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12th Class

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1. English	2. Physics
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CHEMISTRY

Time: 3 Hours *Maximum Marks: 70*

SECTION-A

Objective Type Questions

(1×10 = 10 marks)

Q.1. Select the correct one.

(i) The molarity of pure water is:

(a) 5.556 mol/litre (b) 55.56 mol/litre (c) 18 mol/litre (d) 0.18 mol/litre

(ii) Which of the following conditions is correct for an ideal solution?

(a) $\Delta H_{mix} = 0$ **and** $\Delta V_{mix} = 0$ **(b)** $\Delta H_{mix} > 0$ **and** $\Delta V_{mix} > 0$

(c) $\Delta H_{mix} < 0$ **and** $\Delta V_{mix} < 0$ **(d)** $\Delta H_{mix} > 0$ **and** $\Delta V_{mix} < 0$

(iii) Which of the following is not a good conductor of electricity?

(a) CH_3COONa (b) C_2H_5OH (c) NaCl (d) KOH

(vi) The units of rate constant for second order reaction is

(a) CH_3COONa (b) litre mol^{-1} sec^{-1} (c) $litre^2$ $mol^{-2}sec^{-1}$ (d) sec^{-1}

(v) Which of the following Oxidation state is common for all Lanthanoids?

(a) +3 (b) +2 (c) +4 (d) +5

(vi) The IUPAC name of the compound shown below

.....diagram.....

(a) 2–Bromo-6-chlorocyclohex-1-ene (b) 6-Bromo-2-cyclochlorohexene

(c) 3-Bromo-1-chlorocyciohexene (d) 1-Bromo-3-chlorocyclothexene

(vii) Which of the following is most acidic?

(a) Benzyl alcohol (b) Cyclohexanol (c) Phenol (d) m-Chlorophenol

(viii) The product of the following reaction is $CH_3CN \xrightarrow{Na(Hg)+C_2H_5OH} X$

(a) CH_3CONH_2 (b) $CH_3–CH_2–NH_2$ (c) C_2H_6 (d) $CH_3–NH–CH_3$

(ix) Hydrolysis products of Lactose are

(a) glucose and glucose (b) glucose and fructose

(c) glucose and galactose (d) none of these

(x) Vitamin A is

(a) Ascorbic acid (b) Thiamine (c) Calciferol (d) Retinol

* Freshly prepared precipitate sometimes gets converted into colloidal solution by:

(a) Coagulation (b) Electrolysis (c) Diffusion (d) Peptization

* Identify the positively charged sol:

(a) Haemoglobin (b) As_2S_3 (c) Clay (d) Gold sol

* Which of the following will undergo aldol condensation?
(a) $CH_2 = CHCHO$ (b) CH C.CHO (c) C_6H_5CHO (d) CH_3CH_2CHO

* Among the following, the strongest base in aqueous medicine is:
(a) CH_3NH_2 (b) $NCCH_2NH_2$ (c) $(CH_3)_2NH$ (d) $C_6H_5NHCH_3$

* Vitamin 'C' is:
(a) Citric acid (b) Lactic acid (c) Paracetamol (d) Ascorbic acid

* Acetone is mixed with bleaching powder to give:
(a) Chloroform (b) Iodoform (c) Ethanol (d) Phosgene

* Methyl amine reacts with HNO_2 to form:
(a) $CH_3 - O - N = O$ (b) $CH_3 - O - CH_3$ (c) CH_3OH (d) CH_3CHO

* The reaction $ArN_2^+Cl^-$ $ArCl + N_2 + CuCl$ is named as
(a) Sandmeyer reaction (b) Gatterman's reaction
(c) Claisen reaction (d) Carbyl amine reaction.

