

MOST

**IMPORTANT
QUESTIONS**



ICSE Board
Class X – Chemistry
Most Important Questions

Chapter 1: Periodic Table, Periodic Properties and Variations of Properties

1. Define the following terms : [2M]
- (i) Ionisation potential
 - (ii) Electron affinity

2. The following table shows the electronic configuration of the elements W, X, Y, Z:

Element	W	X	Y	Z
Electronic configurations	2, 8, 1	2, 8, 7	2, 5	1

Answer the following question based on the table above:

What is the formula of the compound formed between : [2M]

1. X and Z 2. W and X

3. An element has an atomic number 16. State [3M]
- (i) the period to which it belongs.
 - (ii) the number of valence electrons.
 - (iii) whether it is a metal or non-metal.
4. Give reasons: [3M]
- (i) The oxidising power of elements increases on moving from left to right along a period in the periodic table.
 - (ii) Ionisation potential of the element increases across a period.
 - (iii) Alkali metals are good reducing agents.

5. Use the letters only written in the Periodic Table given below to answer the questions that follow : [4M]

	I	II	GROUPS										III	IV	V	VI	VII	0
PERIODS																		L
1																		
2	Q												E	G	J	Z	M	
3	R																	
4	T																	
5																		

- (i) State the number of valence electrons in atom J.
 (ii) Which element has shown forms ions with a single negative charge?
 (iii) Which metallic element is more reactive than R?
 (iv) Which element has its electrons arranged in four shells?
6. Arrange the following as per the **instructions** given in the brackets: [4M]
- (i) Cs, Na, Li, K, Rb (increasing order of metallic character).
 (ii) Mg, Cl, Na, S, Si (decreasing order of atomic size).
 (iii) Na, K, Cl, S, Si (increasing order ionization energy).
 (iv) Cl, F, Br, I (increasing order of electron affinity).
7. Consider the section of the periodic table given below : [5M]

Group Numbers	I A	II A	III A	IV A	V A	VI A	VII A	0
	1	2	13	14	15	16	17	18
	Li		F			O	J	Ne
	A	Mg	E	Si		H	K	
	B	C		F	G			L

Note : In this table B does not represent boron
 C does not represent carbon
 F does not represent fluorine
 H does not represent hydrogen
 K does not represent potassium

You must see the position of the element in the periodic table.

Some elements are given in their own symbol and position in the periodic table, while others are shown with a letter. With reference to the table:

- (i) Which is the most electronegative?
- (ii) How many valence electrons are present in G?
- (iii) Write the formula of the compound between B and H.
- (iv) In the compound between F and J, what type of bond will be formed?
- (v) Draw the electron dot structure for the compound formed between C and K.

8. For the following questions refer to the periodic table: [5M]

- (a) (i) Name the first and last element in period 2.
- (ii) What happens to the atomic size of elements moving from top to bottom of a group?
- (iii) Which of the elements has the greatest electron affinity among the halogens?
- (iv) What is the common feature of the electronic configurations of the elements in group 17?
- (b) Supply the missing word from those in the brackets (Do not write the sentence)
 - (i) If an element has a low ionisation energy then it is likely to be _____ (metallic/non-metallic).
 - (ii) If an element has seven electrons in its outermost shell then it is likely to have the _____ (largest/smallest) atomic size among all the elements in the same period.
- (c) (i) The metals of group 2 from top to bottom are : Be, Mg, Ca, Ba. Which of these metals will form ions most readily and why?
- (ii) What property of an element is measured by electronegativity?

Chapter 2: Chemical Bonding

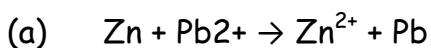
1. [2M]

- (a) Which of the following is not a common characteristic of an electrovalent compound?
 - (A) High melting point
 - (B) Conducts electricity when molten
 - (C) Consists of oppositely charged ions
 - (D) Ionises when dissolved in water.

(b) Among the following the one which is composed of all the three kinds of bond (ionic; covalent and co-ordinate bond) is:

- (A) Sodium chloride
- (B) Ammonia
- (C) Carbon tetrachloride
- (D) Ammonium chloride

2. Divide the following reduction reactions into oxidation and reduction half reactions. [2M]



3. [3M]

(i) What is a lone pair of electrons?

(ii) Draw an electron dot diagram of a hydronium ion and label the lone pair of electrons.

(iii) Name a neutral covalent molecule which contains one lone pair of electrons.

4. [3M]

There are three elements E, F, G with atomic numbers 19, 8 and 17 respectively.

