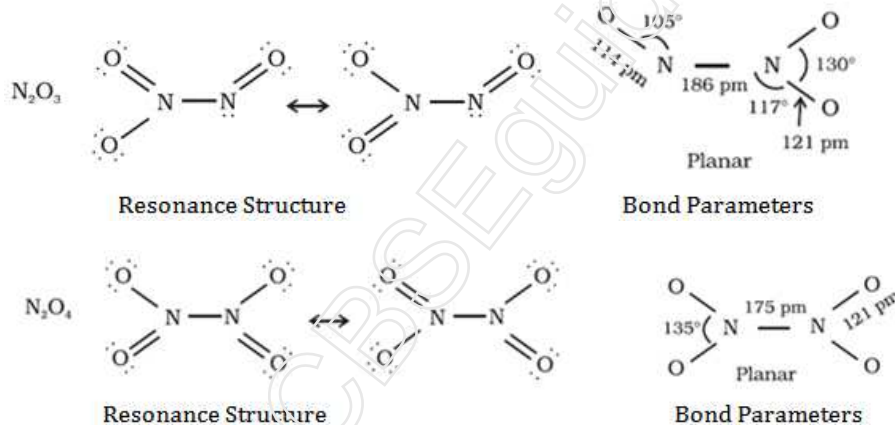


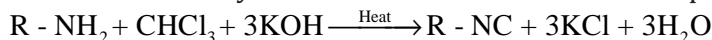
SAMPLE PAPER-01
CHEMISTRY (Theory)
Class – XII

Answers

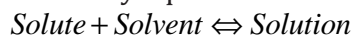
- When calcium chloride is added to silver chloride crystal, an impurity defect is formed. The addition of one calcium ion will replace two silver ions to maintain electrical conductivity. One of the positions of silver ion will be occupied by one calcium ion and other will be left as a hole similar to Schottky defect.
- 3-Bromo-2-methylbut-1-ene.
- Since CO acts as a poison for the catalyst in Haber's process, it lowers the activity of the catalyst and so, CO must be removed when ammonia is obtained.
- The imperfections in a crystal are caused by a departure from the periodic arrangement in the vicinity of an atom or group of atoms, the imperfections are called point defects. These arise from an error at a single point. Point defects are classified into three types namely, stoichiometric defects, impurity defects and non-stoichiometric defects.
- This is because there is a force of attraction between adsorbate and adsorbent due to which there is decrease in surface energy which appears as heat.
-



- Carbylamine test – Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form isocyanides or carbylamines which are foul smelling substances. Secondary and tertiary amines do not show this reaction. This reaction is known as carbylamines reaction or isocyanide test and is used as a test for primary amines.



- The solubility of a solid in a liquid is significantly affected by temperature changes. Consider the equilibrium represented by equation:



This, being dynamic equilibrium, must follow Le Chateliers Principle. If in a nearly saturated solution, the dissolution process is endothermic ($\Delta_{\text{sol}} H > 0$), the solubility should increase with rise in temperature and if it is exothermic ($\Delta_{\text{sol}} H < 0$) the solubility should decrease. These trends are also observed experimentally.

- A unit cell is characterized by two parameters,

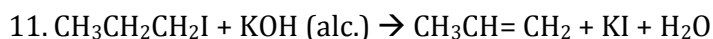
- a) Dimensions along the three edges represented as a, b and c.
- b) Angles between edges α between b and c, β between a and c and γ between a and b.
Hence a unit cell is represented by six parameters.

Or

- a) $1/8$ part of an atom located at the corner belongs to neighbouring unit cell.
- b) No part.

10.

- i. This is because the nitro group is electron withdrawing group and will increase the positive charge on oxygen to make it more acidic. On the other hand, methoxy group is electron releasing group and will decrease positive charge on oxygen making it less acidic as O – H bond will not break easily.
- ii. Ethers have angular structure similar to water, in which oxygen involves sp^3 hybridisation. Oxygen is surrounded by two O – R bonds and two lone pairs. Due to angular structure, ethers have dipole moment even if the two alkyl groups are identical because two C – O moments do not cancel each other.



Molecular mass of iodopropane = $3 \times 12 + 7 \times 1 + 127 = 170$

Molecular mass of propene = $3 \times 12 + 6 \times 1 = 42$

170 g of iodopropane gives 42 g of propene

Therefore,

34 g of iodopropane gives $42/170 \times 34 = 8.4$ g

But the actual yield is 36%, so

The actual mass of propene obtained = $8.4 \times 3.6/100 = 3.024$ g.

12.