* Which of the following is a water soluble vitamin?
(a) Vitamin E (b) Vitamin K (c) Vitamin A (d) Vitamin B

* The compound formed as a result of oxidation of ethyl benzene by $KMnO_4$ is:
(a) Benzyl alcohol (b) Benzophenone (c) Acetophenone (d) Benzoic acid

* Phenol is less acidic than:-
(a) Ethanol (b) O-nitrophenol (c) O-methylphenol (d) O-methoxyphenol

* Which of the following is not a thermoplastic?
(a) Polythene (b) Teflon (c) Bylon-6,6 (d) Bakelite

* Equanil is .....
(a) Artificial sweetener (b) Tranquillizer (c) Antihistamine (d) Antifertility drug

* AS_2S_3 sol is:
(a) Positive colloid (b) Negative colloid (c) Neutral colloid (d) None of these

* Which is the sweetest sugar?
(a) Sucrose (b) Glucose (c) Fructose (d) Maltose

* Butylated hydroxytoluene as a food additive acts as:
(a) Antioxidant (b) Colouring agent (c) Flavouring agent (d) Emulsifier

* Which of the following is biodegradable polymer?
(a) Cellulose (b) PVC (c) Polythene (d) Nylon-6

* Which is the strongest acid?
(a) HCOOH (b) CH_3COOH (c) $(CH_3)_2CHCOOH$ (d) $(CH_3)_3CCOOH$

* Which of the following is an amorphous solid?
(a) NaCl (b) CaF_2 (c) Glass (d) C_5Cl

* Ammonia can be dried by:
(a) Conc. H_2SO_4 (b) P_4O_{10} (c) Anhydrous $CaCl_2$ (d) CaO

* For converting aniline to chlorobenzene which of the following reagents is not used?
(a) Cl_2 (b) HCl (c) HNO_2 (d) CuCl

* Ethyl alcohol gives ethyl chloride with the help of:
(a) Cl_2 (b) KCl (c) $SOCl_2$ (d) NaCl

* Which of the following will undergo aldol condensation?
(a) $CH_2 = HCHO$ (b) C_6H_5CHO (c) $CH = CCHO$ (d) CH_3CH_2CHO

* Haloalkanes in the presence of alcoholic KOH undergo:
(a) Polymerisation (b) Elimination (c) Substitution (d) Dimerisation

* Acetone on heating with Conc. H_2SO_4 gives:
(a) Mesitylene (b) Xylene (c) Mesityloxide (d) Phorone

* The least basic among the following is:
(a) NH_3 (b) $C_6H_5NH_2$ (c) $(C_6H_5)_2NH$ (d) $(C_6H_5)_3N$

* Vulcanised Rubber contains:-
(a) Carbon (b) Hydrogen (c) Sulphur (d) Chlorine.

* Aspirin is :-
(a) Antiseptic (b) Antibiotic (c) Analgesic (d) Antipyretic

* The Monomer of polythene is :-
(a) Vinyl chloride (b) Ethene (c) Ethyne (d) Adipic acid

* An alcohol manufactured from water gas is :
(a) Butanol (b) Ethanol (c) Methanol (d) Isobutanol

* Ethyl bromide reacts with silver nitrite to form:
(a) Nitroethane (b) Ethane
(c) Ethyl nitrite (d) Nitroethane and ethyl nitrite

* Alcohol which is used as beverage is:
(a) Methanol (b) Ethanol (c) Butan–1–ol (d) Propan–1–ol

* Which of the following cannot reduce Fehling solution?
(a) Formic acid (b) Formaldehyde (c) Acetic acid (d) Acetaldehyde

* Ethyl amine reacts with nitrosyl chloride to give:
(a) Ethyl chloride (b) Ethyl alcohol (c) Ethyl nitrite (d) Nitroethane

* Which of the following will most readily be attacked by an electrophile?
(a) Chlorobenzene (b) Benzene (c) Phenol (d) Toluene

* For an endothermic reaction, H represents the enthalpy of the reaction in kJ $mol.^{-1}$ The minimum amount of activation energy will be:
(a) less than H (b) more than H (c) zero (d) equal to H

SECTION - B

Short Answer Type Questions–I

(2×9 = 18 marks)

Q.2. (i) Define the terms

(a) Coordinate number **(b) Ligands**

(ii) Write the IUPAC name of

(a) $[CU(NH_3)_4SO_4]$ **(b) $[Ni(CN)_6]^{2-}$**

(iii) What is Markovnikov's Rule.