(i) Classify the elements as metals and non-metals.

(ii) Give the molecular formula of the compound formed between E and G and state the type of chemical bond in this compound.

5. [4M]

(a) Name the charged particles which attract one another to form electrovalent compounds.

(b) In the formation of electrovalent compounds, electrons are transferred from one element to another. How are electrons involved in the formation of a covalent compound?

(c) The electronic configuration of nitrogen is 2,5. How many electrons in the outer shell of nitrogen atom are not involved in the formation of a nitrogen molecule?

- (d) In the formation of magnesium chloride (by direct combination between magnesium and chlorine), name the substance that is oxidised and the substance that is reduced.
6. Two non metals combine with each other by the sharing of electrons to form a compound X. [4M]
- (a) What type of chemical bond is present in X.
- (b) State whether X will have a high melting point or low melting point.
- (c) Will it be a good conductor of electricity or not?
- (d) Will it dissolve in organic solvents or not?
7. (a) Give the electron dot structures of : [3M]
- (i) NaCl (ii) MgCl₂ (iii) CaO
- (b) Choose the correct answer from the choice A, B, C and D: [2M]
- (i) The property which is characteristic of an electrovalent compound is that:
- (A) it is easily vaporised
- (B) it has a high melting point
- (C) it is a weak electrolyte
- (D) it often exists as a liquid
- (ii) When a metal atom becomes an ion:
- (A) it loses electrons and is oxidised
- (B) it gains electrons and is reduced
- (C) it gains electrons and is oxidised
- (D) it loses electrons and is reduced
8. (a) Element X is a metal with a valency 2. [3M]
- Element Y is a non-metal with a valency 3.
- (i) Write equations to show how X and Y form ions.
- (ii) If Y is a diatomic gas, write the equation for the direct combination of X and Y to form a compound.
- (iii) If the compound formed between X and Y is melted and an electric current passed through the molten compound, the element X will be obtained at the _____ and Y at the _____ of the electrolytic cell.
(Provide the missing words)

(b) Match the column A with column B. [2M]

Column A	Column B
1. Sodium chloride	(a) Increases
2. Ammonium ion	(b) Ionic bond
3. Electronegativity	(c) Covalent and co-ordinate bond
4. Non metallic character	(d) Decreases

Chapter 3: Acids, Bases and Salts

1. Name the following: [2M]

- A basic solution which does not contain a metallic element.
- An alkali which on dissociation produces a high concentration of hydroxyl ions.
- A complex salt solution used for testing a basic gas lighter than air.
- A base which reacts with hydrochloric acid to give a salt which on hydrolysis gives a slightly acidic solution.

2. Give one example in each case: [2M]

- oxy acid
- hydracids
- monobasic acid
- dibasic acid
- tribasic acid
- triacid base

3. A, B, C and D summarize the properties of sulphuric acid depending on whether it is dilute or concentrated. [3M]

A = Typical acid property

B = Non volatile acid

C = Oxidizing agent

D = Dehydrating agent

Choose the property (A, B, C or D) depending on which is relevant to each of the following

- Preparation of Hydrogen chloride gas.
- Preparation of Copper sulphate from copper oxide.
- Action of conc. Sulphuric acid on Sulphur.

4. Explain the following: [3M]
- Dilute nitric acid is generally considered a typical acid but not so in its reaction with metals.
 - Concentrated nitric acid appears yellow when it is left standing in a glass bottle.
 - An all glass apparatus is used in the laboratory preparation of nitric acid.

5. (a) Write balanced chemical equations for the following : [3M]
- Chlorine reacts with excess of ammonia.
 - Ferric hydroxide reacts with nitric acid.
 - Zinc oxide dissolves in sodium hydroxide.
- (b) What happens to the crystals of washing soda when exposed to air? Name the phenomenon exhibited. [1M]

6. (a) Match the following : [2M]

Column A	Column B
1. Acid salt	A. Contains ions and molecules
2. Double salt	B. Ferrous ammonium sulphate
3. Ammonium hydroxide solution	C. Contains only ions
4. Dilute hydrochloric acid	D. Sodium hydrogen sulphate

- (b) Match the following : [2M]

Column A	Column B
1. Carbon tetrachloride	A. Sodium potassium carbonate
2. Mixed salt	B. Sodium zincate
3. Complex salt	C. Sodium carbonate
4. Normal salt	D. Contains only molecules

