



The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2076

Grade: - XII

Set – A

Full Marks:- 75

Stream: Science

Pass Marks:-30

Subject: - Chemistry

Time : 3hrs

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

Group A

Attempt any fifteen questions.

[15×2=30]

1. Is molarity of a solution always equal to normality? If not why? Explain with example.
2. Define the following terms: i) titration ii) titration error
3. 0.7 gm of an acid molecular weight 90 required 16.6 ml of N NaOH for complete neutralization. Calculate the basicity of acid.
4. What weight of $K_2Cr_2O_7$ (mol. Wt. = 294.10) should be dissolved to obtain 0.1N solution?
5. Define electrorefining. Write down the anode and cathode reactions during the electrolysis of $CuSO_4$ between impure Cu-anode and pure Cu-cathode.
6. Derive the relationship between λ_{eq} and λ_M .
7. Calculate the no. of atoms Sr obtained at cathode by the passage of 0.25F of electricity through fused $SrCl_2$.
8. The specific conductance of N/5 KCl solution at $25^\circ C$ is $0.00278 \text{ mho cm}^{-1}$. If the resistance of the cell containing this solution is 500 ohm. Calculate the cell constant.
9. Benzene is an aromatic compound while cyclo octatetraene is not. Justify it.
10. Why nitro group directs incoming substituent to meta position in electrophilic substitution reaction in nitrobenzene?
11. What happens when:
 - i) Sodium benzoate is heated with sodalime.
 - ii) Benzene is burnt with insufficient air.
12. Show your acquaintance with:
 - i) carbyl amine reaction ii) Rierner-Tiemann reaction.

13. Which of the following organic compounds responds to the iodoform test? Give reactions. a) propanal b) propanone.
14. Complete the reaction and give the name of A and B.
$$CH_3 - CH_2 - Br \xrightarrow{AgCN(aq)} A \xrightarrow{LiAlH_4} B$$
15. Starting from iodoethane how would you prepare: i) diethyl ether ii) ethanethiol.
16. Define ambident nucleophile. Give an attacking mechanism by taking $-NO_2$ as an example.
17. How can you prepare the both aldehyde and ketone from the oxidation of two positional isomer of C_3H_8O .
18. Explain :
 - a. Polarity of carbonyl group
 - b. Nucleophilic addition reaction is the chemical property of carbonyl compound.
19. What happens when aq. Blue vitrol is added to aq. Potassium iodide?
20. Convert metallic copper to blue vitrol and vice versa.
21. Give the molecular formula of:
 - i) Philosopher's wool
 - ii) calamine.Zn can displace Cu from copper sulphate solution? Why.
22. What is tailing of mercury? Hg is liquid metal, explain.

Group B

Attempt any five questions.

[5× 5=25]

23. Define end point and equivalence point. 12 cc of solution of HCl exactly neutralized 18 cc of solution of NaOH. 10 cc of the same HCl solution when treated with $AgNO_3$ gave 0.1435 gm of $AgCl$. Calculate the normality of NaOH and HCl. [2+3]
24. State and explain Faraday's 2nd law of electrolysis. Derive the relationship between ECE and E. [4+1]
25. How can you obtain benzene from ethyne? Discuss electrophilic substitution reactions of aromatic cyclohexatriene with reference to halogenation, alkylation, sulphonation and nitration giving reactions for each. [1+4]
26. How does chloroethane reacts with $NaCN_{(aq)}$ followed by subsequent hydrolysis and reduction. Starting from ethyl iodide how would prepare:
 - i) Ethyl acetate
 - ii) methanol
 - iii) diethyl zinc. [2+3]

27. The dehydrohalogenation of compound A gives an alkene B which on treating with O_3 , cyclic intermediate C is obtained. The intermediate C undergoes decomposition into D and E on heating with Zn/H_2O . If the compound D and E are the functional isomer of C_3H_6O , identify A,B,C,D and E with their IUPAC name and concerned chemical reaction.
28. Explain the principle and process sketching a well labeled diagram for the extraction of zinc from its ore. What happened when zinc is exposed to moisture? [4+1]
29. What is Nessler's reagent? How it is prepared? Write three methods of preparation of red oxide of copper. How does red oxide of copper reacts with dil. HNO_3 and conc. H_2SO_4 ? [1+3+1]

Group C

Attempt any two questions. [10× 2=20]

30. a) Define indicators. Describe the theory of selection of indicators in acid-base titration representing suitable titration curve.
- b) how many gms of Ag could be plated out on a serving tray by passing electricity through a solution of silver(I) salt for 8 hours at a current of 9 ampere? What is the area of tray if the thickness of Ag plating is 0.002 cm. (density of Ag = 10gm/cm^3 , at.wt of Ag = 108) [7+3]
31. describe the laboratory preparation of trichloromethane from ethanol and acetone using bleaching powder. How does chloroform react with
- acetone
 - air in presence of sun light
 - HNO_3
 - aq. NaOH .
- Describe in detail. [6+4]
32. Write short note on: (any two)
- primary and secondary standard solution.
 - variation of conductance with dilution
 - Functional group characterization by iodoform test.
 - Chemistry of calomel

The End



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Group A

Attempt any fifteen questions.

