    i) How would you obtain for saturated $CuSO_4$ solution ? 1
    ii) Convert blue vitrol into red oxide. 2
    iii) Write any two application of blue vitrol. 2

16. Write down the Victor-Mayer's test of 1°, 2° and 3° alcohol. 5

Or

A carbonyl compound (M) is used as nail polish remover. The compound (M) contains three carbon atoms and it undergoes iodoform test.
    i) Identify the compound (M)
    ii) Write down a chemical rxn for the preparation of M.
    iii) How is (M) converted into propane ?
    iv) Predict the final product obtained when (M) is heated with CH_3MgI in presence of dry ether and following by hydrolysis ?
    v) Give a laboratory test reaction of carbonyl compound. (5×1)

17. $C_6H_5OH \xrightarrow{A} C_6H_6 \xrightarrow{B} C_6H_5CH_3 \xrightarrow{C} C_6H_5CHO$

    Choose corrent reagent (A), (B) and (C) in the above seaction sequence. How would you convert C_6H_6 into $C_6H_5N_2Cl$? 3+2

18. Write down any three method of preparation ethanoic acid. How is ethanoic acid converted into ethanamine ? 3+2

19. Write an example of each of the following reaction.
    i) Rosenmmund's Redction
    ii) Sandmayer's reaction
    iii) dehydrohologination
    iv) Carbylamine reaction
   v) Markovnikov's rule

Group 'C' 3×8=24

20. a) Derive relationship between P^H and P^{OH} and calculate the P^H of 10^{-3} M KOH. 4
    b) Write the application of common ion effect and solubility product principle in qualitative salt analysis. 4

Or

a) Calculate the enthalpy of combustion of methane if enthalpy of formation of methane, water and carbondioxide are-440, -72 and 93 KJ. 4
b) Standard electrode potential for the following electrode reaction at standard state is given 4

$Zn(s) \rightarrow Zn^{++}_{(aq)} + 2e, E^o Zn/2n^{++} = 0.76 V$

$Cu^{++}_{(aq)} + 2i \rightarrow Cu_{(s)}, E^o Cu^{++}/Cu = 0.34 V$
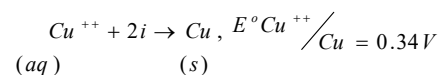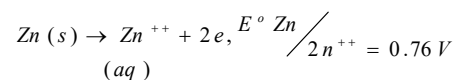
    i) Calculate emf of cell
    ii) What would be the ΔG for the reaction.
    iii) Can we store $CuSO_4$ solution in Zn-container.
    iv) Write the cell notation for the reaction

21. a) A Sweet smelling organic compounds (A) slowly oxidized by air in the presence of sunlight to give highly poisonous gas carbonyl chloride.
    i) Why above compound (A) stored in dark and brown bottle ?
    ii) Give principle reaction involved in the preparation of compound (A) from ethanol.
    iii) How would you convert compound (A) into (a) Chloretone (b) Chloropicrin (c) ethyne
    iv) Why the compound (A) cannot give white ppt whith $AgNO_3$ solution 1+2+3+2

Or

Give proper reason
    i) phenol is more acidic than aliphatic alcohol.
    ii) amino group is protected before nitration of aniline
    iii) Grigand reagent is stored in dry ether.
    iv) Willamson's etherification is useful for the preparation of both symmetrical and unsymmetrical ether. 2+2+2+2

22. a) What is meant by artificial radiovetivity ? Wirte an example of it. 2
    b) PVC and nylon-66 are two common polymers widely used in daily life.
        i) State the process of polymerization by which nylon-66 is formed. 1
        ii) Write down the chemical reaction to form PVC. 1
    C) i) Write down the importance of cement industry in Nepal. 3
        ii) Define the term clinker. 1

-0-

Contd...