7. Write balanced equations to satisfy each statement: (Any five) [5M]
- Acid + Sulphide \rightarrow Salt + Hydrogen sulphide
 - Acid + Active metal \rightarrow Salt + Hydrogen
 - Acid + Base \rightarrow Salt + Water

- (d) Acid + Chloride \rightarrow Salt + Hydrochloric acid gas
 (e) Acid + Carbonate \rightarrow Salt + Water + Carbon dioxide
 (f) Acid + Sulphide \rightarrow Salt + Water + Sulphur dioxide

8. Write the balanced chemical equation for each of the following reactions: [5M]
 (i) Sodium thiosulphate is reacted with dilute hydrochloric acid
 (ii) Calcium bicarbonate reacts with dilute hydrochloric acid
 (iii) Dilute sulphuric acid is poured over sodium sulphite
 (iv) Lead nitrate solution is added to sodium chloride solution
 (v) Zinc is heated with sodium hydroxide solution

Chapter 4: Analytical Chemistry - Use of Ammonium Hydroxide and Sodium Hydroxide

1. Select the correct answer from the choices A, B, C, D which are given below :
 The salt which in solution gives a pale green precipitate with sodium hydroxide solution and a white precipitate with barium chloride solution is [1M]
 A: Iron (III) sulphate
 B: Iron (II) sulphate
 C: Iron (II) chloride
 D: Iron (III) chloride
2. Choose the correct answer from the options given below : [1M]
 Hydroxide of this metal is soluble in sodium hydroxide solution.
 (A) Magnesium
 (B) Lead
 (C) Silver
 (D) Copper
3. Write the equation for each of the following reactions : [2M]
 (i) Sulphur is heated with concentrated sulphuric acid.
 (ii) Ammonium chloride is heated with sodium hydroxide.
4. (a) What do you observe when sodium hydroxide solution is added to zinc sulphate solution in excess? [1M]
 (b) How would you distinguish between Zn^{2+} and Pb^{2+} using ammonium hydroxide solution? [1M]

5. Write the observations and balanced equations for the following reactions: [3M]
- Sodium hydroxide is added dropwise till in excess to a solution of zinc sulphate.
 - Ammonium hydroxide is added first in a small quantity and then in excess to a solution of copper sulphate.
 - Excess of ammonium hydroxide is added to a substance obtained by adding hydrochloric acid in silver nitrate solution.
6. (a) Give one chemical test to distinguish between the following pairs of compounds: [3M]
- Zinc sulphate solution and Zinc chloride solution.
 - Iron (II) chloride solution and Iron (III) chloride solution.
 - Calcium nitrate solution and Calcium solution.
7. The following table shows the tests of student performed on aqueous solutions A, B, C and D. Write down in your answer scripts the observations (i) to (iv) that were made. [4M]

Test	Observation	Conclusions
(i) To solution A, barium chloride solution and dilute hydrochloric acid were added.	(i)	A contains SO_4^{2-} ions.
(ii) To solution B, sodium hydroxide solution was added.	(ii)	B contains Fe^{3+} ions.
(iii) To solution B, sodium hydroxide solution was added.	(iii)	C contains Cu^{2+} ions.
(iv) To solution D, silver nitrate solution and dilute nitric acid were added.	(iv)	D contains Cl^- ions.

8. What do you observe when caustic soda solution is added to the following solutions : first a little and then in excess.

- (i) FeCl_3
- (ii) $\text{Al}_2(\text{SO}_4)_3$
- (iii) ZnSO_4
- (iv) $\text{Pb}(\text{NO}_3)_2$
- (v) CuSO_4

Also give balanced chemical equations. [5M]

9.

(a) Give one test each to distinguish between the following pairs of chemicals :

- (i) Zinc nitrate solution and calcium nitrate solution.
- (ii) Sodium nitrate solution and sodium chloride solution.
- (iii) Iron (III) chloride solution and copper chloride solution. [3M]

(b) State one observation for each of the following : [2M]

- (i) Excess ammonium hydroxide solution is added to lead nitrate solution.
- (ii) Sodium hydroxide solution is added to ferric chloride solution at first a little and then in excess.

10.

(a) Write the equation for each of the following reactions : [2M]

- (i) Sulphur is heated with concentrated sulphuric acid.
- (ii) Ammonium chloride is heated with sodium hydroxide.

