Chemistry XII

SET 1

Group 1, Very short questions (Any fifteen)   **15×2 = 30**

1. Predict the structure of methane using VSEPR theory?
2. Distinguish between end point and equivalence point of a titration.
3. Calculate the PH of 0.5 N sulphuric acid.
4. What do you mean by standard hydrogen electrode and mention one of its use?
5. Enthalpy of a reaction is a state function. Why?
6. What is the condition for the reaction to be spontaneous in the light of free energy change?
7. define the term a) instantaneous rate of reaction b) activation energy.
8. Benzene is an aromatic compound. Justify in tens of Huckel rule.
9. Starting from iodoethane, how would you prepare: propanoic acid and butane.
10. What happens when phenol is treated with nitrating mixture? Mention its one use.
11. prepare methoxy benzene using williamson's synthesis.
12. How is ethanal converted to propanone?
13. How would you convert benzoic acid to benzene?
14. Why is nitro group meta directing?
15. How does aniline react with a) aqueous bromine b) HNO_2 at low temperature.
16. What is saponification? Use this reaction for the preparation of 1,2,3-trihydroxy propantriol.
17. What is meant by peptide bond? Write and example of dipeptide.
18. Name any two synthetic polymer with the monomers used in it.
19. Write any two examples of azo - dyes with their formulas.
20. What is the effect of heat on copper sulphate penta-hydrate?
21. What are white vitriol, philosopher's wool, Rinman's green and white vitriol?
22. How would you convert calomel into corrosive sublimate and vice versa?

Group 2 Short questions (any five)

23. State faradays law of electrolysis and write the mathematical relationship between ECE and chemical equivalent. 1.52 g of trivalent metal was deposited at cathode by passing a current of 2.5 ampere through its salt solution (metal sulphate) for 30 minutes. What is the atomic mass of the metal?

24. What do you mean by enthalpy of combustion? Find the enthalpy of formation of benzene if enthalpy of water and carbon dioxide and benzene are -395 ,-285 kJ and 55 KJ respectively.

25. X g of metal (equ wt =12) was completely dissolved in 100 cc of N/2 HCl. The volume was then made up to 500 mL. 25 mL of the diluted acid required 30 mL of N/10 NaOH for complete neutralization. Find the value of X.

26. Give the chemical reaction involved in the synthesis of chloroform form ethanol. What happens when it is heated with silver powder? What happens when chloroform is reacted with phenol in the presence of base?

27. Carry out the following conversion:
    a) ethoxyethane to ethanoylchloride
    b) Ethoxyethane into methoxymethane

28. Show your familiarity with cannizaro's reaction and Perkin condensation reaction. What happens when propanone is treated with 2,4-DNPH?

29. Explain the principle and process, sketching the diagram for the extraction of zinc from the ore. What happens when it is exposed to moist air?

Group 3 Short questions (any two)

30. Write short notes on solubility product and its application in analytical chemistry. The solubility product of calcium hydroxide at 25oC is 4.42 x 10^-5. 500 mL of calcium hydroxide is mixed with equal volume of 0.4 m NaOH. How much calcium hydroxide is precipitated.

31. Describe the preparation of methanol acid in the laboratory. How would you dry it to obtain anhydrous acid? How does methanol acid react with i) methanol in acidic condition ii) fehling's solution iii) Conc. H_2SO_4.

32. How would pure nitrobenzene be prepared in the laboratory? Carry out the following conversion i) benzoic acid to p- amino benzoic acid ii) nitro benzene to p- hydroxy benzene

33. Write short notes on: (any two)
    a) Rusting of iron
    b) Separation of primary, secondary and tertiary amines by hoffmann method
    c) Separation of primary, secondary and tertiary alcohol by victor meyer method
    d) Factor affecting rate of reaction

SET 2

Group 1, Very short questions (Any fifteen)   **15×2 = 30**

1. The bond angle at the central atom in NF3 is 103 degree whereas BF_3 is 120 degree. What factor accounts for the difference in bond angle?

2. Define the following terms
   (a) gram/liter (b) normality (c) decinormal solution (d) molarity (e) molality (f) normality factor

3. Give with reason; is the solution of calcium chloride acidic, basic or neutral?

4. Define the term electrochemical equivalence.

5. State Hess law of constant heat summation. Why is enthalpy called state function?

6. What is entropy of a system? What is the change in entropy with increase in the temperature?

7. What is meant by half life of a reaction? The half life of two substance is 321 mim and 569 min. Which of these reaction is faster?

8. What is nitrating mixture? What is its action on benzene?

9. What happens when oxidation product of ethanol is treated with a compound obtained by reacting iodomethane with metal magnesium in dry ether.