(iv) Distinguish between Primary, Secondary and Tertiary alcohols by Lucas test.

(v) What is Carbylamine reaction?

(vi) Give source and deficiency diseases of Vitamin C and D.

(vii) Define Rate of a Reaction. Give one example of Zero Order Reaction.

(viii) Define Activation energy and write Arrhenius equation.

(ix) Give elementary idea of Collision theory.

* Define conductivity and give its S.I units.
* Distinguish between the rate of reaction and the rate constant.

Why do transition metals from coloured compounds?

Explain the linkage isomerism in coordination compounds by giving an example.

* Give any two chemical substitution reactions of haloalkanes.
* What are the uses and environmental effects of freons?
* Define equivalent conductivity and give its S.I. units.
* Define Activation Energy. How is it related to threshold energy?
* Why do transition metals form interstitial compounds?
* Define the term with examples:

(a) Coordination complex (b) Coordination number.

* Explain hydrate isomerism in coordination compounds with an example.
* Give any two chemical reactions of chlorobenzene.
* What is order of reaction? Give one example each for Ist order and 2nd order reactions.
* Define the following terms with examples:

(a) Chelating ligands (b) Central metal atom or ion.

Explain coordination isomerism in coordination compound with an example.

* Give any two chemical reactions of chlorobenzene.
* What are the important uses and environmental effects of Carbon tetrachloride?
* Write the relationship between conductivity and molar conductivity of a solutions kept in a cell.

What are *f*-block elements? Why are they so called?

* What is a Ligand? Give example of bidentate ligand.

What is Complex ion? Give two examples of complex ion.

* How will you convert ethyl bromide to (a) ethane (b) ethoxyethane?
* State Kohlrausch's law.
* Define activation energy. How is activation energy of a reaction affected by using a catalyst?
* Why do transition metals form coloured compounds?
* What are unidentate and bidentate ligands?
* Give an example of Wurtz-Fitting's reaction.
* Give a use and environmental effect of Freon.
* Define specific resistance and specific conductance.

* Define order of reaction. What are the units for the rate constant of first order reaction?
* Why is $CuSO_4$ blue while $ZnSO_4$ is colourless?
* Define Ambidentate ligand. Give one example.
* What is Co-ordination isomerism? Give one example.
* Discuss Wurtz reaction.
* Give a use and environmental effect of Chloroform.
* Describe any two of the techniques used for preventing corrosion of metals.
* Write the electronic configuration of the elements with atomic number 61, 91, 101 and 109.
* Explain why some square planar complexes of Ni (II) are diamagnetic while some other are paramagnetic.
* Give main postulates of Valence Bond (VB) theory.
* Explain nature of C-X Bond in case of haloalkanes.
* Explain Hofmann ammonolysis by giving one example.
* Define rate of reaction and rate constant.
* What is Roasting? Also define smelting.
* Why are transition metals called d-block elements?
* What is Diazotisation?
* How is aniline diazotised?
* How will you convert ethyl bromide into: (i) Ethyl alcohol (ii) Ethyl cyanide?
* Give name of a cationic and an anionic detergent.
* How will you convert aniline into phenylcyanide.
* Name the metal atom present in complex species haemoglobin and chlorophyll.
* Give two dehydration reactions of Ethyl alcohol.
* Give four uses of emulsions.
* What is PVC? Name its monomer. Give its two uses.
* What is Heinsberg's test?
* Mention the name and symptoms of the disease caused by the deficiency of vitamin C.
* How will you convert aniline into phenyl isocyanide?
* What is Buna S? How is it synthesised?
* What are Lyophilic and Lyophobic colloids?
* What happens when Pot. dichromate reacts with acidified solution of $FeSO_4$ and acidified solution of KI?
* What is a Coupling Reaction?
* How will you prepare isopropyl amine from acetone?
* Explain Chemisorption and Coagulation.
* Illustrate briefly carbylamine reaction.
* How is Aniline prepared from chlorobenzene? Give its reaction with benzoyl chloride.
* Give one coupling reaction of benzimidazolium chloride.
* What are interhalogens? Give examples?
* Write the electronic configuration of noble gases.
* What are anti-histamines? Give an example.

