

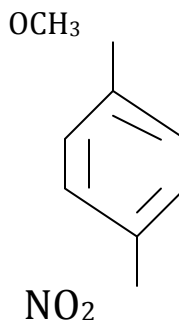
Sample Papers – 2008  
Class – XII  
Subject - Chemistry

1. Write the equations of the following named reactions:
  - a) Hydro boration b) williamson's synthesis
  - c) cumene phenol process d) Kolbe's reaction e) Riemier Tiemann reaction
2. Explain Lucas test with suitable examples
3. Distinguish chemically between the following pairs of organic compounds
  - a) Phenol and methanol b) methanol and ethanol c) propan-1-ol and propan-2-ol d) pentan-3-ol and 2-Methyl butan 2-ol
4. Account for the following:
  - a) COH bond angle in alcohol is less than tetrahedral angle of  $109.5^\circ$
  - b) COC bond angle in ether is more than tetrahedral angle of  $109.5^\circ$
  - c) C-O bond length in phenol is less than that of alcohol.
  - d) Phenol has lower dipole moment than alcohol.
  - e) Phenol under goes electrophillic substitution at ortho and para position.
  - f) Alcohol acts as a bronsted acid as well as bronsted base.
  - g) Phenol is more acidic than alcohol.
  - h) Acidity of alcohol is primary alcohol > sec alcohol > tert alcohol.
  - i) Basicity of alcohol is tert alcohol > sec alcohol > primary alcohol.
  - j) In Williamson's synthesis sec and tert halide can not be used.
  - k) para nitro phenol is less steam volatile than ortho nitro phenol.
  - l) Presence of nitro group at ortho and para position makes phenol more acidic.
  - m) Alcohols and phenols have higher boiling point.
  - n) Boiling point of alcohol is higher than its isomeric ether.
  - o) Boiling point of glycerol > ethylene glycol > ethanol.
  - p) Grignard reagent is a versatile reagent in organic chemistry.
  - q) Cresol is less acidic than phenol.
  - r) In esterification reaction, water is removed as soon as it is formed.
  - s) Order of reactivity of HX with alcohol is  $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$
  - t) Alcohol reacts with  $\text{SOCl}_2$  to give pure halo alkane.
  - u) Ease of dehydration of alcohol is tert alcohol > sec alcohol > primary alcohol.
  - v) Phenol and anisole undergoes bromination reaction even in the absence of

halogen carrier.

- w) Methyl phenyl ether reacts with HI to give phenol and methyl iodide and not methanol and iodo benzene.
  - x) Methoxy ethane reacts with HI to give methyl iodide and ethanol and not ethyl iodide and methanol.
  - y) Tert butyl methyl ether reacts with HI to give tert butyl iodide and methanol and not not methyl iodide and tert butyl alcohol.
  - z) Anisole undergoes electrophillic substitution at ortho and para position.
  - aa) Boiling point of butan-1-ol is higher than tert butyl alcohol.
  - bb) Alcohol, phenol and ether are soluble in water.
  - cc) In the reaction between acid chloride and alcohol a small amount of pyridine is added.
  - dd) Alcohol behaves as nucleophile as well as electrophile.
  - ee) Water is a stronger acid than alcohol.
5. Carry out the following conversions:
- a) Ethanal to ethanol.
  - b) Acetone to propan-2-ol.
  - c) Ethanoic acid to ethanol.
  - d) Ethene to ethanol.
  - e) Propene to propan-2-ol.
  - f) Methanal to ethanol.
  - g) Methanal to benzyl alcohol.
  - h) Ethanal to propan-2-ol.
  - i) Acetone to 2-methyl propan-2-ol.
  - j) But-1-ene to butan-1-ol.
  - k) But-2-ene to butan-2-ol.
  - l) Chloro benzene to phenol.
  - m) Aniline to phenol.
  - n) Benzene to phenol.
  - o) Ethanol to ethyl ethanoate.
  - p) Ethanol to ethene.
  - q) Ethanol to ethanal.
  - r) Tert butyl alcohol to 2-methyl prop-1-ene.
  - s) Propan-2-ol to acetone.
  - t) Phenol to i) phenyl ethanoate. ii) 2-Acetoxy benzoic acid. iii) ortho and para nitro phenol. iv) 2,4,6-trinitro phenol v) para bromo phenol vi) 2,4,6- tri bromo phenol vii) salicylic acid vii) salicylaldehyde viii) anisole ix) phenatole x) benzene xi) benzo quinone.
  - u) Ethyl iodide to diethyl ether
  - v) Methyl bromide to 2 methoxy 2 methyl propane.
  - w) Benzyl chloride to benzyl alcohol
  - x) Ethyl magnesium chloride to propan-1-ol

- y) Cumene to phenol  
 z) Anisole to i) phenol ii) ortho and para hydroxyl aceto phenone iii) para bromo anisole iv) ortho and para methyl anisole v) ortho and para methoxy aceto phenone vi) ortho and para nitro anisole  
 aa) Ethene to ethane-1,2-diol
6. Explain the mechanism of the following reactions:
- a)  $\text{CH}_2=\text{CH}_2 + \text{H}_2\text{O} \longrightarrow \text{CH}_3\text{CH}_2\text{OH}$   
 b)  $\text{CH}_3\text{CH}_2\text{OH} \longrightarrow \text{CH}_2=\text{CH}_2 + \text{H}_2\text{O}$
- c)  $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{443\text{K}} \text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$   
 $\xrightarrow{413\text{K}}$   
 d)  $\text{CH}_3\text{OC}_2\text{H}_5 + \text{HI} \longrightarrow \text{CH}_3\text{I} + \text{C}_2\text{H}_5\text{OH}$   
 e)  $(\text{CH}_3)_3\text{CO C}_2\text{H}_5 + \text{HI} \longrightarrow (\text{CH}_3)_3\text{CI} + \text{C}_2\text{H}_5\text{OH}$
7. How is ethanol prepared from a) ethene b) cane sugar? Mention 2 uses of ethanol.
8. How is methanol commercially? Mention 2 uses of the same.
9. How is phenol prepared commercially? Mention 2 uses of the same.
11. Write IUPAC names of the following:
- a)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{CH}-\text{CH}-\text{C}-\text{CH}_3 \\ | \quad | \quad | \\ \text{CH}_3 \quad \text{OH} \quad \text{CH}_3 \end{array}$  b)  $\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}-\text{CH}_2\text{CH}_3 \\ | \quad \quad | \\ \text{OH} \quad \quad \text{OH} \end{array}$
- c) Glycerol d) ethylene glycol e)  $\begin{array}{c} \text{CH}_3\text{O CH}_2-\text{CH}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$
- f)  $\text{CH}_3\text{O CH}_2\text{CH}_2\text{O CH}_3$  g)  $\text{C}_6\text{H}_5\text{O CH}_2\text{CH}_3$  h)
- i) )  $\text{C}_6\text{H}_5\text{O C}_7\text{H}_{15}$





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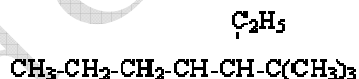
**Sample Paper – 2008**  
**Class – XII**  
**Subject – Chemistry**

Max, Marks – 70

General instructions

- All questions are compulsory.
- Question numbers **1 to 8** are very short answer type questions, carrying 1 mark each. Answer them in one word or in one sentence each
- Question numbers **9 to 18** are short answer type question, carrying 2 marks each. Answer them in about 30 words each.
- Question numbers **19 to 27** are short answer type questions, carrying 3 marks each. Answer them in about 40 words each.
- Question numbers **27 to 30** are long answer type questions, carrying 5 marks each. Answer them in about 70 words each.
- Use log tables if necessary. Calculators are not permitted.