10. How would you convert propan-1-ol to propane-2-ol ?

11. Write the unsymmetrical ether of C_3H_8O. How will you prepare this compound using williamson's synthesis?

12. How would you obtain 2-hydroxy-2-methyl propanoic acid from propanone?

13. Convert ethanoyl chloride to methanol

14. How can you convert nitrobenzene into p-amino phenol and hydrazobenzene respectively?

15. How can ethanamine be obtained from methanmine?

16. What are nucleic acids? Name any four nitrogen bases in nucleic acids.

17. Write two difference between RNA and DNA and draw the structure of ribose sugar.

18. Distinguish between antipyretic and analgesia drug with example.

19. What is meant by herbicide and insecticide? Give one example each.

20. A light blue coloured precipitate A obtained by the reaction of caustic soda and cupric sulphate is converted to black precipitate on heating. What are A and B?

21. Write the molecular formula of Mohr's salt and Green vitriol.

22. What happens when silver nitrate is heated?

23. Define acidimetry? A solution of Conc. HCl contains 38 % of acid by mass. What is the molarity of the solution if the density of the solution is 1.19 g/cc and what is the volume of HCl required to neutralize 1 L of 0.1 M NaOH solution?

24. What is meant by ehtanlpy of formation? Calculate the enthalpy of formation of ethane at 298 K if the enthalpy of combustion of C, H and ethane are -94.14, -68.47 and -373.3 Kcal respectively.

25. An organic compound A reacts with HCN to gov compound B. On hydrolysis of B in acidic medium compound C is produced. Compound A also produces propane when treated with zn amalgam in acidic medium. Identify A, B, C and give their IUPAC names. What would you expect as product when A is treated with trichloromethane in alkaline medium?

26. Describe the preparation of ethoxyethane in the laboratory.

27. Give suitable chemical reaction for the preparation of ethanal from i) ethyne ii) ethanoylchloride and iii) 1,1 dichloroethane

28. Give any two difference between electrochemical and electrolytic cell. You are provided with zinc and copper rod along with zinc sulphate and copper sulphate solution and the standard electrode potential of zinc and copper are -0.76 and 0.34 v respectively. Represent an electrochemical cell indicating anode and cathode. write net cell reaction. Calculate the emf of the cell.

29. Draw a neat labelled diagram for the extraction of pig iron using blast furnace. Write the important reaction involved at different zone.

EXpt no	X Mol/L	Y Mol/L	Rate of formation of z
1	0.1	0.1	$7X\ 10^{-3}$
2	0.3	0.2	$8.4\ X\ 10^{-2}$
3	0.3	0.4	$3.36X\ 10^{-1}$
4	0.4	0.1	$2.8X\ 10^{-2}$

30. Define the term i) first order of the reaction ii) effective collision iii) Activation energy iv) Rate law and v) instantaneous rate. The following data are given for the reaction $2X + Y \longrightarrow Z$. the data associated with the reaction are Calculate the order of reaction with respect X and Y. Half life of the reaction and rate of formation of Z when X =0.6 mol/L and Y = 0.3 Mol/L

31. Describe the preparation of pure and dry chloroform in the laboratory. Write the action of chloroform upon i) heated silver powder ii) aq KOH and iii) aniline in the presence of aqKOH

32. How is pure and dry nitro benzene prepared in the laboratory. Identify A, B,C and d in the following A reacts with zinc to give B, Which further reacts with chloromethane in presence of AlCl3 to give C. Compound C reacts with cerium oxide in acidic medium to give D.

33. Write short notes on:

SET 3

Group 1, Very short questions (Any fifteen)   15×2 = 30

1. Define Hybridization. Draw the structure of ethene and predict the hybridization.
2. Define the term normality and normality factor.
3. The solubility product of barium sulphate in water at 25°C is 1×10^{-10} mol^2L^-2. Calculate the solubility of barium sulphate at the temperature?
4. Calculate the number of coulombs required to deposit 50 g of Al from molten Al_2O_3.
5. Distinguish between intensive and extensive property giving one example each.
6. Give the physical meaning of entropy? Give its unit.
7. What is a first order reaction? Write unit for its rate constant.
8. Write an example of Friedel craft alkylation and acylation.
9. Bromoethane is reacted with silver cynide to give compound A, which further reacts with lithium aluminum hydride to give compound B. Identify A and B and write their IUPAC names.
10. How would you test ethanol in the laboratory?
11. What are symmetrical and unsymmetrical ethers? Give examples of each
12. Write an example of Rosenmund's reaction and cannizaro's reaction.
13. What happens when ethanoic acid is heated with soda lime? Write the reaction involved.
14. Write the action of 1) Zn/NH4Cl and 11) Sn/HCl on nitroalkane.
15. Why is amine more basic than ammonia?
16. Write an example of i) reducing sugar ii) simple lipid iii) disaccharide iv) amino acid
17. What are essential and non essential amino acids? Give one examples of each.
18. Distinguish between addition d condensation polymer with example.
19. Write the monomer of 1) bakelite 11) Nylon-66
20. What is the composition of stainless steel? Give its one use
21. Why do silver nitrate produce permanent black stain in the skin?
22. What is meant by copper matte?