* Give the points of difference between absorption and adsorption.
* Show that in first order reaction half-life period is independent of initial molar concentration of the reactant.
* Why is the time saved when cooking is done in a pressure cooker?
* How is Bakelite synthesized?
* Briefly explain the term Brownian movement?
* Explain Roasting with chemical equations in the extraction of copper form pyrite ore.
* Are equimolar solutions of urea and sodium chloride iso-osmatic? Justify?
* Give one method each for the preparation of Nuclear and Side chain substituted haloalkanes.
* Define half-life period. Write its mathematical expression.
* Write the oxidation states of d-block elements.
* Give two methods of preparation of Halo-alkanes.
* Define amines and give their classification.
* Why detergents are preferred over soaps?
* Why d-block elements form coloured ions?
* Give two methods of preparation of Chloro-Benzene.
* Give two uses of DDT.
* Write one example of carbylamine reaction.
* Define Analgesic and give its two examples.
* Give the two uses of polythene.
* Why d-block elements form complexes?
* Give two properties of Chloro-Benzene.
* Give two uses of Chloroform.
* Write the reaction of Aniline with Bromine water.
* Differentiate between a true solution, colloidal solution and a suspension.
* Explain with suitable examples the co-ordination isomerism in coordination compounds.
* What happens when:
  (i) Aniline is heated with cone. H_2SO_4
  (ii) Ethyle amine is treated with Silver Chloride.
* Why cyanides are generally water soluble while isocyanides are not?
* What is the difference between molarity and molality? Give examples.
* How will you differentiate between Sols and Emulsions?
* Briefly explain the term electrophoresis.
* Explain with suitable examples the linkage isomerism in co-ordination compounds.
* Why Aniline is a weaker base than Ethylamine?
* What are Bio-degradable Polymers? Give examples.
* Write the names of the diseases caused due to deficiency of vitamines A and vitamines B.
* How will you differentiate between multimolecular colloids and micromolecular colloids?
* Briefly explain Hardy Schulze rule in relation to Colloidal systems.
* Explain with suitable examples the Hydrate isomerism in co-ordination compounds.

What happens when:

(i) Aniline reacts with acetyl chloride

(ii) Nitrobenzene is reduced with Zinc dust and Ammonium Chloride solution.

* Why Ethylamine is soluble in water while aniline is not?
* Give the oxidation states of Nitrogen.
* Give two methods of preparation of Ethers.
* Name two allotropic forms of Phosphorous.

SECTION-C

Short Answer Type Question–II

(3×9 = 27 marks)

Q.3. (i) Short and Explain Faraday's 2nd Law of electrolysis.

(ii) Explain Denaturation of Proteins.

(iii) Write three methods of Preparation of Amines.

(iv) Give three oxidising properties of $K_2Cr_2O_7$.

(v) What is Lanthanide Contraction? What are the causes of Lanthanide Contraction?

(vi) What is meant by unidentate, bidentate and hexadentate ligands? Give examples.

(vii) What are the effects caused by Freons and DDT on the environment?

(viii) Discuss:

(a) Reimer-Tiemann's Reaction (b) Kolbe's Reaction

(ix) What is:

(a) Gattermann-Koch Reaction (b) Fries Rearrangement.