(b) Sodium hydroxide solution is added to the solutions containing the ions mentioned in list X. List Y gives the details of the precipitate. Match the ions with their coloured precipitates. [3M]

List X		List Y
(i)	Pb^{2+}	A. Reddish brown
(ii)	Fe^{2+}	B. White insoluble in excess
(iii)	Zn^{2+}	C. Dirty green
(iv)	Fe^{3+}	D. White soluble in excess
(v)	Cu^{2+}	E. White soluble in excess
(vi)	Ca^{2+}	F. Blue

Chapter 5: Mole Concept and Stoichiometry

1. The gas law which relates the volume of a gas to the number of molecules of the gas is :
 - (a) Avogadro's Law
 - (b) Gay - Lussac's Law
 - (c) Boyle's Law
 - (d) Charle's Law [2M]

2. Calculate the relative molecular mass of Ammonium chloroplatinate, $(\text{NH}_4)_2[\text{PtCl}_6]$. [2M]

3. The equation for the burning of octane is:

$$2\text{C}_8\text{H}_{18} + 25\text{O}_2 \rightarrow 16\text{CO}_2 + 18\text{H}_2\text{O}$$
 - i. How many moles of carbon dioxide are produced when one mole of octane burns?
 - ii. What volume, at STP, is occupied by the number of moles of CO_2 determined in (b) (i)?
 - iii. If the relative molecular mass of carbon dioxide is 44, what is the mass of carbon dioxide produced by burning two moles of octane?
What is the empirical formula of octane? [5M]

4. Correct the following statements. [5M]

For example: 'Chlorine is a bleaching agent'.
Should read as 'Moist chlorine is a bleaching agent'.

 - i. Lead bromide conducts electricity.
 - ii. Copper reacts with nitric acid to produce nitrogen dioxide.
 - iii. Haematite is the chief ore of aluminium.
 - iv. Equal masses of all gases under identical conditions contain the same number of molecules.
 - v. Hydrochloric acid is prepared in the laboratory by passing hydrogen chloride directly through water.

5. (a) An organic compound with vapour density = 94 contains
C = 12.67%, H = 2.13% and Br = 85.11%. Find the molecular formula. [Atomic mass : C = 12, H = 1, Br = 80]

- (b) Calculate the mass of :
- 10^{22} atoms of sulphur.
 - 0.1 mole of carbon dioxide. [Atomic mass : S = 32, C = 12 and O = 16 and Avogadro's number = 6×10^{23}] [5M]
6. 4.5 moles of calcium carbonate are reacted with dilute hydrochloric acid. [5M]
- Write the equation for the reaction.
 - What is the mass of 4.5 moles of calcium carbonate? (relative molecular mass of calcium carbonate is 100).
 - What is the volume of carbon dioxide liberated at S.T.P.?
 - What mass of calcium chloride is formed?
(Relative molecular mass of calcium chloride is 111)
 - How many moles of HCl are used in this reaction?
7. [5M]
- A gas cylinder contains 24×10^{24} molecules of nitrogen gas. If Avogadro's number is 6×10^{23} and the relative atomic mass of nitrogen is 14, calculate:
 - Mass of nitrogen gas in the cylinder.
 - Volume of nitrogen at STP in dm^3 .
 - Commercial sodium hydroxide weighing 30 g has some sodium chloride in it. The mixture on dissolving in water and subsequent treatment with excess silver nitrate solution formed a precipitate weighing 14.3 g. What is the percentage of sodium chloride in the commercial sample of sodium hydroxide? The equation for the reaction is $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$.
[Relative molecular mass of NaCl = 58; AgCl = 143]
 - A certain gas 'X' occupies a volume of 100 cm^3 at STP and weighs 0.5 g. Find its relative molecular mass.

Chapter 6: Electrolysis

- Some word/words are missing in the following statement. You are required to rewrite the statement in the correct form using the appropriate word/words:
Cations migrate during electrolysis. [1M]
- During the electrolysis of molten lead bromide which of the following takes place? [2M]
 - Bromine is released at the cathode

- (b) Lead is deposited at the anode
- (c) Bromine ions gain electrons
- (d) Lead is deposited at the cathode

3. Complete and balance the following reactions: [2M]

- (i) $4\text{H}^+ + \underline{\hspace{2cm}} \rightarrow 2\text{H}_2$
- (ii) $\text{Cl}^- - 1\text{e}^- \rightarrow \underline{\hspace{2cm}}$
- (iii) $\text{CH}_3\text{COOH} \rightleftharpoons \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

4. Three different electrolytic cells A, B and C are connected in separate circuits. The electrolytic cell A contains sodium chloride solution. When the circuit is completed, a bulb in the circuit glows brightly. The electrolytic cell B contains acetic acid solution and in this case the bulb in the circuit glows dimly. The electrolytic cell C contains sugar solution and the bulb does not glow. Give a reason for each of these observations. [3M]

