ICSE · CLASS 10 · CHEMISTRY

ICSE Class 10 Chemistry Important Questions 2027

93 question patterns that repeated across past papers · the years show every time each was asked

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Periodic Properties and Variations of Properties

1. Deduce periodic position & compound formula from atomic number/config

Asked 4× · Board 2025, Sample 2023, Sample 2027 · 2/3 marks

Study the table given below (periodic table with letters E, J, Q, L, M, G, D, N, P). Use only the letters given to answer. Do not identify the elements. (a) State the valency of element 'G'. (b) Which element can exhibit catenation? (c) Write the formula of the compound formed between 'M' and 'P'.

questions. **Do not identify** the elements.

IA	IIA						
		IIIA	IVA	VA	VIA	VIIA	0
			E		J		Q
	L			G			
	M	D				P	
	N						

2. Compare EA, electronegativity & periodic position of given elements

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 3 marks

The electron affinity of an element X is greater than that of element Y. (a) How is the oxidising power of X likely to compare with that of Y? (b) How is the electronegativity of X likely to compare with that of Y? (c) State whether X is likely to be placed to the left or to the right of Y in the periodic table?

3. Deduce valency/group/compound formula from an oxide formula

Asked 2× · Sample 2025, Sample 2027 · 2/3 marks

In the reactivity series of metals, Z is a metal above hydrogen and its oxide has the formula ZO. It was found that ZO reacted with water and formed a hydroxide as the product. (a) State the number of valence electrons present in element Z. (b) Name the group which Z belongs to. (c) What will be the formula of the hydroxide of Z?

4. Metallic/electropositive character trend down group

Asked 3× · Board 2025, Sample 2025 · 1 marks

Assertion (A): The tendency of losing electrons increases down the Group. Reason (R): The most reactive metal is placed at the top of Group 1. (a) Both (A) and (R) are true, and (R) is the correct explanation of (A). (b) Both (A) and (R) are true, and (R) is not the correct explanation of (A). (c) (A) is true but (R) is false. (d) (A) is false but (R) is true.

5. Fill in the blanks (mixed periodic terms)

Asked 2× · Sample 2024, Sample 2025 · 5 marks

Complete the following by choosing the correct answers from the bracket: (a) If an element has one electron in the outermost shell, then it is likely to have the _____ [smallest/ largest] atomic size amongst all the elements in the same period. (b) _____ [sulphuric acid/ hydrochloric acid] does not form an acid salt. (c) A _____ [reddish brown/ dirty green] coloured precipitate is formed when ammonium hydroxide is added to a solution of ferrous chloride. (d) Alkynes undergo _____ [addition / substitution] reactions. (e) An _____ [alkaline/acidic] solution will turn methyl orange solution pink or red.

6. Deduce metallic character & reducing agent from electronic configurations

Asked 2× · Sample 2024, Sample 2025 · 3 marks

X [2,8,7] and Y [2,8,2] are two elements. Using this information complete the following: (a) _____ is the metallic element. (b) Metal atoms tend to have a maximum of _____ electrons in the outermost shell. (c) _____ is the reducing agent.

7. Identify element by electron affinity trend

Asked 3× · Board 2023, Board 2024, Sample 2023 · 1 marks

Electron Affinity is maximum in: (a) Mg (b) Ar (c) Li (d) Br

8. Arrange given elements in order of a periodic property

Asked 3× · Board 2023, Board 2024, Sample 2023 · 3 marks

Arrange the following as per the instructions given in the brackets: (a) Carbon, Fluorine, Beryllium (decreasing order of atomic size) (b) Sulphuric acid, Phosphoric acid, Acetic acid (increasing order of number of replaceable H atoms per molecule) (c) Potassium, Lithium, Sodium (increasing order of ionization potential)

9. Identify element by atomic radius trend across a period

Asked 2× · Board 2023, Sample 2026 · 1 marks

Which element amongst the following has the largest atomic radius? (a) Al (b) S (c) Mg (d) Na

10. Identify element by ionisation potential trend

Asked 2× · Board 2024, Board 2025 · 1/2 marks

Given below are two sets of elements from two different periods. Name the element with the highest ionisation potential in each of the following sets. (a) Al, Cl, Mg (b) Ne, O, F

Chemical Bonding

11. Draw electron dot (Lewis) structures of given molecules

Asked 5× · Board 2024, Board 2025, Board 2026, Sample 2027 · 2/3 marks

A compound commonly used in the laboratory has formula H_2P. H represents hydrogen, P represents a non-metal. Draw a dot and cross structure for the formation of the compound H_2P.

12. Identify the term (mixed bonding)

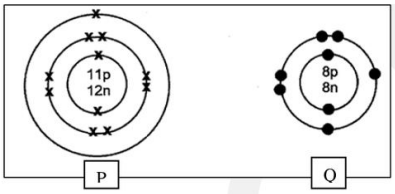
Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 5 marks

Identify the following: (a) A bond formed between two atoms by sharing of a pair of electrons, with both electrons being provided by the same atom. (b) A salt formed by the complete neutralisation of an acid by a base. (c) A reaction in which the hydrogen of an alkane is replaced by a halogen. (d) The energy required to remove an electron from a neutral gaseous atom. (e) A homogenous mixture of two or more metals or a metal and a non-metal in a definite proportion in their molten state.