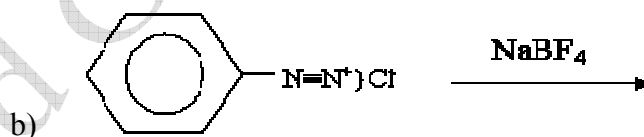
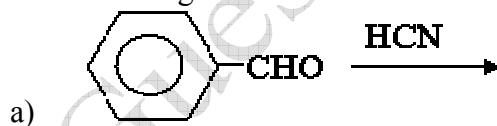
- Q1. What is difference between a sol and a gel?
- Q2. For the assumed reaction,  $X_2 + 2Y_2 \rightarrow 2XY_2$  write the rate equation in terms of the rate of disappearance of  $Y_2$ ?
- Q3. Name the Xenon fluorides molecule is iso-structural with  $IF_5$  Draw the structure of its molecules?
- Q4. What does the prefix  $\eta^2$  in  $PtCl_3(\eta^2-C_2H_4)$  mean?
- Q5. Pick odd out of them Equanil, Seconal, Luminal, Bithional?
- Q6. Give IUPAC name of



- Q7. Why are carbohydrates optically active?
- Q8. Gold crystallizes in FCC arrangement. The edge length is 40.70 nm. Calculate the radius of gold atom?
- Q9. What happens when a solution of NaCl is added to  $Fe(OH)_3$  sol explain? Write whether  $Fe(OH)_3$  sol is a multi-molecular colloid or macro-molecular colloid?
- Q10. Describe the principle of each of the following process
  - a) Mond's Process
  - b) Zone refining
- Q11. Complete and balance the following equations:
  - a)  $NH_3 + NaOCl \rightarrow$
  - b)  $SCl_2 + NaF \rightarrow$

- Q12. Write monomers, polymers with structures and their uses for the following polymers:
- Poly Acrylonitrile (PAN)
  - Poly styrene
- Q13. Define the following and give one example of each:
- F-centre
  - Ionization isomerism in co-ordination compounds
- Q14. With the help of suitable diagrams explain negative deviation from Raoult's Law also give two examples for the deviation?
- Q15. Explain the following giving reasons:
- Electrolysis of aqueous solution of NaCl gives  $H_2$  at cathode and  $Cl_2$  gas at anode
  - Electrolysis of aqueous solution of  $CuBr_2$  gives Cu at cathode and  $Br_2$  at the anode.
- Q16. Explain the following observations that tetrahedral Ni (II) complexes are paramagnetic but square planar Ni (II) complexes are di-magnetic?
- Q17. Give two examples of artificial sweeteners. What are their advantages over natural sweeteners?

- Q18. Complete the following reactions:



- Q19. Calculate the normal boiling point of sample of sea water containing 3.5% NaCl and 0.13% of  $MgCl_2$  by mass .Given  $K_b = 0.52 \text{ K kg mol}^{-1}$  [wt. of NaCl = 58.5,  $MgCl_2 = 95 \text{ g / mol}$ ]
- Q20. Calculate  $E^\circ_{\text{cell}}$ ,  $\Delta G$  for the cell  $Al|Al^{+3} (0.01M) || Fe^{+2} (0.02M)| Fe$   
 Given Potentials are  $Al \rightarrow Al^{+3} + 3e^- \quad E^\circ = +1.66 \text{ V}$   
 $Fe^{+2} + 2e^- \rightarrow Fe \quad E^\circ = - 0.44 \text{ V}$
- Q21. PbS has NaCl type structure. What is its density if its edge length is 500 pm? Given  $[N_A = 6.023 \times 10^{23}]$ , Atomic weight of Pb= 207.2 and S = 32 a.m.u.]
- Q22. If the rate constant of a reaction is  $2.0 \text{ mol / L / s}$  at 700 K and  $32.0 \text{ mol/L/ s}$  at 800 K, what is the activation energy?
- Q23. Do as directed
- Give mechanism of conversion of Alcohol to ether

- b) Distinguish between the following by suitable chemical test
- Phenol and benzoic acid
  - Benzaldehyde and aniline
- Q24. Give the following conversions (not more than four steps)?
- An aldehyde to an acetal
  - Phenol to Aspirin
  - Aniline to benzoic acid
- Q25. How will you account for the following?
- Chloro-acetic acid is stronger acid than acetic acid?
  - Ethers possess a net dipole moment even if they are symmetrical in structure?
  - Aniline is a weaker base than ethyl amine?.
- Q26. Explain why it is difficult to prepare pure amines by ammonolysis of alkyl halide? Give the method that can prepare pure alkyl amines?
- Q27. Write short notes on the following:
- Hell- Volhard Zelinsky Reaction
  - Hofmann's Bromamide degradation reaction
- Q28. Give appropriate reasons for each of the following observations:
- Sulphur vapour exhibits some paramagnetic behavior
  - $\text{NH}_3$  is more basic than  $\text{PH}_3$
  - Of the noble gases only xenon is known to form real chemical compounds.
  - Despite lower electron affinity  $\text{F}_2$  is stronger oxidising agent than  $\text{O}_2$
  - Nitrogen shows little tendency for catenation, whereas phosphorus shows a clear tendency for catenation.
- Q29. Account for the following:
- Transition elements have higher boiling points
  - Zn, Cd and Hg are normally not regarded as transition elements
  - Transition metals exhibit higher enthalpies of atomisation..
  - Transition elements show variable oxidation states
  - Zr resembles with Hafnium.
- Q30. Explain giving equations when:
- Sodium ethoxide is mixed to iso-propyl bromide.
  - Benzaldehyde is mixed with acetaldehyde in dilute alkaline medium
  - Propane nitrile is treated with tin in dilute hydrochloric acid

**SAMPLE PAPER - 2008**

**CLASS – XII**  
**SUBJECT – Chemistry (Theory)**

**General instructions:-**

1. All questions are compulsory
2. Internal choices has been provided in some questions you have to attempt only one of the choice in such questions.
3. Q.No 1 to 8 are very short answer type questions, carrying one mark each.
4. Q. No. 9 to 18 are short answer type questions, carrying two mark each.
5. Q.No. 19 to 27 are also short answer questions, carrying three mark each.
6. Q.No. 28 to 30 are long answer type questions, carrying five mark each.
7. Use of calculators is not permitted. However you may use log tables, if necessary.

Q.1 Excess of potassium makes KCl crystals lilac, Why ?

Q.2 People living at high altitude generally suffer from anoxia , Explain.

Q.3 Define limiting molar conductivity .

Q.4 “A greater insight in to the energetic and mechanistic aspects of reactions”. Explain the above statement which was given by “Max Trautz” and William Lewis”

Q.5 Name the sweetest carbohydrate.

Q.6 Name one Biodegradable aliphatic polyester.

Q.7 Ortho-sulphobenzimide is used in the preparation of sweet for a diabetic person or patient, why ?

Q.8 How does prevailing temperature influence the extent of absorption of a gas on solid.

Q.9 What do you mean by activity and selectivity of catalysts?



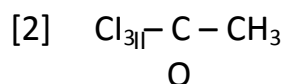
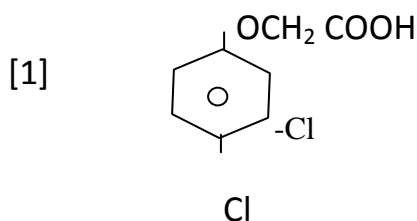
Q.10 Define conductivity and molar conductivity for the solution of an electrolyte.

Q.11 Mention the factors which affect the rate of a chemical reaction.

Q.12 How will you convert –

1. Toluene to benzyl alcohol 2. But –1-ene to But -2-ene.

Q.13 Give IUPAC names of following

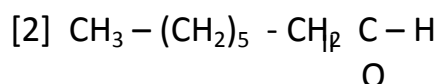
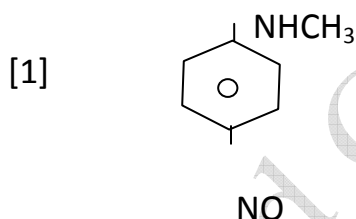


Q.14 During the preparation of Esters from carboxylic acids and alcohols in the presence of acid as catalyst, the water or ester should be removed as fast as it is formed.

**OR**

Although phenoxide ion has more number of resonating structure than carboxylate ion, carboxylic acid is a stronger acid than phenol. Why?

Q.15 Give IUPAC names of following.



Q.16 How do you explain amphoteric behaviour of amino acids?