5. Mr Ramu wants to electroplate his key chain with nickel to prevent rusting.

For this electroplating:

- i. Name the electrolyte
- ii. Name the cathode
- iii. Name the anode
- iv. Give the reaction at the cathode
- v. Give the reaction at the anode

6. A metal article is to be electroplated with silver. The electrolyte selected is sodium argentocyanide. [5M]

- i. What kind of salt is sodium argentocyanide?
- ii. Why is it preferred to silver nitrate as an electrolyte?
- iii. State one condition to ensure that the deposit is smooth, firm and long lasting.
- iv. Write the reaction taking place at the cathode.
- v. Write the reaction taking place at the anode.

7.

- (a) Differentiate between electrical conductivity of copper sulphate solution and copper metal. [2M]

(b) During the electrolysis of copper (II) sulphate solution using platinum as cathode and carbon as anode: [3M]

- What do you observe at the cathode and at the anode?
- What change is noticed in the electrolyte?
- Write the reactions at the cathode and at the anode.

8. Select the correct answer from the list give in brackets: [5M]

- An aqueous electrolyte consists of the ions mentioned in the list, the ion which could be discharged most readily during electrolysis.
[Fe²⁺, Cu²⁺, Pb²⁺, H⁺].
- The metallic electrode which does not take part in an electrolytic reaction.
[Cu, Ag, Pt, Ni].
- The ion which is discharged at the anode during the electrolysis of copper sulphate solutions using copper electrodes as anode and cathode.
[Cu²⁺, OH⁻, SO₄²⁻, H⁺].
- When dilute sodium chloride is electrolysed using graphite electrodes, the cation is discharged at the cathode most readily.
[Na⁺, OH⁻, H⁺, Cl⁻].
- During silver plating of an article using potassium argentocyanide as an electrolyte, the anode material should be [Cu, Ag, Pt, Fe].

Chapter 7: Metallurgy

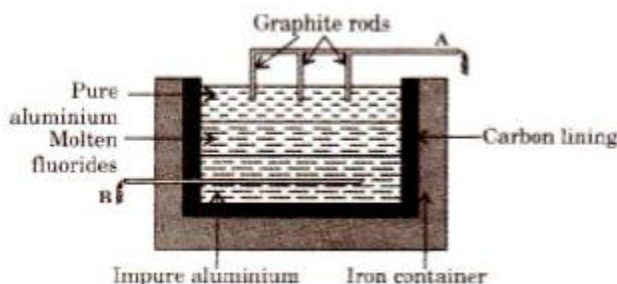
- What would you observe when carbon monoxide is passed over heated copper oxide? [1M]
- State the property of the metal being utilised in the following : [1M]

Use of metal	Property
Zinc in Galvanisation	
Aluminium in Thermite welding	

- Which of the following metallic oxides cannot be reduced by normal reducing agents? [1M]

(A) Magnesium oxide	(B) Copper (II) oxide
(C) Zinc oxide	(D) Iron (III) oxide

4. Find the odd one out and explain your choice (Note: Valency is not a criterion.): [2M]
- (i) Sulphur, Phosphorus, Carbon, Iodine
(ii) Copper, Lead, Zinc, Mercury
5. The sketch below illustrates the refining of aluminium by Hoopes process. [3M]



- i. Which of A and B is the cathode and which one is the anode?
ii. What is the electrolyte in the tank?
iii. What material is used for the cathode?
6. Match the properties and uses of alloys in List 1 with the appropriate answer from List 2. [5M]

List 1	List 2
(i) The alloy containing Cu and Zn is hard, silvery and is used in decorative articles.	A. Duralumin
(ii) It is stronger than aluminium, light and is used in making light tools.	B. Brass
(iii) It is lustrous, hard, corrosion resistant and is used in surgical instruments.	C. Bronze
(iv) Tin lowers the melting point of the alloy and is used for soldering purpose.	D. Stainless steel
(v) The alloy is hard, brittle, takes up polish and is used for making statues.	E. Solder

