

Important Questions [PYQ]

Chemistry

CLASS -10th



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Chemical Reaction & Equations

1. While studying the double displacement reaction, the solutions of barium chloride and sodium sulphate are mixed together.

(i) What do you observe as soon as the two solutions are mixed together?

(ii) What will happen in the above observation made by you after ten minutes? **(2 M) (2022, 2020, 2019, 2016)**

2. While electrolysing water before passing the current some drops of an acid are added. Why? Name the gases liberated at cathode and anode. Write the relationship between the volume of gas collected at anode and the volume of gas collected at cathode. **(3 M) (2024, 2023)**

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3. Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity. **(3 M) (2024, 2020, 2019, 2018)**

4. $\text{MnO}_2 + x\text{HCl} \rightarrow \text{MnCl}_2 + y\text{H}_2\text{O} + z\text{Cl}_2$

In order to balance the above chemical equation, the values of x, y and z respectively are: **(1 M) (2024, 2023)**

(a) 6,2,2 (b) 4, 1,2 (c) 4,2, 1 (d) 2, 2, 1

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5. Which of the following statements about the reaction given below are correct?

$\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$

(i) HCl is oxidized to Cl_2

(ii) MnO_2 , is reduced to MnCl_2

(iii) MnCl_2 , acts as an oxidizing agent

(iv) HCl acts as an oxidizing agent

(1 M) (2024, 2023, 2022, 2016)

(a) (ii), (iii) and (iv)

(b) (i), (ii) and (iii)

(c) (i) and (ii) only

(d) (iii) and (iv) only



6. Select (i) combination reaction, (ii) decomposition reaction and (iii) displacement reaction from the following chemical equations:

(3 M) (2023, 2022, 2019, 2015)

(i) $\text{ZnCO}_3(\text{s}) \rightarrow \text{ZnO}(\text{s}) + \text{CO}_2(\text{g})$

(ii) $\text{Pb}(\text{s}) + \text{CuCl}_2(\text{aq}) \rightarrow \text{PbCl}_2(\text{aq}) + \text{Cu}(\text{s})$

(iii) $\text{NaBr}(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{AgBr}(\text{s}) + \text{NaNO}_3(\text{aq})$

(iv) $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow 2\text{HCl}(\text{g})$

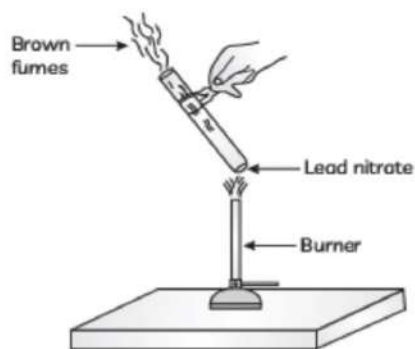
(v) $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

(vi) $3\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$

(vii) $\text{CaCO}_3(\text{s}) \xrightarrow{\text{Heat}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$

7. Assertion (A): Reaction of Quicklime with water is an exothermic reaction. Reason (R): Quicklime reacts vigorously with water releasing a large amount of heat. **(1M) (2024, 2023, 2020)**

8. The emission of brown fumes in the given experimental set-up is due to **(1 M) (2024, 2023, 2022)**



- (a) thermal decomposition of lead nitrate which produces brown fumes of nitrogen dioxide.
- (b) thermal decomposition of lead nitrate which produces brown fumes of lead oxide.
- (c) oxidation of lead nitrate forming lead oxide and nitrogen dioxide.
- (d) oxidation of lead nitrate forming lead oxide and oxygen.

9. Write one chemical equation each for the chemical reaction in which the following have taken place: **(An) (3 Marks) (2024)**

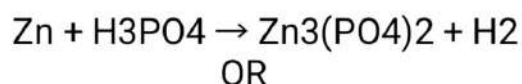
- (i) Change in colour
- (ii) Change in temperature
- (iii) Formation of precipitate

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Mention colour change/temperature change (rise/fall)/compound precipitated along with equation.