13. Deduce compound formula & molar mass from electronic configuration

Asked 3× · Board 2024, Sample 2025, Sample 2027 · 1/2/3 marks

The diagram illustrates the structures of two atoms P (11p, 12n) and Q (8p, 8n). What is the formula and mass of one mole of the compound formed when P and Q react together? [At. wt of P is 23 and Q is 16]



14. Draw electron dot structure of ammonium ion (coordinate bond)

Asked 3× · Board 2023, Sample 2025, Sample 2026 · 2 marks

Draw the electron dot diagram of ammonium ion. [Atomic No.: N=7, H=1]

15. Identify ion by number of lone pairs

Asked 2× · Sample 2026, Sample 2027 · 1 marks

Identify the ion that contains one lone pair of electrons. (a) OH^{-1} (b) H_3O^+ (c) NH_4^+ (d) H^+

16. High melting point of ionic compounds

Asked 2× · Board 2026, Sample 2027 · 1 marks

Assertion (A): Ionic compounds have high melting points. Reason (R): A strong electrostatic force of attraction exists between the oppositely charged ions. (a) (A) is true but (R) is false. (b) (A) is false but (R) is true. (c) Both (A) and (R) are true, and (R) is the correct explanation of (A). (d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

17. Draw electron dot structure of hydronium ion (coordinate bond)

Asked 2× · Sample 2023, Sample 2024 · 2 marks

Draw the electron dot diagram of Hydronium ion.

18. Match Column A with Column B (ionic vs covalent properties)

Asked 2× · Board 2023, Board 2024 · 5 marks

Match the Column A with Column B: A: (a) Water (b) Alkali metal (c) Halogen (d) Calcium oxide (e) Weak acid. B: 1. Lithium 2. Iodine 3. Covalent compound 4. Acetic acid 5. Ionic compound 6. Sulphuric acid

Study of Acids, Bases and Salts

19. Relate pH values to acid/base behaviour

Asked 5× · Board 2024, Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 3 marks

Rohit has three solutions X, Y and Z that have pH 2, 7 and 13 respectively. Which solution out of X, Y or Z will: (a) liberate sulphur dioxide gas when heated with sodium sulphite? (b) liberate ammonia gas when reacted with ammonium chloride? (c) not have any effect on litmus paper?

20. Write balanced equation for preparation of given salt

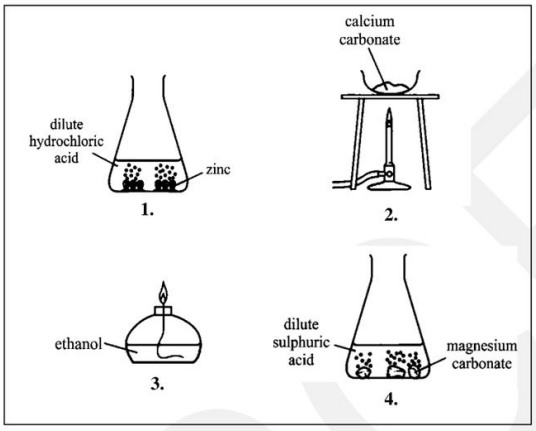
Asked 3× · Board 2026, Sample 2025, Sample 2026 · 2/3 marks

Given below are some chemicals [Lead nitrate, Copper, Hydrochloric acid, Lead oxide, Iron, Sodium carbonate, Copper carbonate, Chlorine]. Using suitable chemicals from the box, write balanced chemical equations for the preparation of the following salts (chemicals may be used more than once): (a) Lead (II) carbonate (b) Copper (II) chloride (c) Iron (II) chloride

21. Identify reactions that produce water

Asked 2× · Sample 2026, Sample 2027 · 1 marks

A teacher demonstrated four different reactions: 1. dilute hydrochloric acid + zinc 2. calcium carbonate heated 3. ethanol burning 4. dilute sulphuric acid + magnesium carbonate. Which reactions will produce water? (a) 1 and 2 (b) 1 and 3 (c) 3 and 4 (d) 2 and 3



22. Write equations for zinc conversion scheme to zinc salts

Asked 2× · Sample 2026, Sample 2027 · 3 marks

Write balanced chemical equations for the following conversions (A to C): $ZnSO_4$ <-A- Zn -B-> ZnS; Zn -C-> $Zn(OH)_2$.

23. Identify acid / its basicity

Asked 2× · Sample 2023, Sample 2024 · 1 marks

The basicity of acetic acid is: (a) 1 (b) 2 (c) 3 (d) 4

24. Match salt with its method of preparation

Asked 2× · Board 2024, Board 2025 · 3 marks

P, Q, R and S are the different methods of preparation of salts. P - Simple displacement; Q - Neutralisation by titration; R - Precipitation; S - Direct combination. Choose the most appropriate method to prepare the following salts: (a) $PbCl_2$ (b) $FeCl_3$ (c) Na_2SO_4

25. Indicator behaviour in acid/alkali

Asked 2× · Board 2023, Sample 2023 · 1 marks

The indicator which changes to pink colour in an alkaline solution is: (a) Blue Litmus (b) Methyl Orange (c) Red Litmus (d) Phenolphthalein

Analytical Chemistry

26. State whether given pair is distinguishable by the stated test

Asked 4× · Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 2 marks

State giving reasons if: (a) Zinc metal and aluminium metal can be distinguished by heating the metal powders separately in two different test tubes with concentrated sodium hydroxide solution. (b) Zinc nitrate and lead nitrate can be distinguished by adding ammonium hydroxide solution to the salt solution.