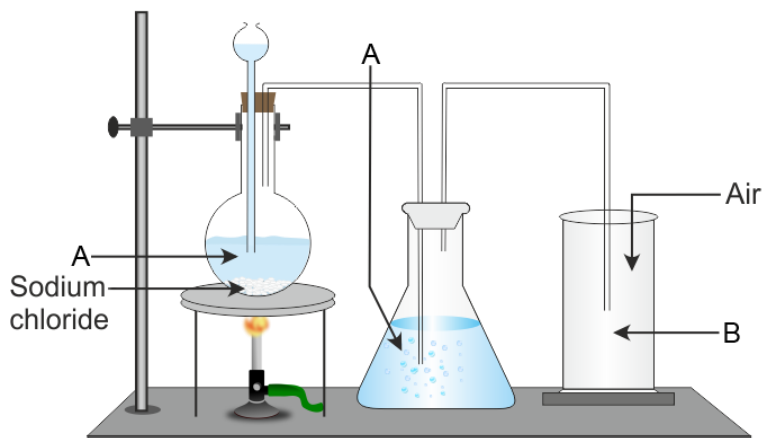
7. Answer the following questions: [5M]
- Name a metal which is found abundantly in the Earth's crust.
 - What is the difference between calcination and roasting?
 - Name the process used for the enrichment of sulphide ore.
 - Write the chemical formulae of one main ore of iron and aluminium.
 - Write the constituents of electrolyte for the extraction of aluminium.
8. [5M]
- (a) Name the following metals: (Any two)
- A metal present in cryolite other than sodium.
 - A metal which is unaffected by dilute or concentrated acids.
 - A metal present in period 3, group 1 of the periodic table.
- (b) The following questions are relevant to the extraction of aluminium:
- State the reason for addition of caustic alkali to bauxite ore during purification of bauxite.
 - Give a balanced chemical equation for the above reaction.
 - Along with cryolite and alumina, another substance is added to the electrolyte mixture. Name the substance and give one reason for the addition.

Chapter 8: Hydrogen Chloride

1. State one chemical test to distinguish between the following pair: [1M]
Manganese dioxide and Copper (II) oxide
2. Some word/words are missing in the following statement. You are required to rewrite the statement in the correct form using the appropriate word/words: [1M]
Aqua regia contains one part by volume of nitric acid and three parts by volume of hydrochloric acid.
3. Write the equation for the following reactions: [4M]
- Dilute hydrochloride acid and sodium thiosulphate.
 - Dilute hydrochloric acid and lead nitrate solution.
 - Concentrated hydrochloric acid and potassium permanganate solution.
 - Silver nitrate solution and sodium chloride solution.

4. Manganese (IV) oxide, lead (IV) oxide and red lead (Pb_3O_4) react with concentrated hydrochloric acid liberating chlorine. [3M]
- What is the common property shown by these metals oxides?
 - Write the equation for the reaction of hydrochloric acid with Pb_3O_4 .
 - What kind of compound can be added to the bleaching powder to obtain chlorine?
5. [3M]
- What is the property of concentrated sulphuric acid which allows it to be used in the preparation of hydrogen chloride and nitric acid?
 - What property of hydrogen chloride is demonstrated when it is collected by downward delivery (upward displacement)?
 - Why is hydrogen chloride not collected over water?
6. [3M]
- Name the experiment illustrated in the diagram.
 - Which property of hydrogen chloride is demonstrated by this experiment?
 - State the colour of the water that has entered the round bottomed flask.
7. [5M]
- What must be added to sodium chloride to obtain hydrogen chloride? Write the equation for the reaction.
 - What would you see when hydrogen chloride mixes with ammonia.
 - Hydrogen chloride dissolves in water forming an acidic solution.
 - Name the experiment which demonstrates that hydrogen chloride is highly soluble in water.
 - Give three distinct tests (apart from using an indicator) you would carry out with this solution to illustrate the typical properties of an acid.
 - Write the equation for the reaction of hydrochloric acid with each of the following:
 - Lead nitrate solution
 - Manganese dioxide

8. With respect to the laboratory preparation of hydrochloric acid answer the following questions. [5M]



- Name the substance A and give its use.
- Which method is used to collect hydrogen chloride gas?
- Give the reaction which place in round bottom flask.
- Why is the temperature of the reaction mixture kept below 200 °C?
- How can hydrochloric acid be prepared from substance B?

Chapter 9: Ammonia

- Give balanced equation for the following reaction: [1M]
Ammonia and oxygen in the presence of a catalyst.
- State what is observed when excess of ammonia is passed through an aqueous solution of lead nitrate? [1M]
- Write the equations for the following reactions which in the formation of ammonia. [2M]
 - A mixture of ammonium chloride and slaked lime is heated.
 - Aluminium nitride and water.
- [2M]
 - Name the gas evolved in each case (formula is not acceptable). The gas that can be oxidised to sulphur.
 - Write a fully balanced equation for the following cases : Magnesium nitride is treated with warm water.