Q.17 Define thermoplastic and thermosetting plastic (polymers) with two examples of each.

Q.18 How do antiseptics differ from disinfectants? Give one example of each.

Q.19 What are biodegradable and non-biodegradable detergents? Give one example of each.

Q.20 Define following terms –

1. Co-enzymes. 2. Nucleosides 3. Peptide linkage (bond)

**OR**

Write short note on- 1. Mutarotation 2. Invert sugar 3. Anomers

Q.21 How will you bring about the following conversions –

[1] Propanal to Butanone [2] Benzene to phenyl acetic acid [3] Benzaldehyde to Benzophenone.

Q.22 [1] Alcohols are comparatively more soluble in water than Hydrocarbons of comparable molecular masses, explain.

[2] Write the reactions of WILLIAMSON'S Synthesis of 2-Ethoxy 3-Methyl pentane starting from ethanol and 3-methyl pentan-2-ol.

Q.23 Silver crystallizes in fcc lattice. If edge length of the cell is  $4.77 \times 10^{-8}$  cm and density is  $10.5 \text{ gm/cm}^3$ , calculate the atomic mass of Silver.

Q.24 100 gm of Liquid "A" ( Molar mass 140 g/mol) was dissolved in 1000gm of liquid "B" ( Molar mass 180 g/mol). The vapour pressure of pure "B" was found to be 500 torr. Calculate the vapour pressure of pure "A" and its vapour pressure in solution is recorded as 475 torr.

Q.25 Write Nernst Equation and the e.m.f. of the following cells at 298K.

[1]  $\text{Mg(s)} \mid \text{Mg}^{++} (0.001\text{M}) \parallel \text{Cu}^{++} (0.0001 \text{ M}) \mid \text{Cu(s)}$

[2]  $\text{Fe(s)} \mid \text{Fe}^{++} (0.001\text{M}) \parallel \text{H}^+ (1 \text{ M}) \mid \text{H}_2 (\text{g}) (1 \text{ bar}) \mid \text{Pt(s)}$

Given  $E^0 \text{ Mg}^{++}/\text{Mg} = -0.237 \text{ V}$ ,  $E^0 \text{ Cu}^{++}/\text{Cu} = +0.34\text{V}$ ,  $E^0 \text{ Fe}^{++}/\text{Fe} = -0.44\text{V}$ .

Q.26 Explain following –

1. Activation Energy 2. Threshold Energy 3. Activated complex.

Q.27 What are emulsions? What are their different types? Give one example of each type.

Q.28 What are the Colligative properties? Explain any one of them. Show that elevation in boiling point is a Colligative property.

**OR**

**The following results have been obtained during the kinetic studies of the reaction-**

Experiment	[A] Mol L <sup>-1</sup>	[B] Mol L <sup>-1</sup>	Rate [mole L <sup>-1</sup> min <sup>-1</sup> ]
I	0.1	0.1	6.0 x 10 <sup>-3</sup> mol L <sup>-1</sup> min <sup>-1</sup>
II	0.3	0.2	7.2 x 10 <sup>-2</sup> mol L <sup>-1</sup> min <sup>-1</sup>
III	0.3	0.4	2.88 x 10 <sup>-1</sup> mol L <sup>-1</sup> min <sup>-1</sup>
IV	0.4	0.1	2.4 x 10 <sup>-2</sup> mol L <sup>-1</sup> min <sup>-1</sup>

Determine the rate law and the rate constant for the reaction.

Q.29 [a] Write mechanism of acid dehydration of ethanol to yield ethene.

[b] Explain – 1. KOLBE REACTION 2. REIEMER – TIEMANN REACTION.

**OR**

Explain – 1. Acetylation 2. Transesterification 3. Carbylamine reaction  
4. HVZ reaction 5. Schiff's base formation.

Q.30 a. What are the common types of secondary structure of Proteins.

b. Differentiate between globular and fibrous proteins.

c. What are Enzymes ?

**OR**

Define –

1. Chemotherapy 2. Antacids 3. Food preservatives  
4. Artificial sweetening agents 5. Drug Target.

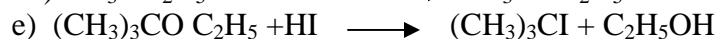
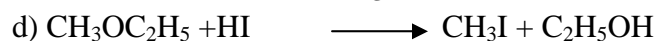
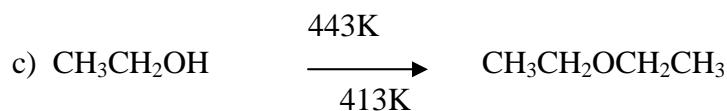
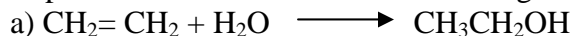
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  - d) Phenol has lower dipole moment than alcohol.
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  - f) Alcohol acts as a bronsted acid as well as bronsted base.
  - g) Phenol is more acidic than alcohol.
  - h) Acidity of alcohol is primary alcohol > sec alcohol > tert alcohol.
  - i) Basicity of alcohol is tert alcohol > sec alcohol > primary alcohol.
  - j) In Williamson's synthesis sec and tert halide can not be used.
  - k) para nitro phenol is less steam volatile than ortho nitro phenol.
  - l) Presence of nitro group at ortho and para position makes phenol more acidic.
  - m) Alcohols and phenols have higher boiling point.
  - n) Boiling point of alcohol is higher than its isomeric ether.
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  - s) Order of reactivity of HX with alcohol is  $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$
  - t) Alcohol reacts with  $\text{SOCl}_2$  to give pure halo alkane.
  - u) Ease of dehydration of alcohol is tert alcohol > sec alcohol > primary alcohol.
  - v) Phenol and anisole undergoes bromination reaction even in the absence of halogen carrier.
  - w) Methyl phenyl ether reacts with HI to give phenol and methyl iodide and not methanol and iodo benzene.
  - x) Methoxy ethane reacts with HI to give methyl iodide and ethanol and not ethyl

iodide and methanol.

- y) Tert butyl methyl ether reacts with HI to give tert butyl iodide and methanol and not methyl iodide and tert butyl alcohol.
  - z) Anisole undergoes electrophilic substitution at ortho and para position.
  - aa) Boiling point of butan-1-ol is higher than tert butyl alcohol.
  - bb) Alcohol, phenol and ether are soluble in water.
  - cc) In the reaction between acid chloride and alcohol a small amount of pyridine is added.
  - dd) Alcohol behaves as nucleophile as well as electrophile.
  - ee) Water is a stronger acid than alcohol.
5. Carry out the following conversions:
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  - b) Acetone to propan-2-ol.
  - c) Ethanoic acid to ethanol.
  - d) Ethene to ethanol.
  - e) Propene to propan-2-ol.
  - f) Methanal to ethanol.
  - g) Methanal to benzyl alcohol.
  - h) Ethanal to propan-2-ol.
  - i) Acetone to 2-methyl propan-2-ol.
  - j) But-1-ene to butan-1-ol.
  - k) But-2-ene to butan-2-ol.
  - l) Chloro benzene to phenol.
  - m) Aniline to phenol.
  - n) Benzene to phenol.
  - o) Ethanol to ethyl ethanoate.
  - p) Ethanol to ethene.
  - q) Ethanol to ethanal.
  - r) Tert butyl alcohol to 2-methyl prop-1-ene.
  - s) Propan-2-ol to acetone.
  - t) Phenol to i) phenyl ethanoate. ii) 2-Acetoxy benzoic acid. iii) ortho and para nitro phenol. iv) 2,4,6-trinitro phenol v) para bromo phenol vi) 2,4,6- tri bromo phenol vii) salicylic acid viii) salicylaldehyde ix) phenatole x) benzene xi) benzo quinone.
  - u) Ethyl iodide to diethyl ether
  - v) Methyl bromide to 2 methoxy 2 methyl propane.
  - w) Benzyl chloride to benzyl alcohol
  - x) Ethyl magnesium chloride to propan-1-ol
  - y) Cumene to phenol
  - z) Anisole to i) phenol ii) ortho and para hydroxyl aceto phenone iii) para bromo anisole iv) ortho and para methyl anisole v) ortho and para methoxy aceto phenone vi) ortho and para nitro anisole
  - aa) Ethene to ethane-1,2-diol