27. Identify ammonium salt from action of NaOH

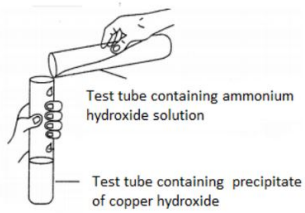
Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 1 marks

A compound P is heated in a test tube with sodium hydroxide solution. A red litmus paper held at the mouth of the test tube turns blue. Which of the following could compound P be? (a) Zinc sulphate (b) Copper sulphate (c) Ferrous sulphate (d) Ammonium sulphate

28. Special action of ammonium hydroxide on copper salts

Asked 3× · Board 2023, Sample 2025, Sample 2026 · 1/2 marks

A student was asked to perform two experiments. State one observation for each of the Experiments 1 and 2 on mixing the given solutions. (a) Experiment 1: test tube containing solution of zinc sulphate and test tube containing solution of barium chloride. (b) Experiment 2: test tube containing ammonium hydroxide solution and test tube containing precipitate of copper hydroxide.



[Understanding]

29. Identify cation/ion from precipitate observations

Asked 4× · Board 2023, Board 2024, Board 2026, Sample 2023 · 2 marks

Alex was given a solution of an unknown salt Y for analysis. To a part of the solution he added silver nitrate solution and obtained a white precipitate which was soluble in ammonium hydroxide solution. To the remaining solution he added a few drops of sodium hydroxide solution and obtained a pale blue precipitate. Based on the observations, identify: (a) the anion and (b) the cation present in salt Y.

30. Identify amphoteric hydroxide/oxide

Asked 3× · Board 2024, Sample 2023, Sample 2026 · 1 marks

Identify from the following metal oxide which can react with an acid as well as an alkali. (a) Silver oxide (b) Calcium oxide (c) Copper(II) oxide (d) Aluminium oxide

31. Identify salt/ion from thermal decomposition & precipitate

Asked 2× · Sample 2025, Sample 2026 · 3 marks

Abhishek was given a salt 'X' for analysis which was white in colour. On strong heating it produced a yellow residue, a colourless gas, and also a reddish-brown gas. The solution of the salt 'X' when tested with excess of ammonium hydroxide produced a chalky white insoluble precipitate. (a) Name the coloured gas evolved when Abhishek heated the salt strongly. (b) Which cation was present in the sample given to Abhishek? (c) Identify the salt given to Abhishek for analysis.

32. Identify H2S/sulphide from gas test/smell

Asked 2× · Board 2024, Sample 2027 · 1 marks

When compound X reacts with dilute hydrochloric acid, it releases a gas that turns moist lead acetate paper black and decolourises acidified potassium permanganate solution. Which of the following is compound X? (a) Sodium nitrate (b) Sodium sulphide (c) Sodium carbonate (d) Sodium sulphite

33. Identify the anion from given observations

Asked 3× · Board 2023, Board 2024, Sample 2023 · 2/3 marks

Identify only the anion present in the following compound: (a) The compound on heating produces a colourless, odourless gas which turns lime water milky and has no effect on acidified potassium dichromate solution. (b) The solution of the compound which on treating with concentrated sulphuric acid and freshly prepared ferrous sulphate solution produces a brown ring.

34. Distinguish given salt pair using stated reagent

Asked 2× · Board 2025, Sample 2023 · 2 marks

Differentiate between the following pairs of compounds using the reagent given in the bracket: (a) Ammonium chloride and Sodium chloride (using an alkali) (b) Zinc Nitrate solution and Calcium Nitrate solution (using excess sodium hydroxide solution)

35. Name the gas evolved in the given reactions

Asked 2× · Board 2024, Board 2025 · 3 marks

Name the gas produced during each of the following reactions: (a) When copper is treated with hot, concentrated nitric acid. (b) When ammonia is burnt in an atmosphere of oxygen. (c) When ferrous sulphide reacts with dilute hydrochloric acid.

Mole Concept and Stoichiometry

36. Stoichiometry from equation: mass, moles and gas volume

Asked 7× · Board 2024, Board 2025, Board 2026, Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 3/4 marks

Solid ammonium dichromate decomposes as under: $(NH_4)_2Cr_2O_7 \rightarrow N_2 + Cr_2O_3 + 4H_2O$. If 126 g of ammonium dichromate decomposes, calculate: (a) the number of moles of ammonium dichromate that undergoes decomposition. (b) the mass of chromic oxide formed at the same time. (c) the volume of nitrogen gas evolved at STP. [At wt: N=14, Cr=52, O=16, H=1]

37. Gas-volume (eudiometry) stoichiometry of reacting gases

Asked 6× · Board 2023, Board 2024, Board 2025, Board 2026, Sample 2023, Sample 2025 · 1/2/3 marks

What volume of carbon dioxide is produced at STP when 5 litres of propane is burnt completely according to: $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$? (a) 10 litres (b) 15 litres (c) 20 litres (d) 25 litres