5. What do you observe when ammonia is passed through the following : (Also give equations) [3M]
- Copper oxide
 - Lead oxide
 - Excess chlorine
6. The following questions are based on the preparation of ammonia gas in the laboratory: [4M]
- Explain why ammonium nitrate is not used in the preparation of ammonia.
 - Name the compound normally used as a drying agent during the process.
 - How is ammonia gas collected?
 - Explain why it is not collected over water?
7. From the list given below, select the word(s) required to correctly complete the blanks (i) to (v) in the passage: [5M]
- [Note: Words chosen from the following list are to be used only once. Write only the answers. Do not copy the passage.]
- (Reddish, brown, ammonium, nitrogen dioxide, hydroxyl, dirty green, ammonia, acidic, alkaline)
- Nitrogen and hydrogen combine in the presence of a catalyst to give (i) _____ gas. When the above mentioned gas is passed through water, it forms a solution which will be (ii) _____ in nature, and the solution contains (iii) _____ ions and (iv) _____ ions. The above solution when added to iron (II) sulphate solution gives a (v) _____ coloured precipitate of iron (II) hydroxide.
8. The questions below are related to the manufacture of ammonia. [5M]
- Name the process.
 - In what ratio must the reactants be taken?
 - Name the catalyst used.
 - Give the equation for the manufacture of ammonia.
 - Ammonia can act as a reducing agent; write a relevant equation for such a reaction.

Chapter 10: Nitric Acid

1. (a) Name the process used for the manufacture of nitric acid and
(b) Raw materials required for it. [2M]

2. (a) Write a balanced equation for the reaction of sulphur with hot concentrated nitric acid.
(b) Write the equation for the reaction of dilute nitric acid with copper. [2M]

3. How will you prepare the following from nitric acid? [3M]
 - (a) Sodium nitrate
 - (b) Magnesium nitrate
 - (c) Lead nitrate

4. Correct the following, if required: [3M]
 - (a) HNO_3 is a strong oxidising agent.
 - (b) Nitric acid remains colourless even when exposed to light.
 - (c) NaNO_3 gives NO_2 and O_2 on heating.

5. [4M]
 - (a) When nitric acid is prepared by the action of concentrated sulphuric acid on potassium nitrate, what is the special feature of the apparatus used?
 - (b) Write the equation for the laboratory preparation of nitric acid from potassium nitrate and concentrated sulphuric acid.
 - (c) Potassium nitrate is prepared from potassium hydroxide and nitric acid. Name the type of this reaction.
 - (d) Which gas is produced when potassium nitrate is heated? Write the equation for the reaction.

6. [3M]
 - (a) With respect to the brown ring test for nitrates, explain:
 - (i) Freshly prepared ferrous sulphate solution is used.
 - (ii) The brown ring disappears if the test tube is disturbed.
 - (iii) Lead nitrate does not respond well to the brown ring test.

(b) Give the name and formula of brown ring. [1M]

7. Name: [5M]

- (a) A solution which absorbs nitric oxide.
- (b) A nitrate of metal which on heating does not give nitrogen dioxide.
- (c) A metal nitrate which on heating is changed into metal oxide.
- (d) A metal nitrate which on heating is changed into metal.
- (e) A nitrate which on heating leaves no residue behind.

8. [5M]

- (a) Give the source of ammonia gas used in the manufacture.
- (b) Give one example of each one of the following:
 - (i) A nitrate of metal which on heating does not give nitrogen dioxide.
 - (ii) A nitrate which on heating leaves no residue behind.
 - (iii) A metal nitrate which on heating is changed into metal oxide.
 - (iv) A metal nitrate which on heating is changed into metal.
 Also give equations in each case.

Chapter 11: Sulphuric Acid

1. Write balanced equations for the following reactions: [2M]

- (i) Potassium hydrogen carbonate and dilute sulphuric acid.
- (ii) Sodium nitrate and concentrated sulphuric acid.

2.

- (i) What happens when conc. sulphuric acid is added to a lump of blue vitriol?
- (ii) How is dilute sulphuric acid made from the concentrated acid?