6. Explain the mechanism of the following reactions:

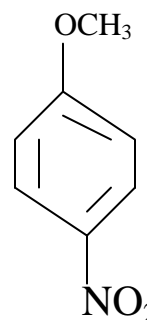
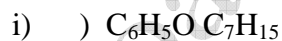
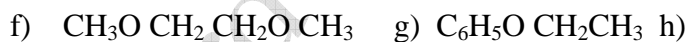
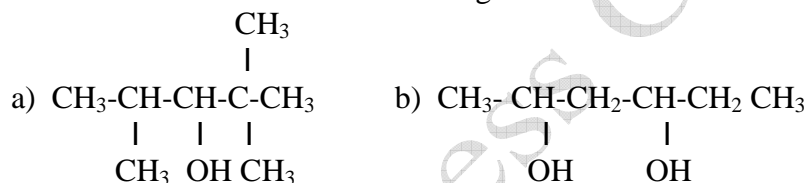


7. How is ethanol prepared from a) ethene b) cane sugar? Mention 2 uses of ethanol.

8. How is methanol commercially? Mention 2 uses of the same.

9. How is phenol prepared commercially? Mention 2 uses of the same.

11. Write IUPAC names of the following:



**SAMPLE PAPER – 2008**  
**SUBJECT - CHEMISTRY**  
**CLASS - XII**

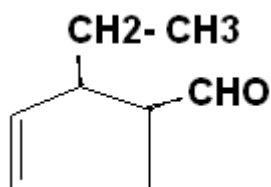
**Time: Three Hours**  
**Marks : 70**

**Max.**

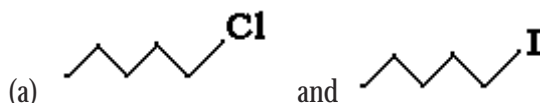
**General Instructions**

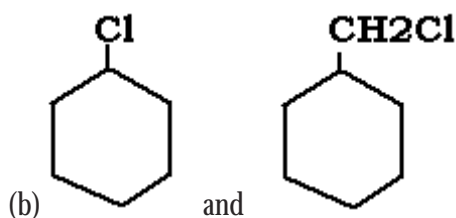
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5. Question nos. 28 to 30 are long answer questions and carry five marks each.
6. Use log tables if necessary. Calculators are not allowed.

1. On heating crystals of KCl in potassium vapours, the crystals start exhibiting violet colour.  
Why? 1
2. The gas phase decomposition of xy follows the rate law,  $r = k [xy]^n$ . what are the units of its rate constant? 1
3. Give the IUPAC name of the following compound 1

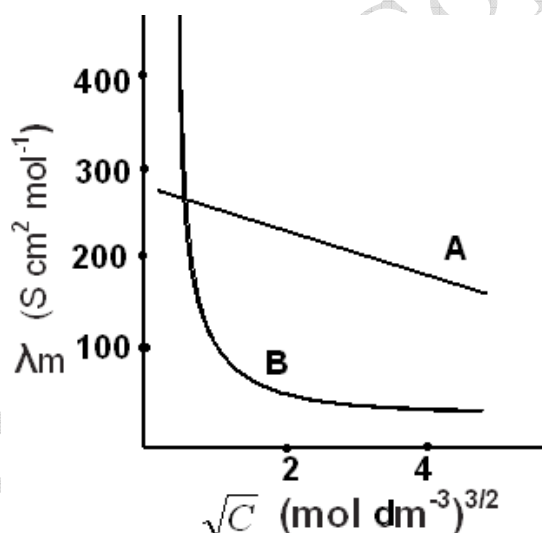


4. How many tetrahedral voids are there in 1 mole of a compound having cubic close packed structure? 1
5. What would be the probable plot of *conc. Vs time* for zero order reaction? 1
6. In each of the following pairs of organic compounds, identify the compound which will undergo  $SN^2$  reaction faster? 1





7. In the ring test for identification of nitrate ion, what is the formula of the compound responsible for the brown ring formed at the interface of two liquids? 1
8. Name two narcotics which are used as analgesics. 1
9. An element A crystallizes in face centred cubic structure. 200 g of this element has  $4.12 \times 10^{24}$  atoms. The density of A is  $7.2 \text{ g cm}^{-3}$ . Calculate the edge length of the unit cell. 2
10. The following curve is obtained when molar conductivity (y-axis) is plotted against the square root of concentration  $\sqrt{C}$  (x - axis) for two electrolytes A and B.



- (a) What can you say about the nature of the two electrolytes A and B?
- (b) How do you account for the increase in molar conductivity  $\lambda_m$  for the electrolytes A and B on dilution? 2
11. How is  $\text{Fe}(\text{OH})_3$  sol prepared? What happens when a freshly prepared  $\text{Fe}(\text{OH})_3$  is shaken with little amount dilute solution of  $\text{FeCl}_3$ ? 2
12. What is Lanthanoid contraction? Give two consequences of lanthanoid contraction. 2



13. Name the chief ore of Iron. How is pig iron converted to steel? Describe the chemical reaction takes place during this process.

OR

- (a) Although thermodynamically feasible, in practice, magnesium metal is not used for the reduction of alumina in the metallurgy of aluminium. Why?
- (b) Copper can be obtained by hydrometallurgy but not zinc. Why? 2
14. (a) Amines are basic substances while amides are neutral. Why?
- (b) Aromatic amines are weaker bases than aliphatic amines. Why? . 2
15. Give reasons:
- (a) Carboxylic acids do not give characteristic reactions of carbonyl group.
- (b) Sodium bisulphate is used for the purification of aldehydes and ketones. 2
16. (a) Why does chlorine water lose its yellow colour on standing?
- (b) What happens when  $\text{Cl}_2$  reacts with cold dilute solution of sodium hydroxide? Write equation only. 2
17. Convert:
- (a) ethanol to acetone
- (b) formaldehyde to n – butane. 2
18. Give mechanism of preparation of ether from alcohol. 2
19. (a) The same quantity of electrical charge deposited 0.652 g of Ag when passed through  $\text{AgNO}_3$ ,  $\text{AuCl}_3$  solution. Calculate the weight of gold formed. (Atomic mass of Au = 197 g / mol, Ag = 108 g / mol)
- (b) Predict the products of electrolysis of  $\text{AgNO}_3$  with silver electrodes. 3
20. (a) A first order reaction takes 69.3 minutes for 60% completion. Set up an equation for determining the time required for 80% completion.
- (b) Calculate the ratio of rate constants at 290 K and 300 K for the first order reaction with half life periods 20 and 12 minutes at this temperature. 3
21. Write short notes on the following giving example:
- (i) van – Arkel method
- (ii) Alumiothermic process

(iii) Liquation

22. Write down the equations for hydrolysis of  $\text{XeF}_2$ ,  $\text{XeF}_4$  and  $\text{XeF}_6$ . Which of these two reactions is a Redox reaction? 3
23. Draw a sketch to show the splitting of d – orbitals in an octahedral and tetrahedral crystal fields. State for a  $d^6$  ion how the actual configuration of the splitting of d – orbitals in an octahedral crystal field is decided by the relative values of  $\Delta_o$  and P. 3
24. (a) Which of the following will have a higher boiling point? Why?  
1 - Chloro ethane and 2 methyl -2- chlorobutane  
(b) Explain why:  
(i) vinyl chloride is unreactive in nucleophilic substitution reactions.  
(ii) *tert* – butyl chloride reacts with aqueous NaOH by  $\text{SN}^1$  mechanism while n – butyl chloride reacts by  $\text{SN}^2$  mechanism 3
25. (a) Despite having an aldehyde group, glucose does not give 2,4 – DNP reagent test. What does this indicate?  
(b) Why is benzoic acid stronger than acetic acid?  
(c) Why benzaldehyde doesn't undergo aldol condensation 3
26. (a) What is the role of Benzoyl peroxide in polymerisation of ethene?  
(b) What are LDPE and HDPE? How are they prepared? 3
27. Classify synthetic detergents giving an example in each case.