38. Molar volume at STP calculations

Asked 3× · Board 2024, Sample 2026, Sample 2027 · 1 marks

The volume occupied by 0.2 moles of a gas at S.T.P. is: (a) 22.4 litres (b) 2.24 litres (c) 44.8 litres (d) 4.48 litres

39. Compare masses/moles of given substances using molar mass

Asked 2× · Sample 2025, Sample 2027 · 1/2 marks

20 grams of a gas M_2P has lesser number of moles than 20 grams of the gas MP. Justify the above statement using mathematical calculations. [At.wt. M=14, P=16]

40. Determine VD/molecular mass from equal-volume masses

Asked 3× · Board 2025, Sample 2023, Sample 2024 · 2 marks

A gas cylinder can hold 150 g of hydrogen under certain conditions. If an identical cylinder with the same capacity can hold 450 g of gas 'G' under the same conditions, find: (a) the vapour density of the gas 'G'. (b) the molecular weight of gas 'G'.

41. Calculate volume ratio of given gases

Asked 2× · Sample 2025, Sample 2026 · 1 marks

The ratio between the volumes occupied by 22 grams of carbon dioxide and 10 grams of hydrogen gas is: (a) 2.2:1 (b) 1:2.2 (c) 1:10 (d) 10:1

42. Determine molecular formula from vapour density

Asked 2× · Board 2025, Sample 2027 · 1 marks

An organic compound X containing carbon and hydrogen only has Vapour Density (V.D.) 14. The molecular formula of X is _____. (At. wt. of C=12, H=1) (a) CH (b) C_2H_4 (c) C_2H_2 (d) CH_2

43. Define/state the given law or term

Asked 3× · Board 2024, Board 2025, Sample 2023 · 2 marks

(a) State Avogadro's Law. (b) Define Co-ordinate bond.

44. Empirical & molecular formula from percentage composition

Asked 2× · Board 2025, Sample 2023 · 2/4 marks

An organic compound 'X' contains carbon, oxygen and hydrogen only. The percentage of carbon and hydrogen are 47.4% and 10.5% respectively. The relative molecular mass of 'X' is 76. Find the empirical formula and the molecular formula of 'X'. [Atomic weight: C=12, O=16, H=1]

45. Molecular formula from empirical formula & molecular mass

Asked 2× · Board 2023, Sample 2024 · 2/3 marks

The empirical formula of an organic compound is C_3H_4N. Its molecular weight is 108. Find the amount of carbon in one mole of the compound. Show all the steps involved. (Atomic weights: C-12; H-1; N-14)

46. Calculate vapour density = molecular mass / 2

Asked 2× · Board 2023, Sample 2023 · 1 marks

The vapour density of CH_3OH is _____. (At. Wt. C=12, H=1, O=16) (a) 32 (b) 18 (c) 16 (d) 34

Electrolysis

47. Conduction of current by ions in electrolytes

Asked 4× · Sample 2025, Sample 2026, Sample 2027 · 1 marks

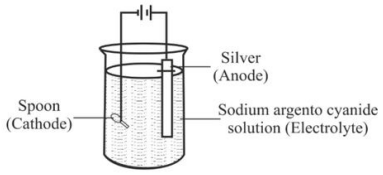
Which statement given below is correct with reference to the flow of electric current? (a) In all aqueous solutions, current is carried by electrons. (b) In all acidic solutions, current is carried by ions. (c) In molten electrolytes, current is carried by electrons. (d) In metal wires, current is carried by ions.

48. Interpret electroplating diagram (electrode reactions, electrolyte)

Asked 4× · Board 2024, Board 2026, Sample 2025, Sample 2026 · 4/5 marks

The diagram given below shows the electroplating of a spoon with silver (Silver anode, Spoon cathode, Sodium argentocyanide solution electrolyte). (a) Write an equation for the reaction that occurs at the cathode. (b) Silver nitrate solution is not preferred as an electrolyte in the above process. Give a reason. (c) Why is alternating current not used in the process? (d) What is the observation at the anode?

reference to the diagram, answer the following questions:

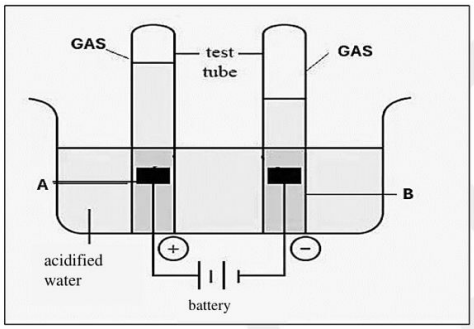


(a) Write an equation for the reaction that occurs at the cathode

49. Electrolysis of acidified water

Asked 3× · Board 2025, Board 2026, Sample 2027 · 1/3/5 marks

The diagram shows the electrolysis of acidulated water (electrode A at positive, electrode B at negative). (a) Write an equation for the reaction that takes place at A. (b) Give a test to confirm the product formed at A. (c) Which gas is liberated at B? (d) Why is water acidified for electrolysis? (e) What is the ratio by volume of the gases liberated at A and B?