10.(A) Why do we balance a chemical equation? Name and state the law that suggests the balancing of a chemical equation? Balance the following chemical equation: **(Un) (3 Marks) (2025)**

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(B) Define a precipitation reaction. Give its example and also express the reaction that occurs in the form of a balanced chemical equation.

(Re) (3 Marks)

(c). How is a double displacement reaction different from a displacement reaction? Explain giving example in the form of balanced chemical equations.

(Re) (3 Marks)

11.(a) Identify the reducing agent in the following reactions

- (i) $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$
- (ii) $\text{H}_2\text{O} + \text{F}_2 \rightarrow \text{HF} + \text{HOF}$
- (iii) $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
- (iv) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$



(b) Define a redox reaction in terms of gain or loss of oxygen. **(3 M) (2023)**

12. 1 g of copper powder was taken in a China dish and heated. What change takes place on heating? When hydrogen gas is passed over this heated substance, a visible change is seen in it. Give the chemical equations of reactions, the name and the color of the products formed in each case. **(An) (3 Marks) (2020)**

13. Mention with reason the colour changes observed when: **(Un) (3 Marks) (2020)**

- (i) silver chloride is exposed to sunlight.
- (ii) copper powder is strongly heated in the presence of oxygen.
- (iii) a piece of zinc is dropped in copper sulphate solution.

Acids, Bases and Salts

1. (i) A compound 'X' which is prepared from gypsum has the property of hardening when mixed with proper quantity of water. Identify 'X' and write its chemical formula.
(ii) State the difference in chemical composition between baking soda and baking powder. **(2 M) (2023, 2022, 2020, 2018)**
2. How is washing soda prepared from sodium carbonate? Give its chemical equation. State the type of this salt. Name the type of hardness of water which can be removed by it? **(3 M) (2023, 2020)**
3. Design an experimental set-up to demonstrate that "Alcohol and glucose contain hydrogen but are not categorised as acids". Also give the reason to justify this fact. **(3 M) (2025)**
4. (1) Suggest a safe procedure of diluting a strong concentrated acid.
(ii) Name the salt formed when sulphuric acid is added to sodium hydroxide and write its pH.
(iii) Dry HCl gas does not change the colour of dry blue litmus paper. Why? **(3 M) (2023, 2019, 2015)**
5. During electrolysis of brine, a gas 'G' is liberated at anode. When this gas 'G' is passed through slaked lime, a compound 'C' is formed, which is used for disinfecting drinking water.
(i) Write formula of 'G' and 'C'.
(ii) State the chemical equation involved.
(iii) What is common name of compound 'C'? Give its chemical name. **(3 M) (2023, 2020, 2019, 2016)**
6. Salts play a very important role in our daily life. Sodium chloride which is known as common salt is used almost in every kitchen. Baking soda is also a salt used in faster cooking as well as in baking industry. The family of salts is classified on the basis of cations and anions present in them. **(2024, 2023, 2022, 2019)**
- (a) Identify the acid and base from which Sodium chloride is formed. **(1 M)**
(b) Find the cation and the anion present in Calcium sulphate. **(1 M)**
(c) "Sodium chloride and washing soda both belong to the same family of salts." Justify this statement. **(2 M)**
- OR
- (c) Define the term pH scale. Name the salt obtained by the reaction of Potassium hydroxide and Sulphuric acid and give the pH value of its aqueous solution. **(2 M)**
7. Giving reason, state the advantage of using baking powder over baking soda for the preparation of bread or cakes. **(Un) (2 Marks) (2025)**
8. Common salt is an important raw material for various chemicals of daily use. State in brief the method of preparation of (i) Sodium hydroxide, and (ii) Sodium hydrogen carbonate from common salt. Write balanced chemical equations of the reactions that occur. **(2025)(Ap) (3 Marks)**