**OR**

What are antihistamines? Give two examples. Explain how they act on the human body. 3

28. (a) Derive the relationship between relative lowering of vapour pressure and mole fraction of a non volatile solute.  
(b) (i) Phenol associates in benzene to certain extent to form dimer. A solution contains  $20 \times 10^{-3}$  kg of phenol in 1 kg of benzene has its freezing point decreased by 0.6 K. Calculate the fraction of phenol that has dimerised. [ $K_f$  for Benzene =  $5.12 \text{ K} / \text{m}$ ]  
(ii) What would have been the vapour pressure in the absence of dimerisation?  
(iii) Derive a relationship between mole fraction and vapour pressure of a component of an ideal solution in the liquid phase and vapour phase. 5

**OR**

28. (a) What is meant by positive deviation from Raoult's law? Explain with the help of example.
- (b) Define Henry's law. Give two of its application.
- (c) 0.1 M solution of  $K_4Fe(CN)_6$  is 50% ionized. Calculate its osmotic pressure at 300 K.
- (d) The osmotic pressure of blood is 8.21 atm at 37°C. How much glucose should be added per litre for an intravenous injection that is at same osmotic pressure as blood. 5
29. Give reasons for the following:
- (a) Transition metals have high enthalpies of atomization.
- (b) Among the lanthanoids, Ce(III) is easily oxidised to Ce(IV).
- (c)  $Fe^{3+} | Fe^{2+}$  redox couple has less positive electrode potential than  $Mn^{3+} | Mn^{2+}$  couple.
- (d) Copper (I) has  $d^{10}$  configuration, while copper (II) has  $d^9$  configuration, still copper (II) is more stable in aqueous solution than copper (I).
- (e)  $Mn^{2+}$  compounds are more stable than  $Fe^{2+}$  towards oxidation to their +3 state. 5

**OR**

29. Give reasons:
- (i) Transition metal fluorides are ionic in nature, whereas bromides and chlorides are usually covalent in nature. .
- (ii)  $K_2PtCl_6$  is well known compound whereas corresponding compound of Nickel is not known.
- (iii) Transition metals form a number of interstitial compounds.
- (iv) Scandium doesnot exhibit variable oxidation state. 5
30. (a) An aliphatic compound 'A' with a molecular formula of  $C_3H_6O$  reacts with phenylhydrazine to give compound 'B'. Reaction of 'A' with  $I_2$  in alkaline medium on warming, gives a yellow precipitate 'C'. Identify the compounds A, B and C. Write the equations involved.
- (b) How will you bring about the following conversions in not more than two steps?

- (i) Benzaldehyde to Benzophenone
- (ii) Bromobenzene to 1 – phenylethanol
- (iii) Benzoyl chloride to benzonitrile 5

**OR**

30. (a) An organic compound 'A' with molecular formula  $C_5H_8O_2$  is reduced to n-pentane on treatment with Zn-Hg / HCl. 'A' forms a dioxime with hydroxylamine and gives a positive Iodoform test and Tollen's test. Identify the compound A and deduce its structure.
- (b) Write the chemical equations for the following conversions: (not more than 2 steps)
- (i) Ethyl benzene to benzene
  - (ii) Acetaldehyde to butane - 1, 3 - diol
  - (iii) Acetone to propene 5
-

**Sample Paper – 2008**

**Class – XII**

**Subject - Chemistry**

**Time: Three Hours**

**Max.Marks: 70**

1. All questions are compulsory.
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1. What type of drug pencillin is?

1

2. Give one example of biodegradable polymer?

1

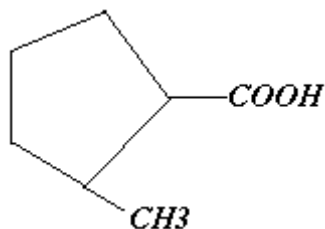
3. What is meant by anomers?

1

4. Write zwitter ion of amino acetic acid.

1

5. Give the IUPAC name of the following compounds:



6. Why propanol has higher boiling point than that of the hydrocarbon, butane? 1
7. Give the chemical formula for the compound potassium hexacyanocobaltate (III) 1
8. State Hardy-Schulze rule. 1
9. Give three differences between amorphous and crystalline compounds? 2
10. An element has a body centred cubic (bcc) structure with a cell edge of 288pm. The density of the element is 7.2g/cm<sup>3</sup>. How many atoms are present in 208g of the element? 2
11. State Raoult's law for a solution of volatile liquids. 2
12. Calculate the equilibrium constant for the reaction:

$\text{Zn(s)} + \text{Cu}^{+2}(\text{aq}) \rightleftharpoons \text{Zn}^{+2}(\text{aq}) + \text{Cu(s)}$ , Given:  $E^\circ_{\text{Zn}^{+2}/\text{Zn}} = -0.763\text{V}$  and  $E^\circ_{\text{Cu}^{+2}/\text{Cu}} = +0.34\text{V}$ . 2

13. What is lanthanoids contraction? What are the consequences of lanthanoids contraction? 2

14. Using valence bond theory, predict the geometry and magnetic behaviour of  $[\text{NiCl}_4]^{-2}$ . 2

15. What are amident nucleophiles? Explain with suitable example. 2

16. Explain why tert-butyl chloride reacts with aqueous sodium hydroxide by  $\text{S}_\text{N}1$  mechanism while n-butyl chloride reacts by  $\text{S}_\text{N}2$  mechanism? 2

17. Distinguish between 'chain growth polymerisation' and 'step growth polymerisation' and give one example of each type. 2

18. Define the following and give one example of each:  
i) Antihistamines                      ii) Antacids 2

19. a) Define vitamins and state their classification. List two vitamins of each class.  
b) What are enzymes? State the activity of an enzyme. 2

20. Give reason:

- i) It is difficult to prepare pure amines by ammonolysis of alkyl halide.
  - ii) Aniline is a weaker base than cyclohexylamine.
  - iii) Amines have lower boiling points than those of the corresponding alcohols.
- 3

21. Explain the following with suitable example:

- i) Kolbe's reaction
  - ii) Reimer-Tiemann reaction
  - iii) Williamson ether synthesis.
- 3

22. Indicate the steps in the preparation of  $K_2Cr_2O_7$  from chromite ore.

3

23. Complete the following reactions:

- i)  $I_2 + NaClO_3 \rightarrow$
  - ii)  $I_2 + S_2O_3^{2-} \rightarrow$
  - iii)  $XeF_2 + H_2O \rightarrow$
- 3

24. Write short notes on the following giving example:

- i) Magnetic separation]
  - ii) Aluminothermic process.
  - iii) Liquefaction
- 3



25. State what is observed when:

- i) the electrodes connected to a battery are dipped into a sol.
- ii) an electrolyte solution is added to a sol.
- iii) an emulsion is subjected to high speed centrifugation.

3

26. a) What is corrosion? What are the factors which affect corrosion?  $\text{CO}_2$  always present in

natural water. Explain its effect (increases, stops or no effect) on rusting of Fe.

b) Give the cell reaction in  $\text{H}_2\text{-O}_2$  fuel cell.

3

27. Determine the amount of  $\text{CaCl}_2$  ( $i = 2.47$ ) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at  $27^\circ\text{C}$ .

3

28. a) Time required for 10% completion of a first order reaction at 298K is equal to that required for its 25% completion at 308K. If the value of A is  $4 \times 10^{10}\text{s}^{-1}$ . calculate k at 318K and  $E_a$ .

b) Account about pseudo first order reaction with suitable example.

c) Show that in a first order reaction, time required for completion of 99.99% is 10 times of half-life ( $t_{1/2}$ ) of the reaction.

5

29. i) Xe has highest polarising power. Why?  
ii) Halogens are coloured. Why?  
iii) Noble gases are mostly chemically inert. Why?  
iv) Nitrogen does not form pentahalide. Why?  
v) Bismuth is a strong oxidising agent in pentavalent state. Why?