3. Concentrated sulphuric acid [3M]

- (i) Has a great affinity for water
- (ii) Is an oxidising agent
- (iii) Is the least volatile acid

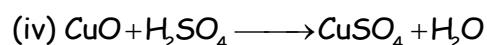
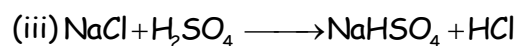
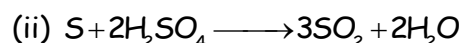
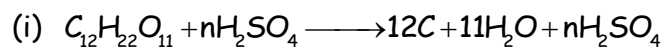
Give the chemical equations to show the above properties of conc. sulphuric acid.

4. Copy and complete the following table relating to the important industrial processes. Output refers to the product of the process and not the intermediate steps. [3M]

Name of the process	Inputs	Catalyst	Equation for catalysed reaction	Output
Contact process	Sulphur dioxide+Oxygen			

5. Some properties of sulphuric acid are listed below. Choose the property A, B, C or D which is responsible for the reactions (i) to (iv). Some properties may be repeated: [4M]

- A) Acid
B) Dehydrating agent
C) Non-volatile acid
D) Oxidising agent



6. What property of conc. sulphuric acid is made use in each of the following cases? Give equation for the reaction in each case. [4M]
- (i) In the production of hydrogen chloride gas when it reacts with a chloride.
(ii) In the preparation of carbon monoxide gas from formic acid
(iii) As a source of hydrogen by diluting it and adding a strip of magnesium.
(iv) In the preparation of sulphur dioxide by warming a mixture of conc. sulphuric acid and copper turnings.

7. [5M]
- (a) Outline the steps required to convert hydrogen chloride to anhydrous iron (III) chloride. Write the equation for the reaction which takes place.

- (b)
- (i) What are the two steps necessary to change lead carbonate into lead chloride?
 - (ii) Give the name of a soluble lead salt and write the equation for the action of heat on this salt.
 - (iii) Write the equation for the preparation of nitric acid from potassium nitrate.

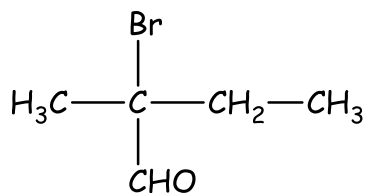
8. What happens when hot and concentrated sulphuric acid reacts with the following: [5M]

- (i) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- (ii) Oxalic acid
- (iii) Formic acid
- (iv) NaOH
- (v) Sugar
- (vi) Carbon
- (vii) Sulphur

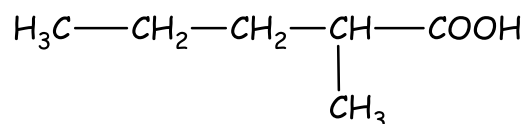
Chapter 12: Organic Chemistry

1. [2M]
 - (i) Draw the structural formula of ethene.
 - (ii) Name the feature of the ethene structure which allows ethene to react with chlorine in the way it does.
2. Write the chemical equation for the following: [2M]
 - (a) Acetic acid from ethane.
 - (b) Acetylene from calcium carbide.
3. [3M]
 - (a) Name an organic compound used as a thermometric liquid.
 - (b) Why is pure acetic acid known as glacial acetic acid?
 - (c) Write the chemical equation for the reaction between ethyl alcohol and acetic acid.
4. Write the IUPAC names for following. [3M]
 - (i) $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_2\text{CH}_3$

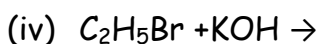
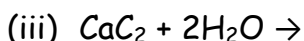
(ii)



(iii)



5. Name the organic compound prepared by each of the following reactions. [4M]



6. From the following organic compounds given below, choose one compound on each case which relates to the description [i] to [iv]: [4M]

[Ethyne, ethanol, acetic acid, ethene, methane]

(i) An unsaturated hydrocarbon used for welding purposes.

(ii) An organic compound whose functional group is carboxyl.

(iii) A hydrocarbon which on catalytic hydrogenation gives a saturated hydrocarbon.

(iv) An organic compound used as a thermometric liquid.

7. [5M]

(a) Define the term catenation.

(b) Write the equations for the following laboratory preparations:

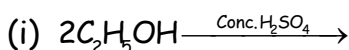
(i) Ethane from sodium propionate

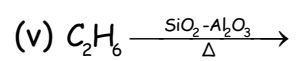
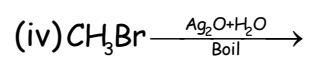
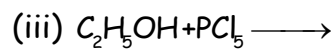
(ii) Ethane from iodomethane.

(iii) Ethyne from calcium carbide.

(iv) Methanol from iodomethane.

8. Complete the following reactions: [5M]





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