9. Consider the following compounds: FeSO_4 ; CuSO_4 ; CaSO_4 ; Na_2CO_3 . The compound having maximum number of water of crystallisation in its crystalline form in one molecule is **(Re) (1M)(2024)**

10. Assertion (A): Hydrogen gas is not evolved when zinc reacts with nitric acid.

Reason (R): Nitric acid oxidises the hydrogen gas produced to water and itself gets reduced. **(Eu) (1 Mark) (2024)**

11.(i) The pH of a sample of tomato juice is 4.6. How is this juice likely to be in taste? Give reason to justify your answer. **(1 Mark)**

(ii) How do we differentiate between a strong acid and a weak base in terms of ion-formation in aqueous solutions? **(1 Mark)**

(iii) The acid rain can make the survival of aquatic animals difficult. How? **(Ap) (1 Mark) (2024)**

12. Two test tubes A and B are taken, each containing one mL of starch solution. Add 1 mL of saliva to test tube 'A' only and leave both the test tubes undisturbed for a few minutes. Now add a few drops of dilute iodine solution to both the test tubes. **(Ap) (2 Marks)(2024)**

(a) Which one of the two test tubes shows change in colour? Write the changed colour observed in this test tube.

(b) What can we conclude from this activity?

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(a) Which one of the two test tubes shows change in colour? Write the changed colour observed in this test tube.

(b) What can we conclude from this activity?

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14. Which of the options in the given table are correct? **(2022)**

	Natural Source	Acid Present
(i)	Orange	Oxalic acid
(ii)	Sour milk	Lactic acid
(iii)	Ant sting	Methanoic acid
(iv)	Tamarind	Acetic acid

(a) (i) and (ii)

(b) (i) and (iv)

(c) (ii) and (iii)

(d) (iii) and (iv)



15. Study the following table and choose the correct option: **(2022)**

	Salt	Parent Acid	Parent Base	Nature of Salt
(a)	Sodium Chloride	HCl	NaOH	Basic
(b)	Sodium Carbonate	H_2CO_3	NaOH	Neutral
(c)	Sodium Sulphate	H_2SO_3	NaOH	Acidic
(d)	Sodium Acetate	CH_3COOH	NaOH	Basic

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Metals & Non - metals

1. Carbon cannot reduce the oxides of sodium, magnesium and aluminum to their respective metals. Why? Where are these metals placed in the reactivity series? How are these metals obtained from their ores? Take an example to explain the process of extraction along with chemical equations. **(5M) (2020, 2018)**

2. A metal and a non-metal that exists in liquid state at the room temperature are respectively: **(1 M) (2024, 2023, 2016)**

- (a) Bromine and Mercury
- (b) Mercury and Iodine
- (c) Mercury and Bromine
- (d) Iodine and Mercury



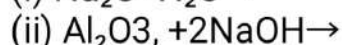
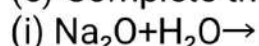
3. Silver articles become black when kept in open for some time, whereas copper vessels lose their shiny brown surfaces and gain a green coat when kept in open. Name the substances present in air with which these metals react and write the name of the products formed. **(2 M) (2019, 2016, 2015)**

4. Almost all metals combine with oxygen to form metal oxides. Metal oxides are generally basic in nature. But some metal oxides show both basic as well as acidic behaviour. Different metals show different reactivities towards oxygen. Some react vigorously while some do not react at all. **(2023, 2022, 2020, 2019)**

(a) What happens when copper is heated in air? (Give the equation of the reaction involved). **(1 M)**

(b) Why are some metal oxides categorized as amphoteric? Give one example. **(1M)**

(c) Complete the following equations: **(2 M)**



Or

(c) On burning Sulphur in oxygen a colourless gas is produced. **(2 M)**

(i) Write chemical equation for the reaction.

(ii) Name the gas formed.

(iii) State the nature of the gas.

(iv) What will be the action of this on a dry litmus paper?