5

30. a) An organic compound 'A'  $C_8H_6$  on treatment with dilute  $H_2SO_4$  containing mercuric sulphate gives compound 'B'. Which can also be obtained from a reaction of benzene with acid chloride in the presence of  $AlCl_3$ ? 'B' on treatment with  $I_2$  in aq.KOH gives 'C' and yellow compound 'D'. Identify A,B,C and D. Give the chemical reactions involved.

b) How will you convert:

- i) acetophenone to ethyl benzene      ii) propanone to 2-Propanol.

State conditions and reactions in each case.

5

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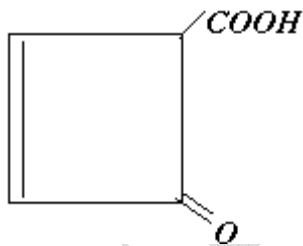
1. Give an example of heterogeneously catalysed reaction?

1

2. What is the oxidation number of Ni in  $[\text{Ni}(\text{CO})_4]$ ?

1

3. Give the IUPAC name of the following compound



1

4. Account the following:  
*o*-nitrophenol has lower boiling point than *p*-nitrophenol.

1

5. Why are primary amines are higher boiling than tertiary amines?

1

6. Name the purines present in DNA.

1

7. Write formulae of the monomers of polythene and Teflon?

1

8. Why is bithional is added to the toilet soap?  
1
9. An element having bcc structure with a cell edge of 288pm. If the density of the element is  $7.2\text{g/cm}^3$ , what is atomic mass of the element?  
2
10. Explain the following terms with suitable example:  
i) F-centres ii) Schottky defect.  
2
11. Molarity or molality, which is the best method to express concentration of a solution? Why?  
2
12. How much electricity in terms of Faraday is required to produce,  
i) 20 g of Ca from molten  $\text{CaCl}_2$ ?  
ii) 50 g of Al from  $\text{Al}_2\text{O}_3$ ?  
2
13. Which is more basic  $\text{La}(\text{OH})_3$  or  $\text{Lu}(\text{OH})_3$ ? Why?  
2
14. a) Use valance bond theory predict the geometry and magnetic behaviour of  $[\text{Co}(\text{NH}_3)_6]^{+3}$  ion. [At.No. of Co= 27]  
b) Write the IUPAC name of  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$   
2
15. Define the following terms:  
a) Racemic mixture b) Resolution c) Enantiomers  
2
16. What happens when: (Give chemical reactions)  
a) Cyclohexanol is treated with Thionyl chloride?  
b) p-Hydroxybenzyl alcohol is heated with HCl?  
2
17. Distinguish between the terms homopolymer and co polymer and give an example of each. 2
18. What do you understand by broad spectrum antibiotics? Give one example.  
2

19. At 300K, 36g of glucose ( $C_6H_{12}O_6$ ) present per liter in its aqueous solution has an osmotic pressure of 4.98 bars. If the osmotic pressure of another solution of glucose is 1.52 bar at the same temperature, what would be its concentration?  
3
20. Write the Nernst equation. Calculate e.m.f of the following cell at  $25^\circ C$ :  
 $Pt(s)/Br_2(l)/Br^-(0.010M)/H^+(0.030M)/H_2(1\text{ bar})/Pt(s)$  [Given:  $E^\circ Br_2/Br^- = +1.08\text{ V}$ ]  
3
21. a) Why is alum added to water for purification?  
b) Explain why deltas are formed where river and sea water meet.  
c) Describe the preparation of a colloidal solution of arsenous sulphide in water.  
3
22. Outline the principles of refining of metals by the following methods:  
i) Zone refining      ii) Electrolytic refining      iii) Vapour phase refining.  
3
23. a) Assign reasons for the following observations:  
i) Hydrogen iodide is a stronger acid than hydrogen fluoride in aqueous solution.  
ii) The basic character among the hydrides of Group 15 elements decreases with increasing atomic numbers.  
iii) Draw the structural formula for  $XeOF_4$ .  
3
24. Complete the following reaction equations:  
i)  $Cr_2O_7^{2-} + Sn^{+2} + H^+ \rightarrow$   
ii)  $MnO_4^- + Fe^{+2} + H^+ \rightarrow$
25. a) Give chemical test to distinguish between phenol and ethanol in seemingly similar conditions.  
b) Write the reaction equation for what happens when tertiary butyl alcohol is heated with reduced copper at about 573K.  
3
26. Write one chemical equation to exemplify the following reactions:  
a) Carbylamine reaction  
b) Hofmann bromamide reaction.  
3

27. Define the following terms:  
i) Co-enzymes  
ii) Mutation in biomolecules  
iii) Nucleotides.  
3
28. a) Mention the factors that affect rate of a chemical reaction.  
  
b) A first order reaction takes 69.3 minutes for 50% completion. Set up an equation for determining the time required for 80% completion of this solution.  
  
c) Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ( $t_{1/2}$ ) of the reaction.  
5
29. Account for the following:  
a)  $\text{PH}_3$  is a weaker base than  $\text{NH}_3$ .  
b)  $\text{SF}_6$  exists but  $\text{SH}_6$  does not.  
c)  $\text{ClF}_3$  exists but  $\text{FCl}_3$  does not.  
d)  $\text{H}_3\text{PO}_3$  is diprotic acid.  
e)  $\text{ICl}$  more reactive than  $\text{I}_2$ .  
5
30. a) An organic compound with the molecular formula  $\text{C}_9\text{H}_{10}\text{O}$  forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2-benzene dicarboxylic acid. Identify the compound.  
  
b) Write the steps and conditions involved in the following conversions:  
i) Acetophenone to 2-phenyl-2-butanol.  
ii) Propene to acetone.

**SAMPLE PAPER - 2008**

**Subject – Chemistry**

**CLASS – XII**

**Time: Three Hours**

**Max. Mark: 70**

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1. Define “Kraft” temperature. 1
2. What are double salts? Give one example. 1
3. A person suffering from high blood pressure should take less common salt, why? 1
4. Draw the structural formula of Hex-2-en-4-ynoic acid. 1
5. What is the main purpose of vulcanization of rubber?  
1
6. Why do soaps do not work in hard water? 1
7. Arrange the following in increasing order of basic strength:  
Aniline, p-nitroaniline and p-toluidine 1
8. What are reducing sugars? Give one example. 1
9. If the radius of the octahedral void is  $r$  and radius of the atoms in close packing is  $R$ ,  
derive relation between  $r$  and  $R$ . 2
10. Analysis shows that nickel oxide has the formula  $Ni_{0.98}O_{1.00}$ . What fractions of  
nickel exist as  $Ni^{+2}$  and  $Ni^{+3}$  ions?

Or

Explain the following with suitable examples:

- i) Ferromagnetism
- ii) Ferrimagnetism
- iii) 12-16 and 13-15 group compounds.

2

11. State Henry's law and mention some important applications? 2
12. Copper can be extracted by hydrometallurgy but not Zinc. Explain. 2
13. How would you account for the following:  
a) Of the  $d^4$  species,  $Cr^{+2}$  is strongly reducing while manganese (III) is strongly oxidizing.
14. Indicate the steps in the preparation of  $KMnO_4$  from Pyrolusite ore? 2
15. Explain why  
i) the dipole moment of Chlorobenzene is lower than that of cyclohexyl chloride.  
ii) Alkyl halides, though polar, are immiscible with water.  
iii) Grignard reagents should be prepared under anhydrous conditions? 2
16. Write the structure of the major organic products in each of the following reactions:  
 a)  $CH_3CH_2CH_2Cl + NaI \xrightarrow[\text{Heat}]{\text{Acetone}}$   
 b)  $(CH_3)_3CBr + KOH \xrightarrow[\text{Heat}]{\text{Ethanol}}$   
 c)  $CH_3CH_2CH=CH_2 + HBr \xrightarrow{\text{Peroxide}}$  2
17. Define thermoplastics and thermosetting plastics with two examples each. 2
18. How do antiseptics differ disinfectants? Give one example of each. 2
19. A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8kPa at 298K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9kPa at 298K. Calculate  
 i) molar mass of the solute  
 ii) vapour pressure of water at 298 K. 3
20. Three electrolytic cells A, B, C containing solutions  $ZnSO_4$ ,  $AgNO_3$  and  $CuSO_4$  respectively are connected in series. A steady current of 1.5 ampere was passed through them until 1.45g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and zinc were deposited?



