CK SCHOOL OF PRACTICAL KNOWLEDGE- CUDDALORE-1

Comman Quarterly Examination – 2022-2023

1. Metallurgy

Very important questions :

1) What are the difference b/w mineral and ores ?
2) Describe a method for refining nickel.
3) How is gold ore leached by cyanide leaching ?
4) Explain the electrometallurgy of aluminium.
5) Explain the principle of electrolytic refining with an example.
6) Give the basic requirement for vapour phase refining.
7) Explain forth flotation process with an example.

Important questions :

1) Give the uses of aluminium.
2) Mention the role of iodine in refining of zirconium.
3) Give the limitations of Ellingham diagram.
4) Aluminium can be used as reducing agent for the reduction of chromic oxide, not magnesium oxide. Why ?
5) What is auto reduction ?| give an example.
6) What is the role of quicklime in the extraction of iron from its oxide Fe_2O_3.
7) Write down the observations of Ellingham diagram.

2. p-block elements - I

Very important questions :

1) Write a note on anamalous properties of the first element of p – block.
2) Write a note on Fischer – tropsch synthesis.
3) An aqueous solution of borox is basic in nature. Prove.
4) How will you identify borate radical ?
5) Describe the structure of diborane.
6) Write MCAfcc process.
7) Give an equation to boron trifluoride undergo hydrolysis.
8) How is alum prepared ?
9) Distinguish b/w graphite and diamond .

Important questions :

1) Give the uses of silicones.
2) Write a note on zeolites.

3) What is burnt alum ?
4) What are cyclic silicates.
5) Give the structure of CO and CO_2.
6) What is phosgene ? How it is prepared ? Give its use.
7) Carbondioxide is a very stable compound. Prove.
8) How is borax prepared .
9) Give the uses of boric acid.
10) A hydride of 2nd period alkali metal (A) on reaction with compound of boron (B) to give reducing agent (C). identify A, B, C.

3. p-block elements - II

Very important questions :

1) How is ammonia prepared laboratory ?
2) Describe the structure of ammonia.
3) How is nitric acid manufactured by Ostwald's process ?
4) Write a note on Holme's signal.
5) Give the structure and basicity of sulphurous and marshall acid.
6) Bleaching action of SO_2 is temporary. Prove.
7) How is chlorine prepared by Deacon's process ?
8) Why HF is not stored in glass bottles ? give equation.
9) What type of hybridisation occur in the following ? a) BrF_5 b) ClF_3 c) CLF
10) Sulphuric acid is a dibasic acid. Prove.

Important questions :

1) Give the oxidation state of i) O_2F_2 ii) Cl_2O_3
2) Ammonia acts as a reducing agent. Prove.
3) How does magnesium reacts with nitric acid ?
4) Distinguish b/w white and red phosphorous.
5) Describe the structure of phosphine.
6) Show that ozone is a powerful oxidising agent.
7) Describe the bleaching action of chlorine.
8) How is sulphuric acid manufactured by cascade process.
9) Give the balanced equation for the reaction between chlorine with cold NaOH and hot NaOH.
10) Give the uses of helium.

4. Transition and Inner Transition Elements

Very important questions :

1) What are transition metals ? give an example.
2) Describe the preparation of potassium dichromate.
3) What is chromyl chloride test ?

4) What are interstitial compounds ?
5) Why transition elements for co-ordination compounds ?
6) Calculate the equivalent weight of $KMnO_4$ in alkaline medium.
7) Gd^{3+} is colourless. Why ?
8) Compare lanthanides and actinoids.
9) Which is stronger reducing agent Cr^{2+} and Fe^{2+} ?

Important questions :

1) Calculate the number of unpaired electrons in Ti^{3+} and Mn^{2+} and calculate spin only magnetic moment.
2) Which is more stable Fe^{2+} (or) Fe^{3+}. Explain.
3) Give the consequences of lanthanide contraction.
4) Why do zirconium and Hafnium exhibit similar properties ?
5) Transition metals show high melting points why ?
6) Complete the following
   a) $Cr_2O_7^{2-} + I^- \longrightarrow$?
   b) $Cr_2O_7^{2-} + Sn^{2+} \longrightarrow$?
7) For 3d transition series, decrease in atomic radius from SC to V, there after upto Cu nearly remains same. Why ?
8) Transition elements exhibit variable oxidation state. Why ?

6. Solid State

Very important questions :

1) Distinguish b/w crystalline and amorphous solids.
2) Classify the following as covalent, ionic, metallic, and molecular solids.
   a) diamond   b) urea   c) naphthalene   d) cesium chloride
   e) sodium chloride   f) iron   g) brass   h) silicon carbide
3) Calculate the number of atoms in fcc unit cell.
4) Calculate the packing efficiency of body centred cubic system.
5) Explain AAA and ABAB type of packing in crystals.
6) Give any three characteristics of ionic crystals.
7) Distinguish b/w tetrahedral and octahedral roids.
8) Write a note on Frenkel defect.
9) How is density of unit cell calculated ?
10) ZnO is colourless at room temperature, it is heated yellow in colour. Why ?

Important questions :

1) What is primitive and non-primitive unit cell ?
2) What are F- centres ?
3) State Bragg's law.

4) Mention the edge length and crystallographic angle of monoclinic and hexagonal system.
5) Calculate the number of atoms in basis face centred unit cell.
6) What is meant by the term co-ordination number ?
7) What is the co-ordination number of bcc structure ?
8) Sketch a) SC   b) bcc   c) FCC unit cell ?