5. The metals produced by various reduction processes are not very pure. They contain impurities, which must be removed to obtain pure metals. The most widely used method for refining impure metals is electrolytic refining. **(2024, 2018)**

(i) What is the cathode and anode made of in the refining of copper by this process? **(1M)**

(ii) Name the solution used in the above process and write its formula. **(1 M)**

(iii)(A) How copper gets refined when electric current is passed in the electrolytic cell? **(2 M)**

Or

(iii) (B) You have two beakers 'A' and 'B' containing copper sulphate solution. What would you observe after about 2 hours if you dip a strip of zinc in beaker 'A' and a strip of silver in beaker 'B'?

Give reason for your observations in each case. **(2 M)**

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6. The melting points and boiling points of some ionic compounds are given below: **(2023, 2022, 2020)**

Compound	Melting Point (K)	Boiling Point (K)
NaCl	1074	1686
LiCl	887	1600
CaCl ₂	1045	1900
CaO	2850	3120
MgCl ₂	981	1685



These compounds are termed ionic because they are formed by the transfer of electrons from a metal to a non-metal. The electron transfer in such compounds is controlled by the electronic configuration of the elements involved. Every element tends to attain a completely filled valence shell of its nearest noble gas or a stable octet

(i) Show the electron transfer in the formation of magnesium chloride. **(1 M)**

(ii) List two properties of ionic compounds other than their high melting and boiling points. **(1M)**

(iii) (A) While forming an ionic compound, say sodium chloride, how does sodium atom attain its stable configuration? **(2 M)**

Or

(B) Give reasons: **(2 M)**

(i) Why do ionic compounds in the solid state not conduct electricity?

(ii) What happens at the cathode when electricity is passed through an aqueous solution of sodium chloride?

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7.(1) Consider the following metals.

K, Ca, Al, Cu, Ag, Fe

Select from the above metals, a metal which

I. does not react with oxygen even at high temperature.

II. reacts with oxygen at ordinary temperature and forms a protective oxide layer which prevents the metal from further oxidation.

III. catches fire when kept in the open.

IV. does not burn in oxygen but the hot metal is coated with a black coloured oxide layer.

(ii) What are amphoteric oxides? With the help of balanced chemical equations show that aluminium oxide is an amphoteric oxide

(iii) What are alkalis? Give one example **(5M) (2025)**

8. (i) With the help of balanced chemical equations state the process of extracting (i) mercury from its ore called cinnabar and (II) copper from its sulphide ore.

(ii) Silver and copper articles slowly lose their shiny surfaces when exposed to air. Name the compounds formed on (I) silver articles, and (II) copper articles in the form of coating. **(5M) (2025)**

9.10. How is zinc extracted from its ore? Name the processes involved in the extraction and write chemical equations for the reactions that occur during these processes. (UN) (2 M)

Carbon & Its Compounds

1. Distinguish between esterification and saponification reactions with the help of the chemical equations for each process. State one use of each (i) esters, and (ii) saponification
(3 M) (2023, 2017, 2016)

2. A gas is liberated immediately with a brisk effervescence when you add acetic acid to sodium hydrogen carbonate powder in a test tube. Name the gas and describe the test that confirms the identity of the gas.
(2 M) (2019, 2017, 2016, 2015)

3.(a) Why are most carbon compounds poor conductors of electricity?
(b) Write the name and structure of a saturated compound in which the carbon atoms are arranged in a ring. Give the number of single bonds present in this compound
(3 M) (2024, 2019, 2018)

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4.(a) Draw the electron dot structure for ethyne.
(b) List two differences between the properties exhibited by covalent compounds and ionic compounds.
(3 M) (2023, 2022, 2019, 2015)

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5.(i) Give reason why carbon can neither form C^{4+} cations nor C^{4-} anions but form covalent compounds.
(ii) What is homologous series of carbon compound? Write the molecular formula of any two consecutive members of homologous series of aldehydes.
(iii) Draw the structure of the molecule of cyclohexane (C_6H_{12}).
(5M) (2024, 2022, 2020)