21. Explain what is observed
- i) When a beam of light is passed through a colloidal sol
  - ii) An electrolyte, NaCl is added to hydrated ferric oxide sol.
  - iii) Electric current is passed through a colloidal sol. 3
22. The choice of reducing agent in a particular case depends on thermodynamic factor. How far do you agree with this statement? Support your opinion with two examples. 3
23. Explain giving reasons:
- a) Transition metals and many of their compounds show paramagnetic behaviour.
  - b) The enthalpies of atomization of the transition metals are high.
- b) Cobalt (II) is stable in aqueous solution but in the presence of complexing reagents it is easily oxidised. 2
- c) Transition metals and their many compounds act as good catalyst. 3
24. Explain the following with an example:
- a) Kolbe's reaction
  - b) Reimer-Tiemann reaction
  - c) Williamson ether synthesis. 3
25. Arrange the following in the order of property indicated for each set:
- i)  $F_2$ ,  $Cl_2$ ,  $Br_2$ ,  $I_2$ - increasing bond dissociation enthalpy.
  - ii) HF, HCl, HBr, HI- increasing acid strength.
  - iii)  $NH_3$ ,  $PH_3$ ,  $AsH_3$ ,  $SbH_3$ ,  $BiH_3$ - increasing base strength. 3
26. Account for the following:
- a) Ethylamine is soluble in water whereas aniline is not.
  - b) Although amino group is o- and p- directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.
  - c) Gabriel phthalimide synthesis is preferred for synthesizing primary amines. 3
27. Write the important structural and functional difference between DNA and RNA.
- Or**
- What are the common types of secondary structure of proteins? Explain 3
28. During nuclear explosion, one of the products  $^{90}Sr$  with half-life of 28.1 years. If  $1 \mu g$  of  $^{90}Sr$  was absorbed in the bones of a newly born baby instead of calcium, how much of it will remain after 10 years and 60 years if it is not lost metabolically.

**Or**

The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature. 3

29. a) Write the balanced equations for the following:  
i) NaCl is heated with sulphuric acid in the presence of  $\text{MnO}_2$   
ii) Chlorine gas is passed into a solution of NaI in water.  
  
b) How are  $\text{XeO}_3$  and  $\text{XeOF}_4$  prepared?

**Or**

Explain the following:

- a) Why does  $\text{NH}_3$  form hydrogen bond but  $\text{PH}_3$  does not?  
b) Why does  $\text{R}_3\text{P}=\text{O}$  exist but  $\text{R}_3\text{N}=\text{O}$  does not (R = alkyl group)?  
c) Why are halogens strong oxidizing agents?  
d) Why is dioxygen a gas but sulphur a solid?  
e) Why do noble gases have comparatively large atomic sizes? 5
30. a) An organic compound contains 69.77% of carbon, 11.63% hydrogen and rest oxygen. The molecular mass of the compound is 86. It does not reduce Tollen's but forms an addition compound with sodiumhydrogensulphite and give positive iodoform test. On vigorous oxidation it gives ethanoic and propanoic acid. Write the possible structure of the compound.  
b) There are two  $-\text{NH}_2$  groups in semicarbazide. However, only one is involved in the formation of semicarbazones. Why?

**Or**

- a) An organic compound (A) (molecular formula  $\text{C}_8\text{H}_{16}\text{O}_2$ ) was hydrolyzed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic acid produced (B). (C) on dehydration gives but-1-ene. Write equations involved.  
b) Give simple chemical tests to distinguish between the following pairs of compounds.  
i) Propanal and propanone                      ii) Benzoic acid and ethyl benzoate. 5

Sample Paper – 2008  
Class – XII  
Subject - Chemistry

**(Kinetics, Solid, Solutions and Electro)**

- Q1.** Identify the reaction order from each of the rate constants is  $k = 2.3 \times 10^{-5} \text{ L mol}^{-1} \text{ s}^{-1}$ . 1 mark
- Q2.** (a) What advantage the osmotic pressure method has over elevation in boiling point method for determining molecular mass? 1 mark  
(b) Arrange the following in increasing order of freezing points; 1 mark  
1M NaCl, 1M glucose, 1M  $\text{CaCl}_2$
- Q3** (a) Atoms of element B form hcp lattice and those of the element A occupy  $\frac{2}{3}$ rd of tetrahedral voids. What is the formula of the compound formed by the elements A and B? 1 mark  
(b) Under what conditions could quartz be converted into glass? 1 mark
- Q4.** Discuss positive deviation from Raoult's law with suitable example? 3 marks
- Q5.** (a) Ionic solids, which have anionic vacancies due to metal excess defect, develop colour. Explain with the help of a suitable example. 2 marks  
(b) Write two differences between Frenkel defect and Schottky defect 1 mark
- Q6.** How many grams of KCl should be added to 2 Kg of water to lower the freezing point to minus  $8^\circ\text{C}$ ?  
 $K_f(\text{water}) = 1.86^\circ\text{C kg mole}^{-1}$

Or

- An aqueous solution of 2% non-volatile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent. What is the molar mass of the solute? 3 marks
- Q7.** An element with molar mass  $2.7 \times 10^{-2} \text{ kg mol}^{-1}$  forms a cubic unit cell with edge length 405 pm. If its density is  $2.7 \times 10^3 \text{ kg m}^{-3}$ , what is the nature of the cubic unit cell? 3 marks
- Q8.** Resistance of a conductivity cell filled with  $0.1 \text{ mol L}^{-1}$  KCl solution is  $100 \Omega$ . If the resistance of the same cell when filled with  $0.02 \text{ mol L}^{-1}$  KCl solution is  $520 \Omega$ , calculate the conductivity and molar conductivity of  $0.02 \text{ mol L}^{-1}$  KCl solution. The conductivity of  $0.1 \text{ mol L}^{-1}$  KCl solution is  $1.29 \text{ S/m}$ . 3 marks
- Q9.** Calculate the e.m.f of cell reaction  $\text{Cr}_{(s)} | \text{Cr}^{3+}(0.001 \text{ M}) || \text{Fe}^{2+}(0.001 \text{ M}) | \text{Fe}_{(s)}$   
given  $[E^0_{(\text{Fe}^{2+}/\text{Fe})} = -0.44 \text{ V}$  and  $E^0_{(\text{Cr}^{3+}/\text{Cr})} = -0.74 \text{ V}]$  3 marks
- Q10.** A reaction is first order in A and second order in B. 3 marks  
(i) Write the differential rate equation.  
(ii) How is the rate affected on increasing volume of container two times?  
(iii) How is the rate affected when the concentrations of both A and B are doubled?
- Q11.** For the decomposition of azoisopropane to hexane and nitrogen at 543 K, the following data are obtained.

t (sec)	P(mm of Hg)
0	35.0
360	54.0

- Calculate the rate constant. 3 marks
- Q12.** (i) Write anodic and cathodic reactions taking place in Mercury cell. 2 marks  
(ii) For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction. 2 marks  
(iii) ZnO becomes yellow on heating. Why? 1 mark

Q13. Predict & write reactions at cathode and anode when 2 marks

(i)  $\text{AgNO}_3$  solution is electrolysed using Pt electrodes.

(ii)  $\text{CuSO}_4(\text{aq})$  solution is electrolysed using copper electrodes (aq)

Q13. Caesium chloride crystallises as a body centred cubic lattice and has a density of  $4.0 \text{ g cm}^{-3}$ . Calculate the length of the edge of the unit cell of caesium chloride crystal. (Molecular mass of  $\text{CsCl} = 168.5 \text{ g mol}^{-1}$ ,  $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$ ).

3marks

Q14. Explain giving suitable reasons:

3 marks

- Rusting of iron is quicker in saline water than in ordinary water.
- Iron does not rust even if zinc coating is broken in a galvanised iron pipe.
- It is not possible to determine  $\lambda_m$  for weak electrolytes graphically.