* Define the following properties of solids:
(a) Piezoelectricity (b) Pyroelectricity (c) Ferroelectricity.
* Discuss the effect of temperature on the rate of reaction.
* Give a brief account of calcination and roasting.
* Name the elements of group 15 and discuss their oxidation states.
* What is Lanthanoid Contraction? Explain the cause of lanthanoid contraction.
* Give the chemical reactions of ethyl alcohol with:
(i) Conc. H_2SO_4 at 440K (ii) CH_3COOH (iii) CH_3MgBr.
How is aniline prepared from (i) Nitrobenzene (ii) Benzamide (iii) Phenyl cyanide?
* What are Carbohydrates? How are they classified on the basis of hydrolysis products??
* Write short notes on the following:
(i) Electrophoresis (ii) Brownian movement.
* What is meant by Leaching? Give reactions involved during leaching of Alumina.
* With the help of chemical equations, explain in brief the principle of contact process for the manufacture of sulphuric acid.
* What is Lanthanide contraction? What are consequences of Lanthanide contraction?

* Convert phenol into the following:
* What is Diazotisation? Discuss its mechanism.
  What are Amines? Give classification of amines with one example in each.
* What are essential and non-essential amino acid? Give one example of each.
  What are Carbohydrates? Explain their important functions.
* Differentiate between disinfectants and antiseptics.
  What are Detergents? Why are detergents preferred over soaps?
* Define the following and write the formula and unit of each:
  (i) Conductivity (ii) Molar conductivity (iii) Cell constant.
* Give any three differences between order of reaction and its molecularity.
* Explain electrophoresis OR cataphoresis with the help of diagram.
* Explain the use of the following:
  (i) Na CN in froth floatation method
  (ii) Carbon monoxide in Mond process
  (iii) Cryolite in metallurgy of aluminium.
* Draw labelled diagram of Haber process for the manufacture of NH_3. What is the importance of Le- Chatlier's principle in this process?
* Explain the following:-
  (i) Oxidation states of actinoids.
  (ii) Interstitial compounds.
* Give three methods of preparation of alcohols.
* Why aromatic primary amines cannot be prepared by Gabrial Phthalimide reaction.
* Give one point of difference between aniline and benzyl amine.
* Carry out the conversion: -ethanoic acid into methenamine.
* What are amines?
* Give three points of difference between DNA and RNA.
* Give three advantages of using detergents over soap.
* Show that for the reaction of first order half-life period is independent of initial concentration.
* What is meant by unidentate and bidentate ligands?
* What are Alcohols? How are they classified?
* What are essential and non- essential amino acids? Give one example of each.
* How is PCl_3 prepared from white phosphorus? How does it react with (i) SO_3, (ii) S_2Cl_2?
* How will you convert phenol into?
  (i) Salicylaldehyde (ii) Benzene (iii) Picric acid
* How is PCl_3 prepared? Give its reaction with?
  (i) SO_3 (ii) Picric acid
* Give at least three points of difference between molecularity and order of a reaction.
* Name two oxides of phosphorus. How are they prepared? Draw their structure.
* Define rate of reaction and rate constant.
* Why are transition metals called d-block elements?
* How will you convert ethyl bromide into: (i) Ethyl alcohol (ii) Ethyl cyanide?

* Define following terms giving suitable examples:
(i) Coordination entity (ii) Ligand (iii) Coordination number.
* How can primary, secondary and tertiary alcohols be obtained from Grignard's reagent?
* What are Proteins? State their biological functions.
* Give preparation of XeF_4. Give molecular shape of XeF_4.
* Write IUPAC name of the following coordination compounds:
(i) $[Co(NH_3)_6]Cl_3$ (ii) $Li[AlH_4]$ (iii) $[Ni(CO)_4]$
* What is Isomerism? Name various types of isomerism in coordination compounds.
* Discuss ionisation and linkage isomerism.
* Give addition of halogen acids to alkenes and there by discuss Markovnikov rule and peroxide effect.
* Discuss the preparation, structure and reaction with water of:
(i) XeF_2 (ii) XeF_4 (iii) $XeOF_2$.
* What is meant by denticity of ligand? Give examples of a unidentate and bidentate ligand.
* Define order of a reaction. Derive an expression for the rate constant in the zero order reaction.
* What are Haloarenes and how does these differ from Haloalkanes?
* How is Bakelite prepared? Give its important uses.
* Define complex ion and double salt. How does complex ion differ from a double salt?
* Define Leaching. Explain leaching of aluminium ore.
* 40 gm of NaOH are presented in one decilitre of solution. Calculate mole fraction of NaOH.
* Explain with suitable examples the dielectric properties of solids.
* What is Arrhenius equation? Discuss its importance.
* Name the oxo-acids of phosphorous. Write their structures.
* Give the reaction of Ethyl amine with: (i) Grignard's reagent (ii) Carbon disulphide
* What are phenols? How do they differ structurally from aromatic alcohols?
* Describe the main Postulates of Wernier's theory of Co-ordination compounds.
* Explain the following:
(i) Peptide bond (ii) Denaturation of Proteins.
* Give three oxidising properties of ozone.
* Discuss Lanthanoid contraction.
* Give three importance's of co-ordination compounds.
* Explain purification process of Bauxite ore.
* Name the oxoacids of halogens. Write their structures.
* Give the uses and environmental effects of tetrachloromethane.
* Explain the mechanism of acidic dehydration of Ethanol at higher temperature.
* Name the oxides of sulphur and give their structure.
* Give the uses and environmental effects of trichloromethane,
* How can alcohols be distinguished by Victer Meyer's test?