7. Chemical Kinetics

Very important questions :

1) Define average and instantaneous rate.
2) Distinguish b/w order and molecularity.
3) Explain pseudo first order reaction with an example.
4) Give three examples for first order reaction.
5) Derive integrated rate law for first order reaction A   products.
6) Define half life period of a reaction.
7) Write Arrhenius equation and explain the terms involved.
8) Draw a schematic representation of proper and improper alignment of reactants.
9) Calculate the collision factor (f) for a reaction having activation energy of 100 KJ mol^{-1} at 300k.
10) Show that in case of first order reaction, the time required for 99.9% completion is nearly ten times the time required for half completion of the process.
11) Explain briefly the collision theory of bimolecular reactions.
12) Explain the effect of catalyst on reaction on reaction rate with an example.
13) Show that for a first order reaction half life is independent of initial concentration.
14) The rate constant for a first order reaction is 1.54×10^{-3} s^{-1} calculate the rate constant.
15) The rate of formation of a dimer in a second order reaction is 7.5×10^{-3} mol. $L^{-1} S^{-1}$ at 0.05 mol. L^{-1} monomer concentration. Calculate the rate constant.

8. Ionic Equilibrium

Very important questions :

1) What are Lewis acid and bases ? give an example.
2) Explain common ion effect with an example.
3) Define buffer action.
4) Define ionic product of water. Give its valueat room temperature.
5) Identify the conjugate acid base pair for the following in aqueous solution.
   a) HS^- (aq) + HF F^-(aq) + H_2S
   b) HPO_4^{2-} + SO_3^{2-} PO_4^{3-} + HSO_3^-
6) Write the expression for solubility product of Hg_2Cl_2.
7) Derive Ostwald's dilution law.
8) Derive Henderson – Hasselbalch equation.
9) Mention the P^H of the following substance. A) bleach   B) Urine
10) Calculate   i) degree of hydrolysis   ii) hydrolysis constant   iii) PH of 0.1 M CH_3COONa (PKa for CH_3COOH is 4.74)

Important questions :

1) Define P^H.
2) Derive the relation b/w P^H and PO^H.
3) Calculate the P^H of 10^{-7} M HCl.
4) What are buffer solutions ? Mention its type.
5) Discuss the effect of the addition of 0.01M of solid sodium hydroxide to one litre of a buffer solution containing 0.8m CH_3COOH AND 0.8 m CH_3COONa.
6) Define buffer index.
7) Find the PH of a buffer solution containing 0.20 mole per litre sodium acetate and 0.18 moles per litre acetic acid. Ka for acetic acid is 1.8×10^{-5}.
8) Define solubility product.
9) Derive an expression for the hydrolysis constant and degree of hydrolysis of anionic hydrolysis.

11. Hydroxy Compounds and Ethers

Very important questions :

1) How are the following alcohols prepared by using Grignard reagent ?
   a) propan-2-ol   b) butan-1-ol
2) What is hydroboration.
3) Convert croton aldehyde into crotyl alcohol.
4) Write E_2 mechanism.
5) What is PCC ? what is the significance of PCC ? give an example.
6) Write swem oxidation.
7) Write dehydration reaction of glycerol.
8) How is phenol prepared from isopropyl benzene ?
9) Starting from phenol; how is picric acid prepared ?
10) Write coupling reaction of phenol.
11) Give a test to differentiate alcohol and phenol.
12) Write IUPAC name of

                CH_3
   i) CH_3-O-CH-CH_3 ii) CH_3-O-CH- CH_3
                CH_3 CH_3
13) One mole of HI reacts with 2- methoxy propane, mention the products with mechanism.
14) Write Williamson synthesis.
15) Write the uses of diethylether.
16) What is autooxidation of ethers ?
17) Distinguish b/w 1^0, 2^0, 3^0 alcohols by Victor – Meyer test.

12. Carboxyl Compounds and Carboxylic acids

Very important questions :

1) Complete the reaction

   i) $CH_3 C \equiv CH \xrightarrow[H_2SO_4]{Hg^{2+}} X$

   ii) $CH \equiv CH \xrightarrow[H_2SO_4]{Hg^{2+}} Y$
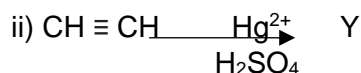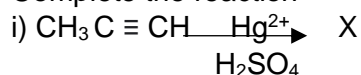
2) What is Rosen mund reduction ? what is the purpose of adding $BaSO_4$ in it ?
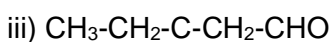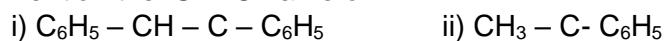3) How is benzaldehyde prepared by Etard reaction ?
4) What is urotropine ? How it is prepared ? give its use.
5) State and explain popof's rule.
6) Write a note on i) perkin reaction   ii) knoevenagal reaction.
7) Mention the IUPAC name of

   i) $C_6H_5 – CH – C – C_6H_5$ ii) $CH_3 – C\text{-} C_6H_5$

             OH   O   O

   iii) $CH_3\text{-}CH_2\text{-}C\text{-}CH_2\text{-}CHO$

             O

8) Give the mechanism of cannizaro reaction.
9) Write Benedicts solution test.
10) Benzoic acid does not undergo Friedel – crafts reaction. Give reason.
11) Formic aid reduces Tollen's reagent, but acetic acid does not why ?
12) Convert Toluene into benzoic acid.
13) Give the mechanism of esterification.
14) Give the test for carboxylic acids.
15) What is transesterification ?

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