50. Match reaction with oxidation/reduction/ionization/dissociation

Asked 2× · Board 2026, Sample 2027 · 5 marks

Match Column A with Column B: A: (a) CuO + C -> Cu + CO (b) Al^{3+} + 3e^- -> Al (c) $PbBr_2$ -> Pb^{2+} + $2Br^{1-}$ (d) $2O^{2-}$ - 4e^- -> O_2 (e) HCl -> H^+ + Cl^{1-}. B: 1. Oxidation 2. Ionization 3. Reduction 4. Redox 5. Electrolytic dissociation

51. Identify electrodes/conditions from CuSO4 electrolysis result

Asked 2× · Sample 2024, Sample 2025 · 1 marks

An aqueous solution of copper sulphate turns colourless on electrolysis. Which of the following could be the electrodes? P: anode copper, cathode copper; Q: anode platinum, cathode copper; R: anode copper, cathode platinum. (a) only P (b) only Q (c) only R (d) both Q and R

52. Identify oxidising electrode & write electrode reaction (CuSO4)

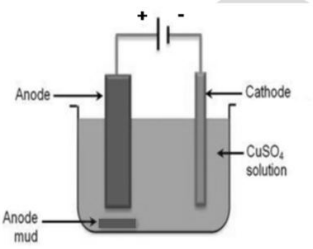
Asked 2× · Sample 2024, Sample 2025 · 3 marks

Copper sulphate solution is electrolysed using copper electrodes. (a) Which electrode [cathode or anode] is the oxidizing electrode? Why? (b) Write the equation for the reaction occurring at the above electrode.

53. Electro-refining of copper

Asked 2× · Board 2023, Sample 2026 · 1/3 marks

In the process of Electrorefining of Copper shown in the diagram, which of the following statements is correct? (a) The anode is made of pure Copper. (b) The cathode is made of impure Copper. (c) Copper is deposited at the anode. (d) Copper ions from the anode move to the cathode and get deposited as pure Copper.



Electrorefining of Copper

54. Identify strong/weak electrolytes and mobile ions

Asked 2× · Board 2026, Sample 2023 · 1 marks

Assertion (A): Dilute Sulphuric acid is a stronger electrolyte than concentrated Sulphuric acid. Reason (R): Dilute Sulphuric acid has a higher concentration of mobile ions. (a) (A) is true but (R) is false. (b) (A) is false but (R) is true. (c) Both (A) and (R) are true and (R) is the correct explanation of (A). (d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

55. Electrolysis of copper sulphate with copper electrodes

Asked 2× · Board 2025, Board 2026 · 1 marks

With respect to the electrolysis of copper (II) sulphate solution using copper electrodes, which statement is correct? (a) Copper metal is deposited at the negative electrode. (b) Oxygen gas is produced at the positive electrode. (c) The positive electrode increases in mass. (d) The negative electrode decreases in mass.

56. Fill in the blanks (electrolysis)

Asked 2× · Board 2025, Board 2026 · 5 marks

Complete the following sentences by choosing the correct option from the brackets: (a) The oxide that dissolves in caustic potash (KOH) is _____. [ZnO / CuO] (b) The reaction that takes place at the anode during the electrolysis of molten lead bromide is _____. [2Br - 2e^- -> 2Br^- / 2Br^- - 2e^- -> Br_2] (c) The volume occupied by 8 grams of oxygen gas at STP is _____ litres. [5.6 / 8.96] (d) _____ does not give hydrogen gas when it reacts with cold and very dilute nitric acid. [Cu / Mn] (e) _____ is a polar covalent compound. [HCl / CCl_4]

57. Identify electrode reaction/product in electroplating

Asked 2× · Board 2023, Sample 2023 · 1 marks

Which of the following reactions takes place at the anode during the electroplating of an article with silver? (a) Ag - 1e^- -> Ag^{1+} (b) Ag + 1e^- -> Ag^{1-} (c) Ag - 1e^- -> Ag (d) None of the above

Metallurgy

58. Identify the alloy from its composition

Asked 5× · Board 2023, Board 2024, Sample 2023, Sample 2024, Sample 2025 · 1/2 marks

Name the alloy which is made up of: (a) Copper, Zinc and Tin (b) Lead and Tin

59. Match Column A with Column B (processes, ores, bonding)

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 5 marks

Match Column A with Column B. A: (a) Aluminium (b) Sulphuric acid (c) Calcination (d) Calcium Chloride (e) Carbon tetrachloride. B: 1. Covalent compound 2. Carbonate ore 3. Hall Heroult's process 4. Contact Process 5. Electrovalent compound

60. State constituent/electrode reaction in aluminium extraction

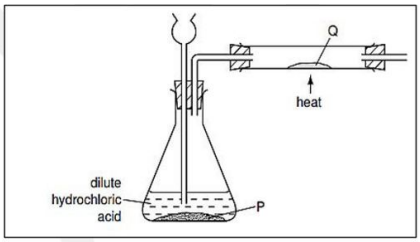
Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 2 marks

The following questions relate to the extraction of Aluminium by electrolysis. (a) Name the other compound which contains aluminium added to alumina. (b) Give a balanced equation for the reaction that takes place at the cathode.