Group B. Short questions (Attempt any five)

23. Define normality and molarity and write the relation between them. A commercial sample of sulphuric acid has specific gravity of 1.8. 10 mL of this acid was diluted to1 L with water. 10 mL of diluted acid required 30 mL of N/10 NaOH for complete neutralization. Calculate the purity of the acid.

24. State Faraday's law of electrolysis? Silver is deposited on a metal pate of surface 800 cc by passing 0.2 ampere of current for 3 h. Calculate the thickness of silver deposited (Specific gravity of Ag is 10.47 and atomic mass is 108)

25. What is instantaneous rate of reaction? How does the concentration and the surface area of the reactant affect the rate of reaction? A first order reaction requires 100 minutes for 60 % completion. How long will it take to complete 90 %?

26. A haloalkane P reacts with aq KOH to give compound Q. The compound Q on oxidation with potassium dichromate gave R. R on clemensons reduction gave product S. The compound P reacts with sodium in dry ether to give 2,3 -dimethyl butane. Identify P,Q, R and S

27. Explain why phenol is more acidic than ethanol but less acidic than ethanoic acid.

28. Mention any three suitable method for the preparation of primary amine. How will you convert methanamine to ethanamine?

29. How is cast iron extracted form iron pyrite?

Group B. Long questions (Attempt any two)

30. What is meant by i) common ion effect ii) solubility product constant. Explain common ion effect and solubility product principle in qualitative analysis of salts. What will be the resulting pH of the solution formed by mixing 200 mL of aq solution of HCl (pH = 2) with 400 mL of aq solution of NaOH (pH = 12).

31. Based on the structure of aldehydes and ketone, explain what type of reaction does these compounds undergo. How does it differ for the reaction of acid chloride? Show your familiarity with i) aldol condensation reaction ii) benzoin condensation iii) Rosenmunds reaction iv) Wolfkisner reduction reaction and v) clemensons reduction

32. Describe with a neat labelled diagram the synthesis of anhydrous methanol acid in the laboratory. What happens when ethanoic acid is reacted with i) thionoylchloride followed by reduction with hydrogen in palladium over barium sulphate ii) with ethanol in presence of dil acid iii) Concentrated sulphuric acid and iv) soda lime

SET 4

Group 1, Very short questions (Any fifteen)   **15×2 = 30**

1. Mention two characters of tetrahedral hybridization.

2. Calculate the normality and molarity of 5% NaOH solution
3. Define Lewis acid and base giving one example?
4. Standard hydrogen electrode acts as both anode and cathode. Why?
5. State the first law of thermodynamics and write its mathematical equation.
6. Define the term standard free energy of the reaction.
7. Identify the order of the reaction form its units a) min^{-1} and b) $molL^{-1}min^{-1}$
8. What happens when 1) phenol is heated with zinc dust ii) sodium benzoate is heated with soda lime.
9. Chlorobenze does not undergo nucleophilic substitution reaction easily. Why?
10. Whys is phenol more acidic than alcohol?
11. Name the isomer of C_3H_8O. Which undergoes iodoform test?
12. What happens when ethanal is treated with i) ammonia ii) hydrazine
13. Convert ethane to ethanoic acid.
14. Convert nitrobenzene to 0- hydroxybenzaldehyde.
15. What is reimertiemann reaction?
16. What are disaccharides? What happens when they get hydrolyzed?
17. Define protein? What is denaturation of protein?
18. Distinguish between antibiotic and anti-fungal drugs with example.
19. What are chemical fertilizers? Give one examples of each.
20. Write a reaction for the preparation of red and black oxide of copper.
21. How would you obtain white vitriol form zinc?
22. How is Nessler's reagent prepared? Give one use of it.

Group B Short questions (Any Five)

23. A secondary haloalkane A gives compound b when heated with alc KOH. B on ozonolysis gives ethanal and methanal as the major product. Identify a and B with the reaction involved.What product do you expect when A is reacted with sodium in dry ether?
24. What is a grignard reagent? How would you convert primary alcohol ti grignard reagent?. Synthesize 2-methyl propan-2-ol and propanoic acid using suitable grignard reagent.
25. Primary alcohol A of the molecular formula C_3H_8O that does not give iodoform test is treated with lucas reagent to give compound B. B on treatment with sodium cyanide gives compound C. Compound C on Hydrolysis with acid produced Compound D which on reaction with ethanol gives compound E in acidic medium. Identify A, B, C, D, E with the reaction involved.