6. Soaps and detergents are both types of salts. State the difference between the two. Write the mechanism of the cleansing action of soaps. Why do soaps not form lather (foam) with hard water? Mention any two problems that arise due to the use of detergents instead of soaps.
(5M) (2023, 2020, 2017, 2015)

7. A saturated organic compound 'A' belongs to the homologous series of alcohols. On heating 'A' with concentrated sulphuric acid at 443 K, it forms an unsaturated compound 'B' with molecular mass 28u. The compound 'B' on addition of one mole of hydrogen in the presence of Nickel, changes to a saturated hydrocarbon 'C'.
(i) Identify A, B and C.
(ii) Write the chemical equations showing the conversion of A into B.
(iii) What happens when compound C undergoes combustion?
(iv) State one industrial application of hydrogenation reaction.
(v) Name the products formed when compound A reacts with sodium.
(5M) (2023, 2020, 2019, 2018, 2016)

8. A student took four test tubes P, Q, R and S and filled about 8 mL of distilled water in each. After that he dissolved an equal amount of Na_2SO_4 in P, K_2SO_4 in Q, $CaSO_4$ in R and $MgSO_4$ in S. On adding an equal amount of soap solution and shaking each test tube well, a good amount of lather will be obtained in the test tubes:
(1 M) (2019, 2017, 2016, 2015)

(a) P and Q (b) P and R (c) P, Q and S (d) Q, R and S

9. 'A' and 'B' are two salts used for washing purposes. Salt 'A' is used for bathing also. Four test tubes I, II, III and IV as mentioned below are taken.

- I. Rain water + solution of salt 'A'
- II. Rain water + solution of salt. 'B'
- III. Tubewell water + solution of salt 'A'
- IV. Tubewell water + solution of salt 'B'

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The test tubes are shaken one by one almost identically for the same time and the lengths of foam formed in each test tube is noted.

(2M) (2025, 2020, 2019, 2017, 2016, 2015)

(i) In which one of the four test tubes is the foam formed the minimum?

(1 M)

(ii) Differentiate between salt A and salt B. **(1 M)**

(iii) (A) What are esters? What happens when an ester reacts with an alkali (say sodium hydroxide)? Give chemical equation for the reaction. **(2 M)**

Or

(iii) (B) What is the cause of hardness of water? Sometimes it is observed that while bathing foam is formed with difficulty and an insoluble substance is formed. Name this substance and write the cause of its formation.

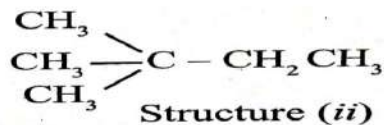
10.(i) Draw the structure of the following compounds:

(a) Butanoic acid

(b) Chloropentane

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(ii) How are structure (i) and structure (ii) given below related to one another? Give reason to justify your answer.



Draw one more possible structure for above case.

(iii) Differentiate between saturated and unsaturated carbon compounds on the basis of their general formula.

(5M) (2023, 2016)

11. "Two different forms of carbon diamond and graphite have different structures and very different physical properties even though their chemical properties are same." Explain why? **(An) (3 Marks)**

12.(i) What happens when a small piece of sodium is dropped in ethanol? Write the equation for this reaction.

(ii) Why is glacial acetic acid called so?

(iii) What happens when ethanol is heated at 443 K in the presence of conc. H_2SO_4 ? Write the role of conc. H_2SO_4 in this case. **(2023)(3M)**

13.(i) Name a commercially important carbon compound having functional group -OH and write its molecular formula.

(ii) Write chemical equation to show its reaction with

(1) Sodium metal

(2) Excess conc. sulphuric acid

(3) Ethanoic acid in the presence of an acid catalyst

(4) Acidified potassium dichromate

Also write the name of the product formed in each case.

(Un) (5 Marks) (2024)