61. Reduction of metal oxide (hydrogen/reactivity series)

Asked 2× · Board 2025, Sample 2027 · 1 marks

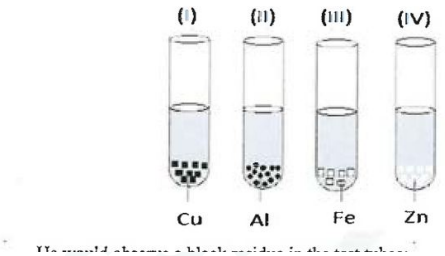
The diagram shows that P reacts with dilute hydrochloric acid to produce a gas which when passed through substance Q, reduces it. What are substances P and Q? (a) P-copper, Q-lead (II) oxide (b) P-lead, Q-magnesium oxide (c) P-magnesium, Q-calcium oxide (d) P-zinc, Q-copper (II) oxide



62. Displacement reaction outcome by reactivity series

Asked 2× · Sample 2024, Sample 2025 · 1 marks

A student takes Cu, Al, Fe and Zn strips separately in four test tubes labeled as I, II, III and IV respectively. He adds 10 ml of freshly prepared ferrous sulphate solution to each and observes the colour of the metal residue. He would observe a black residue in the test tubes: (a) (I) and (II) (b) (I) and (III) (c) (II) and (III) (d) (II) and (IV)



63. Fill in the blanks (metallurgy)

Asked 2× · Board 2024, Sample 2026 · 5 marks

Complete the following by choosing the correct answers from the bracket: (a) When dilute sulphuric acid reacts with zinc granules, the gas evolved is _____ (hydrogen / carbon dioxide), which can be tested using a burning splint. (b) A solution of copper(II) sulphate in sodium hydroxide solution forms a _____ (pale blue / green) precipitate. (c) In methane, each hydrogen atom share(s) _____ (one / two) electron(s) with the central carbon atom to complete its valence shell. (d) The electron affinity of element X is greater than that of element Y. The oxidising power of X is likely to be _____ (more / less) than that of element Y. (e) The naturally occurring compound of a metal from which the metal can be extracted is called its _____ (ore / mineral).

64. Name the base metal of the given alloy

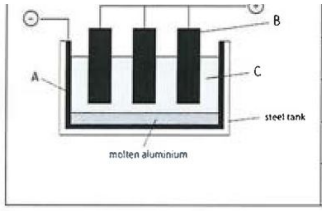
Asked 2× · Board 2024, Sample 2026 · 2 marks

Name the main metal present in the following alloys: (a) Duralumin (b) Brass

65. Interpret Hall-Heroult aluminium extraction diagram

Asked 2× · Board 2023, Sample 2025 · 3/5 marks

Given below in column A is a schematic diagram of the electrolytic reduction of alumina. Identify the parts labelled as A, B and C with the correct options from Column B. Column B: 1. Platinum 2. Anode 3. Cathode 4. Electrolyte mixture 5. Bauxite



1.	Platinum
2.	Anode
3.	Cathode
4.	Electrolyte mixture
5.	Bauxite

[Understanding]

66. Bayer's process for purification of bauxite

Asked 2× · Board 2025, Board 2026 · 2 marks

Bauxite is the principal ore used in the commercial extraction of aluminium. The Bayer's process is used to refine bauxite into pure alumina, with caustic soda playing a crucial role in the initial stage. (a) Explain the reason behind the addition of caustic soda during the Bayer's process. (b) Write a balanced chemical equation representing the reaction between bauxite and caustic soda during the Bayer's process.

67. Identify the ore / non-ore of a given metal

Asked 2× · Board 2023, Board 2025 · 1 marks

The ore that can be concentrated by using magnetic separation: (a) Corundum (b) Haematite (c) Calamine (d) Bauxite

Study of Compounds - Hydrogen Chloride

68. Laboratory preparation of HCl gas

Asked 2× · Board 2024, Sample 2023 · 3 marks

Hydrogen chloride gas is prepared in the laboratory by the action of concentrated sulphuric acid on sodium chloride. (a) Give balanced chemical equation for the above reaction. (b) State the method of collection of the gas formed above. (c) What is the property of sulphuric acid that makes it a suitable reagent for the reaction?

69. Identify drying agent/reagent for HCl gas

Asked 2× · Board 2023, Sample 2023 · 1 marks

In the laboratory preparation, HCl gas is dried by passing through: (a) dilute nitric acid (b) concentrated sulphuric acid (c) dilute sulphuric acid (d) acidified water

Study of Compounds - Ammonia

70. Reducing action of ammonia on copper oxide

Asked 4× · Board 2024, Board 2025, Sample 2024, Sample 2025 · 1/2 marks

Ammonia gas is passed over heated copper (II) oxide in a combustion tube: (a) Name the gas evolved. (b) What will be the colour of the residue that is left in the combustion tube at the end of the reaction?

71. Ammonia with excess chlorine; thermal decomposition of nitrate

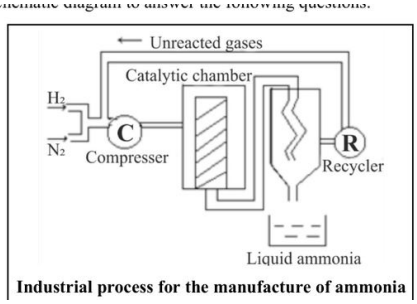
Asked 2× · Sample 2026, Sample 2027 · 2 marks

Give one significant observation when: (a) Excess of chlorine gas reacts with ammonia. (b) Zinc nitrate is strongly heated in a test tube.