* What are Phospholipids? Give their important uses.
* A sugar syrup of weight 183.42 g of sugar ($C_{12}H_{22}O_{11}$). Calculate the mole fraction of sugar.
* How is aluminium obtained by electrolysis of fused alumina?
* Give the uses and environmental effects of dichloromethane.
* What happens when primary, secondary and tertiary alcohols are heated with copper metal at 570 K?
* What are Nucleic Acids? How are these classified?
* Explain Froth Floatation process.
* Give three oxidising properties of KM_nO_4.
* Give three chemical properties of Glucose.
* Explain the effect of Temperature on rate of reaction.
* What are Emulsion? Give its types.
* Explain Electrolytic method for refining of metals.
* Explain Formation of complexes by *d*-block elements.
* Define Carbohydrates and give their classifications.
* Write the preparation and uses of Backelite.
* Explain Amorphous solids.
* Explain Brownian Motion.
* Discuss Zone refining.
* Give three importance's of Co-ordination compounds.
* Give the preparation and uses of Polythene.
* How is ethyl bromide converted into: (i) ethanol (ii) diethylamino (iii) propionic acid?
* Write a short note on:
  (i) Kolbe's reaction (ii) Reimer - Tiemann reaction.
* What are the different methods employed for the concentration of an ore?

SECTION-D

Long Answer Type Questions

(5×3 = 15 marks)

Q.4. (i) Define Molality and Normality. Calculate the molarity and normality of a solution of H_2SO_4 having 0.49 gm of it dissolved in 450 ml of solution.

Or

Define depression in freezing point. How can you calculate the molecular mass of a non-volatile solute with it.

(ii) Define Corrosion of a metal. Explain the mechanism of rusting of iron.

Or

What is Kohlrausch's Law? Explain its application for calculation of molar conductivity at infinite dilution for weak electrolytes.

(iii) Write five methods of preparation of ketones.