- a. Hydrogen bonding – these are weak forces which arise between a partially positive hydrogen and a partially negative atom on the same or different molecule.
- b. Ionic bonding – these takes place between an ionic and cationic side chains resulting side chain cross linking.
- c. Covalent bonding – it is a inter chain bonding is the disulphide bond formed between the sulphur atoms of two cysteine residues.
- d. Hydrophobic bonding – proteins in aqueous solutions fold so that most of the hydrophobic chains become clustered inside the folds. The polar side chains which are hydrophilic lie on the outside the protein.

13.

- i. $\text{POCl}_3 + 3\text{H}_2\text{O} \rightarrow \text{H}_3\text{PO}_4 + 3\text{HCl}$
- ii. $\text{P}_4\text{O}_{10} + \text{H}_2\text{O} \rightarrow 4 \text{H}_3\text{PO}_4$
- iii. $\text{P}_4 + \text{KOH} + \text{H}_2\text{O} \rightarrow \text{PH}_3 + 3 \text{KH}_2\text{PO}_2$

14.

- a) The chemical substances which are used for the treatment of stress, mild and severe mental diseases are called tranquilizers. Example – Iproniazid.

- b) The chemical substances which are used to relieve pains without causing impairment of consciousness, mental confusion, paralysis and other disturbances of nervous system are called analgesics. Example – Novalgin.
- c) The chemical substances which are used to lower the temperature of the body in high fever are called antipyretics. Example – Aspirin.
15. Copolymerization is defined as a process in which two or more monomers combine to form a polymer. It contains a multiple units of each monomer in the chain.
Examples – 1,3-butadiene and acrylonitrile, 1,3-butadiene and styrene
- 16.
- It should be high and selective adsorption power.
 - It should be finely divided to offer greater surface area for adsorption.
 - It should be pure.
 - It should not react chemically either with the sample components.
- 17.
- Noble gases are monoatomic gases and are held together by weak vander Waals forces. Therefore, they are liquefied at very low temperatures. Hence they have low boiling points.
 - The elements in group 18 have completely filled valence shell except He. So, they have neither any tendency to lose nor to gain electrons. However, they react with few elements only under certain conditions and so are called noble gases.
 - He is used as a diluent for oxygen in diving apparatus because of its low solubility in blood.
- 18.
- Nature of the ligand.
 - Oxidation state of the metal ion.
 - Nature of the metal ion.
 - Geometry of coordination entity.

Or

The more basic a ligand, the greater is the ease with which it can donate its lone pairs of electrons and therefore, the greater is the stability of the complexes formed by it. For anionic ligands, the higher the charge and the smaller the size, the more stable is the complex formed.

19.

S. No	Addition polymers	Condensation polymers
1.	It involves one monomer.	It involves two monomers.
2.	The monomers are unsaturated compounds.	The monomers contain two functional groups.
3.	Different monomers add to form a polymer having same molecular formula of the repeating structural unit as that of starting monomer.	A large number of monomers combine with the loss of simple molecules to form a polymer having molecular formula of the repeating structural unit different than that of starting monomers.

4.	Egs - PVC, polythene etc.	Egs - Bakelite, nylon etc.
----	---------------------------	----------------------------

20. Molecular mass of $C_3H_6O_3 = 12 \times 3 + 6 \times 1 + 3 \times 16 = 90$ g

Now, 0.6 g of the compound evolve methane at STP = 295.7 mL

90 g of compound evolve methane at STP = $295.7/0.6 \times 90 = 44355$

Moles of methane produced = $44355/22400 = 1.98$ or 2 approx.

Therefore, one mole of compound produces two moles of methane gas. There are two active hydrogen atoms present in one molecule of compound.

21.

$$\text{Average Rate} = \frac{1}{2} \left\{ -\frac{\Delta[N_2O_5]}{\Delta t} \right\}$$

Substituting the values, we get $1.13 \times 10^{-5} \text{ mol/L/s}$

$$\text{Rate} = \text{Average Rate} = \frac{1}{4} \left\{ -\frac{\Delta[NO_2]}{\Delta t} \right\}$$

Substituting the values,

$$\frac{\Delta[NO_2]}{\Delta t} = 2.72 \times 10^{-3} \text{ mol/L/min}$$

22. F is most electronegative element and so cannot show positive oxidation states whereas the other halogens are less electronegative and so show various positive oxidation states. They also have vacant d-orbitals and hence can expand their octets and show +1, +3, +5 and +7 oxidation states.

23.

a. Industrial alcohol is made unfit for drinking by adding methyl alcohol $CuSO_4$ and pyridine. This alcohol is called denatured alcohol.