72. Haber process conditions/catalyst/manufacture

Asked 3× · Board 2026, Sample 2023, Sample 2024 · 1/3/5 marks

Given below is the industrial process for the manufacture of ammonia gas. Study the schematic diagram: (a) Name the process. (b) Which catalyst is used in the above process? (c) In the above diagrammatic setup, how is ammonia gas separated from the unreacted gases to obtain liquid ammonia? (d) Which two properties of ammonia gas can be demonstrated by the Fountain Experiment?

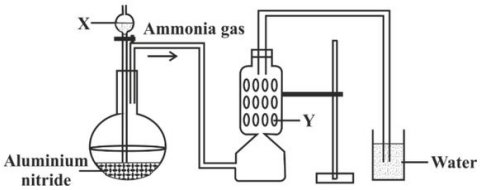


Industrial process for the manufacture of ammonia

73. Laboratory preparation of ammonia (from nitride)

Asked 3× · Board 2023, Board 2025, Sample 2023 · 3/5 marks

A student was instructed to prepare and collect ammonia gas in the laboratory by using aluminium nitride, with the apparatus shown. Study the diagram and answer: (a) Name the substance X added through the thistle funnel. (b) Write a balanced equation for the reaction between Aluminium nitride and substance X. (c) Identify the substance Y. (d) State the function of Y. (e) Why could the student not collect ammonia gas at the end of the experiment?



Study of Compounds - Nitric Acid

74. Action of nitric acid on a carbonate

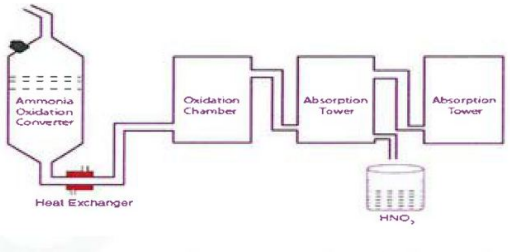
Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 2 marks

Identify the reactant and write the balanced equation for the following: Nitric acid reacts with compound Q to give a salt Calcium nitrate, water and carbon dioxide.

75. Ostwald's process conditions/catalyst

Asked 2× · Sample 2024, Sample 2025 · 1/3 marks

The diagram given below is a representation of the Industrial preparation of Nitric acid by Ostwald's process. (a) Write the temperature and the catalyst required during the catalytic oxidation of ammonia. (b) Give balanced chemical equation for the reaction occurring during the conversion of nitrogen dioxide to nitric acid.



76. Decomposition & storage of nitric acid

Asked 2× · Board 2026, Sample 2023 · 3 marks

Anil is a laboratory assistant. He prepared nitric acid but stored it in a transparent container exposed to sunlight. After a few days, brown fumes were observed in the container and the acid turned slightly yellowish in colour. (a) What was the error made by Anil while storing the acid? (b) Why were brown fumes observed in the container? (c) How can the yellowish tinge in the acid be removed?

Study of Compounds - Sulphuric Acid

77. Identify/state the property of sulphuric acid in a reaction

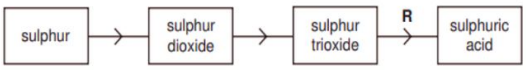
Asked 4× · Board 2023, Sample 2024, Sample 2025, Sample 2026 · 1/2/3 marks

State the property exhibited by sulphuric acid in each of the following reactions: (a) Sulphur with concentrated sulphuric acid. (b) Conversion of ferrous sulphide to hydrogen sulphide gas using sulphuric acid. (c) Ethanol with concentrated sulphuric acid.

78. Contact process: absorption of SO3 (oleum)

Asked 3× · Board 2025, Board 2026, Sample 2027 · 1/3 marks

The diagram represents the industrial process for the manufacture of concentrated sulphuric acid by the Contact process (sulphur -> sulphur dioxide -> sulphur trioxide -R-> sulphuric acid). What is used in step R to obtain sulphuric acid from sulphur trioxide? (a) vanadium pentoxide (b) water only (c) water followed by concentrated sulphuric acid (d) concentrated sulphuric acid followed by water



What is used in step **R** to obtain sulphuric acid from sulphur trioxide?

79. Oxidising action of concentrated sulphuric acid

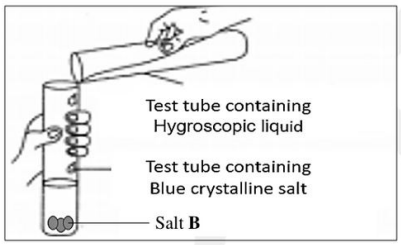
Asked 4× · Board 2024, Board 2025, Board 2026, Sample 2023 · 1 marks

A non-metal which reacts with concentrated sulphuric acid to form two gases which turn lime water milky is _____. (a) Sulphur (b) Carbon (c) Oxygen (d) Nitrogen

80. Dehydrating action of concentrated sulphuric acid

Asked 2× · Sample 2024, Sample 2027 · 1/3 marks

A student was given a crystalline salt 'B' for analysis which was blue in colour. He added a few drops of dense oily hygroscopic liquid to it and observed a colourless neutral gas/vapour being released and the salt turning white. (a) Identify the blue crystalline salt B. (b) Which property of the hygroscopic liquid is demonstrated in this reaction? (c) Write a balanced chemical equation for the above reaction.