Or

Discuss:-

(a) Wolf-kishner's Reduction

(b) Rosenmund's Reduction

(c) Stephen Reduction

* Explain the terms:
  (i) Freezing point of a liquid
  (ii) Depression in freezing point of a solution
  (iii) Molal depression constant
  Derive the relationship between the depression in freezing point and molecular mass of a non-volatile solute.
* Draw the structures of oxoacids of sulphur and write their names.
* Give any two methods of preparation of chlorine and any two chemical reactions. Also give uses of chlorine.
* How can you prepare acetaldehyde from ethanol and acetic acid? How does you prepare acetaldehyde reacts with (i) Ammoniacal $AgNO_3$ (ii) NH_2OH (iii) HCN?
* Write the chemical equations when:
  (i) Acetic acid reacts with Br_2 in the presence of phosphorus
  (ii) Acetic acid reacts with methanol in the presence of H_2SO_4
  (iii) Acetic acid reacts with $SOCl_2$
  (iv) Acetic acid reacts with $LiAlH_4$
  (v) When acetic acid reacts with chlorine in the presence of red phosphorous.
* State and derive Roult's law for solutions containing:
  (i) Volatile solutes (ii) Non-volatile solutes.
* Explain elevation in boiling point of a solution with the help of vapour pressure temperature diagram. How will you determine molecular mass of the solute from it?
* Name the elements of group 15 and give their electronic configuration. Discuss the various oxidation states of Nitrogen.
* What are Interhalogen Compounds? How are they formed? Give structure of IF_7.
* Describe briefly the general methods of preparation of carboxylic acids.
  Write chemical equations when:
  (i) Acetone react with HCN (ii) Ethanol reacts with $NaHSO_3$
  (iii) Acetaldehyde reacts with C_2H_5MgBr (iv) Acetone reacts with NH_2OH
  (v) Acetone reacts with ethanol
* The boiling point of Benzene is 353. 23. When 1.80 g of a non- volatile solute was dissolved in 90 gm of Benzene , the boiling point is raised to 354.11 K. Calculate the molar mass of the solute. Kb for Benzene is 2.53 Kgmol.
* Discuss the general characteristics of group 15 elements with reference to their electronic configuration, oxidation state, atomic size, ionization enthalpy and electronegativity.
* Give five methods of preparation of carboxylic acids.

* What are colligative properties? Derive the relation between the elevation in boiling point and molecular mass of a non-volatile solute in solution.
* How are acetaldehyde react with:
  (i) Hydroxylamine (ii) Hydrazine (iii) Semi carbazide
  (iv) Hydrogen cyanide (v) Sodium bisulphite
* Show that depression in freezing point is a colligative property. How can it be used to determine the molar mass of solute?
* What are ideal and non-ideal solutions? Give reasons for their formation. Give one example in each case.
* What are fuel cells? Describe giving diagram the working of H_2–O_2 fuel cell along with the reactions taking place in it.
* How can aromatic aldehydes and ketones be prepared by the following reactions?
  (i) Fridel-Crafts reaction
  (ii) Reimer-Tieman reaction
* State Raoult's Law and explain it in case of volatile solute.
* Define elevation in boiling point and derive its relation with molecular mass of non-volatile solute.
* How is molar conductivity related to concentration of an electrolyte.
* Based on conductivity values, how will you explain a weak and strong electrolyte?
* What are Primary and Secondary Cells? Explain the working of lead storage cell.
* What is Nernst Equation? How can it be applied in calculating the equilibrium constant for the cell $Zn(s)|ZnSO_4(aq)||CuSO_4(aq)|Cu(s)$?
* Predict the products of electrolysis in each of the following:
  (i) An aqueous solution of copper sulphate with copper electrodes,
  (ii) An aqueous solution of copper sulphate with platinum electrodes,
  (iii) An aqueous solution of sodium chloride.
* State and explain Kohlrauschs law. What are its applications?
* Explain the term electrode potential. How is electrode potential measured?
* Define colligative property. Discuss any one colligative property.
* What is abnormal Molecular mass? Discuss Association.
* Define depression in Freezing point and derive its relation with Molecular mass of non-volatile solute.
* Define Osmotic Pressure. How it helps us to calculate molecular mass of non-volatile solute?
* What do you understand by relative lowering in vapour pressure? Show that it is a colligative property.
* What is Corrosion? Explain electrochemical theory of rusting.
* What is Electrolysis? State and explain Faraday's laws of electrolysis.
* State Kohlrausch's law for electric conductance of an electrolyte at infinite dilution. Give an example.