26. State and explain the foist law of thermodynamics and hence deduce the expression $H = P + V$ where all the symbols have their usual meaning.

27. What are leweis acid and bases? How do they differ from arrhenius acid and base? The pH of 0.1 M HCN solution is 5.5. Calculate the ionization constant of the acid.

28. What do you mean by order and molecularity of the reaction? What aid a psudo order reaction? Give example of it.

29. Write short notes on theory of Corrosion.

Group C Long questions (Any Two)

30. State and explain the Hess law of constant heat summation. What do you mean by heat of formation and heat of combustion. Calculate the Heat of formation of naphthalene, when the heat of formation of Carbon dioxide, water -94.45 Kcal and -68.3 kcal respectively. If the combustion of naphthalene ($C_{10}H_8$) is -1231.6 Kcal

31. Compound A is a primary alcohol containing two canon, B is secondary alcohol containing three carbon and C is tertiary alcohol containing four carbon. How will you distinguish these alcohols using Victor meyer test. Using suitable oxidizing agents show the oxidation products of these compounds.

SET 5

Group 1, Very short questions (Any fifteen) $15 \times 2 = 30$

1. Central element in ammonia is SP3 hybrid but has pyramidal structure. Why?

2. Which of the following is more basic i) 60 g of NaOH and 2M NaOH solution ii) 5.3 g/l of Na_2CO_3 and N/5 Na_2CO_3.

3. What is the pH if t 25 g of H2SO4 is dissolved in 200 mL of its solution?

4. What do you mean by specific and equivalence conductance? Why do they increase with dilution?

5. Under what condition does i) reaction becomes spontaneous and ii) free energy change becomes zero.

6. Calculate the change is entropy and gibbs free energy of ice into water at zero degree.(change in enthalpy = 4 KJ/mol)

7. Draw the labelled energy profile diagram to show the effect of catalyst in the rate of reaction.

8. Write two methods for the preparation of benzene?

9. How would you prepare DDT and BHC front the suitable precursors?

10. A dihydric alchols of molecular formula $C_2H_6O_2$ (A) undergoes stepwise oxidation to give dicarboxylic acid (B). Identify A and B.

11. What happens when ethoxy ethane is heated with i) air and ii) Conc. H_2SO_4.

12. Show your familiarity with perkins and aldol condensation reaction.

13. Suggest a suitable chemical rection to distinguish between ethanoic and methanol acid.

14. What is carbonization reaction? Give example.

15. Write all the possible amino isomer of C_3H_9N. Give their IUPAC name.

16. How is sulphanalic and acetanilide prepared form aniline?

17. What is invert sugar? What is the hydrolysis product of cane sugar?

18. What is denaturation of protein? Write one essential condition for denaturation of protein.

19. What is antibiotic? Mention one broad spectrum antibiotic.

20. Give the structure of paracetamol and why is it called antipyretic drug?

21. What happens when ammonia is passed over red hot copper?

22. Write the action of heat on white vitriol

23. Open-hearth process is more efficient than bessemer process of manufacture of steel. Why?

Short questions (any five)

24. Write the alcoholic isomer of C_3H_8O and convert one isomer to other and distinguish them using victor meyer test.

25. Write three different methods for the preparation of chlorobenzene. What happens when chlorobenzene is reacted with broom ethane and ethanoyl chloride respectively in the presence of lewis acid like BF_3.

26. What is condensation reaction? Write the action of ammonia, Hydrazine, hydroxyl amine, semi carbazide, 2,4-DNPH on ethanal.

27. What is a redox titration? How do you choose a suitable indicator for the acid base titration of all possible combinations?

28. Write short notes on coupling reaction of aniline.

29. What do you mean by solubility product? A sample of AgCl is treated with 5 mL of 2 M Na_2CO_3 solution to produce Ag_2CO_3. The remaining solution contained 0.003 g of Cl- per litre. Calculate the solubility product of AgCl. (Ksp of $Ag_2CO_3 = 8.2 \times 10 -12$.)

Long Questions (Any two)

30. What are strong and weak electrolytes? Derrive the ostwald's dilution law for the dissociation of weak electrolyte. Why is this law not applicable for strong electrolyte?

31. Define the term i) quenching ii) annealing iii) tempering iv) nitriidng and v) stainless steel

32. With a neat and labelled diagram describe the laboratory preparation of pure and dry aniline. What happens when aniline is reacted with i) benzaldehyde ii) Chloroform in the presence of base iii) Mixture of $NaNO_2$ and HCl at cold temperature and iv) with phenol in the presence of $ZnCl_2$ at high temperature.

33. Compare the basicity of aliphatic and aromatic amines with that of ammonia. How do you distinguish primary, secondary and tertiary amine using Hoffmann method? How would you convert aniline to p- nitroaniline, o-broom aniline?