Organic Chemistry

81. Give IUPAC name / draw structural formula of given compounds

Asked 9× · Board 2023, Board 2024, Board 2025, Board 2026, Sample 2023, Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 5 marks

(a) Give the IUPAC name of the following organic compounds: 1. HO-C(=O)-CH_2-CH_2-CH_3 (a butanoic acid); 2. H-C-C-C-C-H chain with two methyl branches (a dimethylbutane). (b) Draw the structural diagram for the following compounds: 1. diethyl ether 2. isopentane 3. propanone.

82. Esterification reaction

Asked 3× · Board 2024, Sample 2026, Sample 2027 · 1/3 marks

In a round bottom flask, a mixture of ethanol, acetic acid and concentrated sulphuric acid was heated. (a) Name the type of reaction occurring in the above set up. (b) What is the role of sulphuric acid in this reaction? (c) State one observation that takes place during the reaction.

83. Identify organic compounds from structures by a property

Asked 3× · Board 2025, Sample 2025, Sample 2027 · 3/4 marks

The structures of five organic compounds, C, D, E, F and G are shown (C: alkene, D: alcohol, E: alkane, F: dibromo compound, G: alkene). State which compound C, D, E, F or G: (a) on halogenation will form F. (b) is an alcohol. (c) is an isomer of 2-methyl propane. (d) is in the same homologous series as ethene.

84. Write equations for organic preparations & lab prep of nitric acid

Asked 3× · Sample 2024, Sample 2025, Sample 2026 · 3 marks

Give balanced equations for the following: (a) Laboratory preparation of ethyne from calcium carbide. (b) Conversion of acetic acid to ethyl acetate. (c) Laboratory preparation of nitric acid.

85. Write balanced equations for organic conversions/preparations

Asked 3× · Board 2023, Sample 2023, Sample 2027 · 3 marks

Give balanced equations for each of the following: (a) Action of warm water on calcium carbide. (b) Oxidation of sulphur with conc. nitric acid. (c) Laboratory preparation of ethane by using sodium propionate and soda lime.

86. Count isomers of butene from structures

Asked 2× · Sample 2025, Sample 2026 · 1 marks

The structures of four hydrocarbons are shown (2-methylpropane, 2-methylprop-1-ene, but-1-ene, 2-methylprop-1-ene variant). How many isomers of butene are shown in the above structures? (a) 1 (b) 2 (c) 3 (d) 4

87. Fill in the blanks (organic)

Asked 2× · Sample 2023, Sample 2027 · 5 marks

Complete the following sentences by choosing the correct option from the brackets: (a) The general formula of an alkyl group is _____ (C_nH_{2n+1}/C_nH_{2n-1}). (b) The aqueous solution of _____ (zinc chloride/ sodium sulphate) gives white precipitate with barium nitrate. (c) The gas liberated when alkalis are heated with ammonium salts is _____ (N_2/NH_3). (d) The alloy that contains a non-metal as one of its constituents is _____ (bronze/steel). (e) A salt prepared by neutralization in which titration is involved is _____ ($CaCl_2$/ NH_4Cl).

88. Complete and balance the given organic equations

Asked 3× · Board 2024, Board 2025, Board 2026 · 2/3 marks

Complete and balance the following equations: (a) $C_2H_4Br_2$ + KOH (alcoholic) -> (b) NH_3 (excess) + Cl_2 -> (c) $C_{12}H_{22}O_{11}$ -(conc. H_2SO_4)->

89. Identify the functional group in a compound

Asked 2× · Sample 2023, Sample 2024 · 1/2 marks

_____ is the functional group in methanol. (a) >C=O (b) -OH (c) -CHO (d) -COOH

90. Identify the term/compound (mixed organic)

Asked 2× · Board 2026, Sample 2023 · 5 marks

Identify the following terms / compounds: (a) A compound which reacts with water to give acetylene gas. (b) The gas evolved when sodium propanoate is heated with soda lime. (c) A reddish-brown precipitate formed when ferric chloride solution reacts with an alkali. (d) A pair of electrons present in an atom which is not shared with any other atom during bond formation. (e) The relative molecular mass of a substance expressed in grams.

91. Dehydration of ethanol to ethene

Asked 2× · Board 2024, Sample 2023 · 1 marks

Conversion of Ethanol to Ethene by the action of concentrated sulphuric acid involves: (a) Dehydration (b) Dehydrogenation (c) Dehydrohalogenation (d) Hydrolysis

92. State the term/process (mixed organic)

Asked 2× · Board 2024, Board 2025 · 5 marks

State the terms for the following: (a) Undistilled alcohol containing a large amount of methanol. (b) A salt formed by the partial replacement of the hydroxyl group of a di-acidic or a tri-acidic base by an acid radical. (c) Organic compounds having the same molecular formula but different structural formula. (d) The tendency of an atom to attract the shared pair of electrons towards itself when combined in a compound. (e) The type of covalent bond in which electrons are shared unequally between the combining atoms.

93. Identify general formula of a homologous series

Asked 2× · Board 2023, Board 2025 · 1 marks

Which formula represents a saturated hydrocarbon? (a) C_4H_8 (b) C_5H_{12} (c) C_4H_6 (d) C_5H_{10}

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