[15×2=30]

1. Phenolphthalein can't be selected as an indicator for titration between H_2SO_4 and Na_2CO_3 . Explain why? Which one is the suitable indicator?
2. Define the following terms? i) molarity ii) equivalence point.
3. Calculate the volume of 1M aq. NaOH solution that is neutralized by 200 ml of 2M aq. HCl and what mass of sodium chloride are produced?
4. What should be the molarity of solution prepared by diluting 250 ml of 0.4N H_2SO_4 with 1500 ml of water.
5. Define term electrolysis. Write down the anode and cathode reactions during the electrolysis of acidulated water.
6. Define specific conductance and molar conductance. Write the mathematical expression of molar conductance.
7. Chromium metal can be plated out from acidic solution containing CrO_3 according to the following equation:
$$\text{CrO}_3(\text{aq.}) + \text{H}^+ + \text{e}^- \longrightarrow \text{Cr}_{(\text{s})} + \text{H}_2\text{O}$$
How many grams of Cr will be plated by 2400C?(atomic mass of Cr = 52)
8. Calculate the equivalent conductivity of 0.01M acetic acid having sp. Conductivity $1.46 \times 10^{-4} \text{ ohm}^{-1} \text{ cm}^{-1}$.
9. Nitrobenzene is an aromatic compound, whereas BHC is not. Justify it.
10. Why halo group directs the incoming substituent to ortho and para position in electrophilic substitution reaction in haloarene?

11. What happens when:
 - i) Chlorobenzene is heated with Mg metal in presence of dry ether followed by hydrolysis.
 - ii) Benzene is treated with bromine in presence of Aluminium bromide.
12. Show your acquaintance with Hofmann's ammonolysis reaction.
13. Which of the following organic compounds respond to the iodoform test?
 - i) Methanol ii) propanone. Give the chemical reaction.
14. Complete the reaction and write the name of X and Y.
$$\text{CH}_3 - \text{CH}_2 - \text{I} \xrightarrow{\text{KCN}(\text{aq})} \text{X} \xrightarrow{\text{LiAlH}_4} \text{Y}$$
15. Starting from bromoethane how would you prepare:
 - i) Ethyl acetate ii) methanol
16. Write the chemistry about Saytzeff rule in dehydrohalogenation of alkyl halide.
17. Carbonyl compound undergoes nucleophilic addition reaction but haloalkane undergoes nucleophilic substitution reaction. Explain it.
18. Explain:
 - a. Aldehyde can easily oxidized than ketone.
 - b. Carbonyl compound are polar compound.
19. A compound A obtained by heating malachite dissolves in dil. H_2SO_4 to give a solution B that turns blue litmus to red. Identify A and B and write reactions.
20. What peculiar behavior does mercury has? Explain.
21. How would you obtain Schwitzer's reagent? Explain with chemical reaction.
22. Write reactions with zinc white with: a) ammonia solution b) Cobalt nitrate

Group B

Attempt any five questions.

[5× 5=25]

23. Define normality factor and decinormal solution. The density of commercial H_2SO_4 is 1.8 gm/ml. 10 ml of this acid was diluted to one litre. 10 ml of this acid required 30 ml of N/10 NaOH for complete neutralization. Find the % purity of commercial of sample of H_2SO_4 . [2+3]
24. Describe the variation of conductance with dilution.
25. How would you obtain benzene from sodium salt of benzoic acid? Explain why benzene undergoes electrophilic aromatic substitution reaction whereas alkenes undergoes addition reaction? Discuss directive influence of the substituents in benzene. [1+4]
26. How would you convert:
- Bromoethane to chloropropane
 - Iso-propyl chloride to n-propyl chloride
- How Grignard reagent is prepared? What precautions should be taken for preparation of Grignard reagent? How does it react with i) CH_3COCl ii) CO_2
27. The dehydrohalogenation of compound P gives an alkene Q which on treating with O_3 , cyclic intermediate R is obtained. The intermediate R undergoes decomposition into S and T on heating with $\text{Zn}/\text{H}_2\text{O}$. If the compound S and T are the functional isomer of $\text{C}_4\text{H}_8\text{O}$, identify P,Q,R,S and T with their IUPAC name and concerned chemical reaction.
28. Give an account of preparation properties and uses of mercuric chloride.
29. What do you mean by Zinc spelter and Lithopone? Explain. How will you obtain crystall of white vitrol? Discuss the electronic refinement of copper? [1+2+2]

Group-C

Attempt any two questions.

[10× 2=20]

30. i) How redox titration differs from acid-base titration? Describe the chemistry of redox titration in detail. Why oxalic acid crystal is regarded as primary standard substance? [1+5+1]

ii) In an industrial plant aluminium is produced by the electrolysis of alumina. This takes a current of ten thousands ampere. If the current efficiency is 90%, how much aluminium will produced per day? Calculate with concerned reaction in electrolysis. [3]

31. Describe the preparation of pure and dry trichloromethane in laboratory. Give its chemical action upon:

- Aniline in presence of aq. NaOH
- Heated silver
- Phenol in presence of alc. KOH

Write the chemical test of impure chloroform. [6+4]

32. Write short notes on: (any two)

- Titration curves
- Electrophilic substitution reactions in benzene
- Chemistry of Zinc white
- Principles of volumetric analysis.

The End