Q15. A galvanic cell consists of a metallic zinc plate immersed in  $0.1 \text{ M Zn(NO}_3)_2$  and metallic plate of lead in  $0.2 \text{ M Pb(NO}_3)_2$  solution. Calculate the emf of cell.

Given

$$E^0 \text{Zn}^{2+} | \text{Zn} = -0.76 \text{ V} \text{ \&}$$

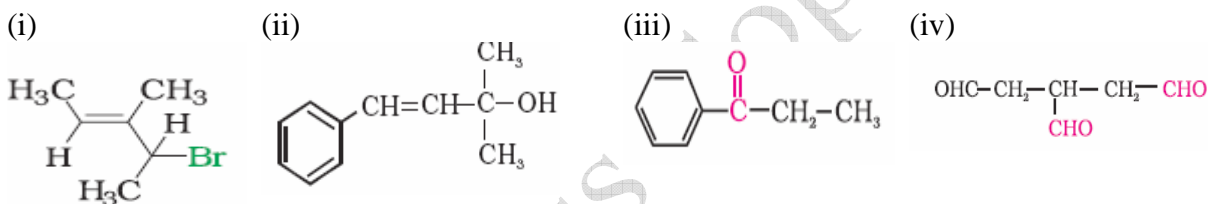
$$E^0 \text{Pb}^{2+} | \text{Pb} = -0.13 \text{ V}.$$

3 marks

**SAMPLE PAPER - 2008**  
**Class - XII**  
**SUBJECT – CHEMISTRY**

**Sample Paper (Organic, Biomolecules, P and d Block)**

- Q1.** Among the isomeric alkanes of molecular formula  $C_5H_{12}$ , identify the one that on photochemical chlorination yields (i) A single monochloride (ii) Three isomeric monochlorides. 1 mark
- Q2.** While separating a mixture of ortho and para nitrophenols by steam distillation, name the isomer which will be steam volatile. Give reason. 1 mark
- Q3.** Write the IUPAC name of the following 2 marks



**Q4. With the help of an example discuss the stereo chemistry involved in  $S_N1$  and  $S_N2$  mechanism** 2 marks

- Q5.** Explain Saytzeff rule by taking suitable examples. 2 marks
- Q6.** Draw the structures of all isomeric alcohols of molecular formula  $C_5H_{12}O$  and give their IUPAC names. Classify these isomers of alcohols as primary, secondary and tertiary alcohols. 2 marks
- Q7.** Nitro group increases the reactivity of chlorobenzene when attached to o and p-position but not at meta position? Explain? Write the mechanism also. 3 marks
- Q8.** Account for the following 3 marks
- It is necessary to avoid even traces of moisture from a Grignard reagent.
  - Chloroform is stored in closed dark coloured bottles completely filled.
  - The carbon– oxygen bond length in phenol is slightly less than that in methanol.
- Q9. (a)** Explain the fact that in aryl alkyl ethers (i) the alkoxy group activates the benzene ring towards electrophilic substitution and (ii) it directs the incoming substituents to ortho and para positions in benzene ring. 2 marks
- (b)** Arrange the following compounds in increasing order of their acid strength: 1 mark  
Propan-1-ol, 2,4,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol, phenol, 4-methylphenol

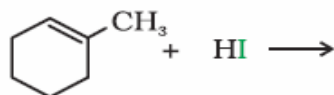
- Q10.** Give equations of the following reactions: 3 marks  
(a) Preparation of Sec-Butyl alcohol from ethanal  
(b) Preparation of Phenol from Aniline.  
(c) Treating phenol with chloroform in presence of aqueous NaOH.
- Q11.** How will you distinguish between the following: 3 marks  
(i) Propanoic acid and propanal  
(ii) Ethanal and Benzaldehyde  
(iii) Pentan-3-one and Pentan-2-one
- Q12.** How will you bring about the following conversions in not more than two steps.  
(a) Propanone to Propene  
(b) Benzene to m-Nitroacetophenone  
(c) Chlorobenzene to benzoic acid  
(d) Propanoic acid to propene  
(e) Propyne to propan-2-ol 5 marks
- Q13.** Explain the following with the help of suitable examples: 5 marks  
(a) Limitation of Williamsons synthesis (b) Stephen reaction. (c) Hell-Volhard-Zelinsky reaction (d) Aldol Condensation (e) Wolff-Kishner reduction.
- Q14.** (a) An organic compound (A) (molecular formula  $C_8H_{16}O_2$ ) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic acid produced (B). (C) on dehydration gives but-1-ene. Write equations for the reactions involved  
(b) Predict the products formed when cyclohexanecarbaldehyde reacts with following reagents.  
(i)  $PhMgBr$  and then  $H_3O^+$  (ii) Tollens' reagent
- Q15.** Primary alkyl halide  $C_4H_9Br$  (a) reacted with alcoholic KOH to give compound (b). Compound (b) is reacted with HBr to give (c) which is an isomer of (a). When (a) is reacted with sodium metal it gives compound (d),  $C_8H_{18}$  which is different from the compound formed when n-butyl bromide is reacted with sodium. Give the structural formula of (a) and write the equations for all the reactions.  
(ii) Out of  $C_6H_5CH_2Cl$  and  $C_6H_5CHClC_6H_5$ , which is more easily hydrolysed by aqueous KOH.
- Q16.** (a) Write the reactions of glucose with (i) HI (ii)  $HNO_3$  (iii)  $(CH_3CO)_2O$   
(b) Discuss the amphoteric nature of amino acid with suitable example
- Q17.** (a) Discuss the following  
(i) Denaturation (ii) invert sugar (iii) Globular proteins  
(b) What is glycogen? How is it different from starch?  
(c) Draw the cyclic structures of anomers of glucose.
- Q18.** (a) Compound A of molecular formula  $C_3H_7Br$ , yields a compound B of molecular formula  $C_3H_8O$  when treated with aq. NaOH. On oxidation the compound B yields a ketone C. Compound C on treating with methyl magnesium bromide and then  $H_2O$  in acidic medium gives tertiary butyl alcohol. Deduce the structures of

A, B and C and write the reactions involved.

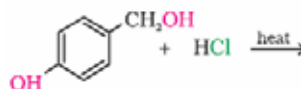
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(b) Draw the structures of major mono halo products in each of the following reactions

(i)



(ii)



2

OR

(i) Carboxylic acid is a stronger acid than phenol. Why?

2

(ii) How will you convert ethanal into the following compounds?

2

(i) Butane-1,3-diol (ii) But-2-enal

(iii) Predict the products formed when cyclohexanecarbaldehyde reacts with

Semicarbazide and weak acid

1

**Q19.** (a) Discuss the chemistry involved in Brown ring test for nitrate ion. Give equations also.

2

(b) Complete the following equations: →

3

(i)  $P_4 + SOCl_2 \rightarrow$

(ii)  $4 AgNO_3 + 2H_2O + H_3PO_4 \rightarrow$

(iii)  $NaCl + MnO_2 + H_2SO_4 \rightarrow$

OR

(a) Account For the Following:

3

(i)  $H_3PO_2$  act as monobasic acid.

(ii) Interhalogen compounds are more reactive than halogens

(iii) Bond dissociation energy of  $F_2$  is smaller than  $Cl_2$ .

(b) Discuss the quantitative method for estimating  $O_3$  gas.

2

**Q20.** (i) What are interstitial compounds? Why are such compounds well known for transition metals?

1

(ii) How is the variability in oxidation states of transition metals different from that of the non transition metals? Illustrate with examples.

1

(iii) Describe the preparation of potassium dichromate from iron chromite ore.

What is the effect of increasing pH on a solution of potassium dichromate?

2+1

OR

(i) Account for the following

1 x 3



- (a) Sc, the first member of first transition series doesn't exhibit variable oxidation state. Account for the following
  - (b) Transition metals have a strong tendency to form complexes.
  - (c) Zirconium (atomic no 40) and hafnium (atomic no 72) exhibit similar properties.
- (ii) How does acidified solution of potassium dichromate react with (a)  $\text{FeSO}_4$  and (b)  $\text{H}_2\text{S}$ ?
-