Ethanol is an excellent solvent and if taken in large quantity it is harmful for humans. So in order to supply ethanol and to refrain people from drinking it is denatured.

b. Yes, because it will help in meeting energy crisis and reduce our fiscal deficit which is created due to import of gasoline.

c. Values - Concern for energy crisis and Concern for economy of country.

24. Conductivity = $26 \times 10^{-2} \text{ ohm}^{-1} \text{ cm}^{-1}$

Resistance of solution = 31.6 ohm

Concentration = 1 M $H_2SO_4 = 98 \text{ g/L}$

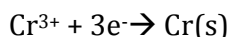
Equivalent weight of sulphuric acid = 49

Gram equivalents per litre = $98/49 = 2$

Equivalent conductivity = $k \times 1000/C$

$$= 26 \times 10^{-2} \times 1000/2 = 130 \text{ ohm}^{-1} \text{ cm}^2 \text{ equiv}^{-1}.$$

Or



3 mol of electricity are required to deposit 1 mol of Cr.

52 g of Cr require current of $3 \times 96500 \text{ C}$

1 g of Cr will require current = $3 \times 96500 / 52 = 5567.3 \text{ C}$

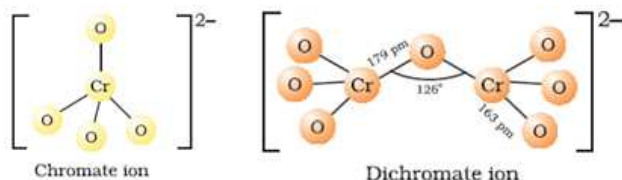
The number of coulombs = current \times time

Time = no. of coulombs / current

= $5567.3 / 1.25 = 4453.8 \text{ sec}$ or 1.24 hrs.

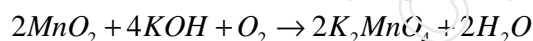
25.

a)



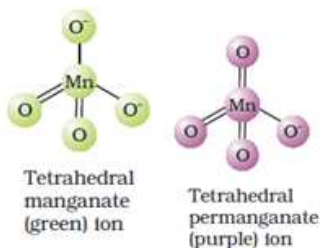
b)

Potassium permanganate is prepared by fusion of MnO_2 with an alkali metal hydroxide and an oxidising agent like KNO_3 . This produces the dark green K_2MnO_4 which disproportionates in a neutral or acidic solution to give permanganate.

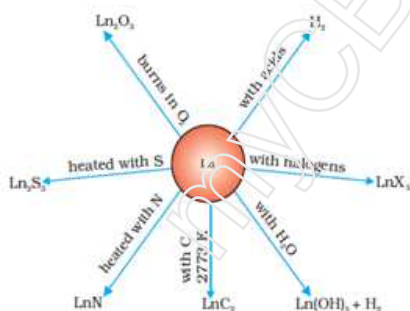


Or

a)

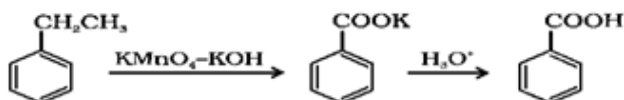


b)

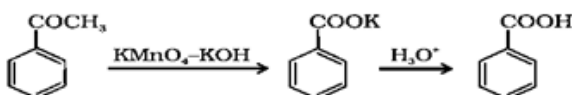


26.

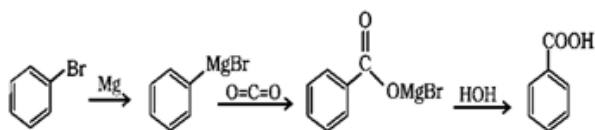
a.



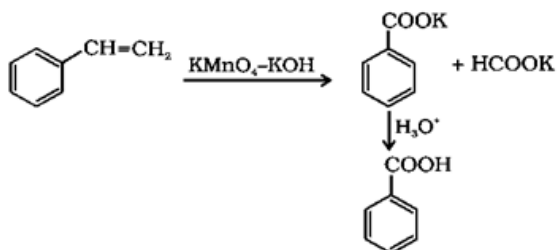
b.



c.



d.

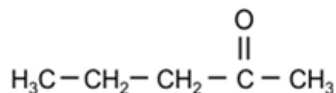


Or

Since the compound X does not reduce Tollen's reagent, the compound X must belong to ketone group.

The compound X forming an addition compound with sodium hydrogen sulphite and giving positive iodoform test confirms that the compound is methyl ketone.

Also, compound X on oxidation gives ethanoic and propanoic acid, so the compound can be



Since this compound is unsymmetrical ketone, the compound is Pentan-2-one with molecular mass 86.