* Define corrosion. What are the various factors affecting corrosion? How can it be prevented?
* Define the terms conductivity, equivalent conductivity, Molar conductivity. How is equivalent conductivity, determined experimentally?
* Predict the products of electrolysis in each of the following:
  (i) an aqueous solution of silver nitrate with silver electrodes
  (ii) an aqueous solution of $AgNO_3$ with platinum electrodes
  (iii) an aqueous solution of $CuCl_2$ with platinum electrodes.
* Explain:
  (i) Compounds of transitional metal are often coloured.
  (ii) Copper (I) is diamagnetic whereas copper (II) is paramagnetic.
  (iii) Why do transitional elements exhibit the tendency for complex formation? Give examples.
* Describe the preparation of $KMnO_4$ from pyrolusite ore. What happens when acidified $KMnO_4$ reacts with alcohol, oxalic acid and H_2O_2?
* What are interhalogen compounds? Why are these named so? Give structure of CIF3 and CIF5?
* How is Nitric acid prepared from Ostwald's process? Give its reaction with Zinc and Iron.
* Explain the Construction and working of Galvanic cell.
* Define Corrosion and how is it prevented.
  (i) Potassium Chloride and Cone. H_2SO_4
  (ii) Sodium Sulphide
  (iii) Potassium Iodide
* What is lanthanoid contraction? What is its cause and the consequences?
* How is $KMnO_4$ prepared from pyrolusite? Give its oxidizing properties in neutral medium with: (i) Manganese Sulphate (ii) Sodium Thiosulphate (iii) Hydrogen Sulphide
* Why do transition metals exhibit variable oxidation states and do form coloured compounds?
* What are Inner transition elements? Write their general electronic configuration. Give comparison of Actinides with Lanthanoids.
* Discuss the general properties of transition elements with reference to 3d-transition series.
* Give the method of preparation of $KMnO_4$. Discuss three oxidising properties of it in acidic medium.
* Write the names and electronic configuration of Noble gases.
* Name the elements of groups 15. Discuss their tendency to form:
  (i) Hydrides (ii) Oxides (iii) Oxyacid's.
* What do you mean by Abnormal Molecular Mass? Show that relative lowering of vapour pressure is a colligative property.
* What are electrochemical cells? Describe briefly fuel cell?

* Explain the manufacture of Ammonia by Haber's process.
* How is phosphate prepared from white phosphorous? Describe briefly its properties and uses.
* Give the electronic configuration of the elements of group 16.
* Discuss the necessary conditions in the manufacture of sulphuric acid by contact process.
* Label the diagram for the manufacture of sulphuric acid by contact process.
* Write notes on the following:
  (i) Aldol condensation (ii) Cannizzaro's reaction
* Give general methods of preparation of aldehydes. What happens when acetaldehyde reacts with glycol and hydroxylamine?
* Describe briefly the oxidation state of 3d-transition series elements along with the paramagnetic behaviour of the ions/metals of this series?
* $KMnO_4$ acts as a strong oxidising agent in acidic, basic and neutral medium. Give two examples in each case.
* Give manufacture of nitric acid. Give its action with metals.
* Write short notes on the following:-
  (i) Aldol condensation (ii) Cannizzaro's reaction.
* Write short notes on the following:
  (i) Cross aldol condensation (ii) Kolbe's electrolytic reaction
* Give any three general methods for the preparation of aldehydes.
* Give its reduction reactions with Tollen's reagent and Fehling's solution.
* Write short notes on the following:
  (i) Claisen reaction (ii) Transesterification (iii) Wolff-Kisher reduction
* Give any two methods of preparation of Acetone. Give its reaction with:
  (i) Methyl magnesium iodide (ii) Formaldehyde (iii) Chloroform
* Write five chemical properties of Aldehydes.
* Give five chemical properties of Carboxylic acids.
* Give three methods of preparation of Ketones and give the reactions of Acetone with:
  (i) HCN (ii) $NaHSO_3$
* Write three methods of preparation of Carboxylic acids and give the reaction of Acetic acid with:
  (i) PCI_5. (ii) NaOH
* How is acetic acid prepared from acetylene? How does it react with:
  (i) HI in presence of red P (ii) PCl_5 (iii) $P_2 O_5$ (iv) $C_2 H_5 OH$
* Give preparation of Ketone from alcohol and carboxylic acid. Give addition reaction of ketone any three.
* Distinguish between aldehydes and Ketones. Give reactions. Explain why formaldehyde gives.