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SCIENCE

Paper 2 (Chemistry)

(Two Hours)

Answers to this paper must be written on the paper separately.
*You will **not** be allowed to write during the first **15** minutes.*
This time is to be spent in reading the question paper.
The time given at the head of this paper is the time allowed for writing the answers.

***Section A** is compulsory. Attempt any **four** questions from **Section B**.*
The intended marks for questions or parts of questions are given in brackets [].

SECTION A (40 Marks)

(Attempt **all** questions from this Section.)

Question 1

(a) Answer the following: [5]

(i) Formula of hydride of a halogen in period 3.

(ii) Element which is most metallic.

(iii) Ions formed by gain of electrons.

(iv) Process by which impurities from metals are removed electrolytically.

(v) Catalyst used in oxidation of ammonia.

(b) Choose the correct answer from the options given below: [5]

(i) The organic compound having a triple C-C covalent bond, is:

(A) C_3H_4 (B) C_3H_6 (C) C_3H_8 (D) C_4H_{10}

(ii) The element with highest ionization potential, is:

(A) Hydrogen (B) Caesium (C) Radon (D) Helium

(iii) A compound which contains all the three types of bonds i.e., ionic, covalent and co-ordinate is:

(A) Sodium chloride (B) Ammonia

(C) Ammonium chloride (D) Calcium chloride

(iv) Group IIA elements are known as:

(A) Alkali metals (B) Alkaline earth metals

(C) Halogens (D) Nobel gases

(v) Hydrogen chloride gas being highly soluble in water is dried by:

(A) Anhydrous calcium chloride (B) Phosphorus pentoxide

(C) Quick lime (D) Conc. Sulphuric acid

(c) Fill in the blanks with the correct choice given in brackets: [5]

(i) Covalent compounds have _____ melting point due to _____ ionic bonds.
[high/low/strong/weak]

(ii) _____ compounds have low boiling point because of _____ intermolecular forces.
[Electrovalent/Covalent/strong/weak]

(iii) A solution of a _____ electrolyte will contain both ions and molecules of the solute.
[strong/weak]

(d) Name the following: [5]

(i) A gas that turns moist starch iodide paper blue black.

(ii) A gas that burns in oxygen with a green flame.

(iii) A gas which is reddish brown in colour.

(iv) A greenish yellow gas.

(v) Name the amorphous powder which is light green and turns black after heating.

(e) Complete and balance the given equations: [5]

(i) $AgNO_3 + HCl \rightarrow$ (ii) $NH_3 + CuO \rightarrow$ (iii) $NH_4OH + HCl \rightarrow$

(iv) $FeCl_3 + NH_4OH \rightarrow$ (v) $C_2H_6 + O_2$ (limited) $\rightarrow$

(f) What do you observe when: [5]

(i) Dilute hydrochloric acid is added to zinc sulphide.

(ii) Ammonium hydroxide is added to zinc sulphate solution.

(iii) Bromine vapours are passed into a solution of ethyne in carbon tetrachloride.

(iv) Dilute hydrochloric acid is added to sodium thiosulphate.

(v) At the anode, when molten lead bromide is electrolyzed using graphite electrodes.

(g) The electronic configuration of an element T is (2, 8, 7) . [5]

Answer the following questions:

(i)What is the group number of T?

(ii)What is the period number of T?

(iii)What is the valency of T?

(iv) Is T a metal or a non-metal?

(v) How many valence electrons are there in an atom of T?

(h) (i) Draw the structural formula for each of the following: [5]

(A) 2,2 dimethyl pentane (B) methanol (C) 1,2 dichloro ethene

(ii) Write the IUPAC name for the following compounds:

(A) acetaldehyde (B) methyl acetylene

SECTION B (40 Marks)

(Attempt any four questions from this Section.)

Question 2

(a) What is a lone pair of electrons? Draw an electron dot diagram of a hydronium ion and label the lone pair of electrons. [3]

(b) Answer the following questions: [5]

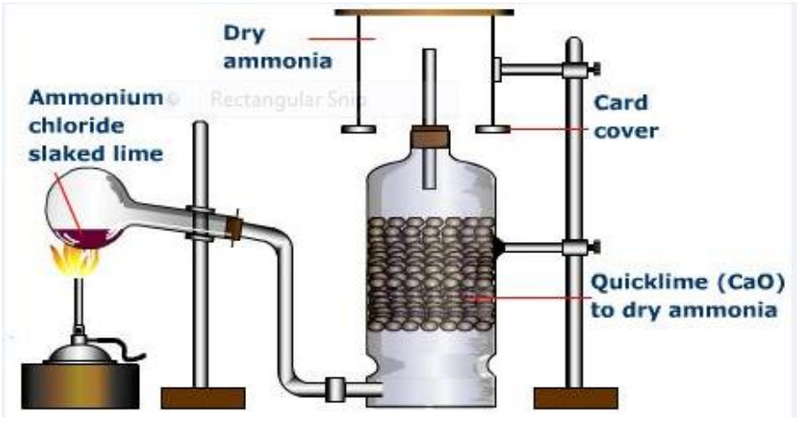
(i) Name all the elements of group 1.

(ii) Arrange the elements of group 1 in — (a) increasing order of number of shells (b) increasing order of atomic size (c) decreasing order of ionization potential (d) increasing order of electron affinity.

(c) Differentiate between electrovalent compound and covalent compound. [2]

Question 3

(a) The questions below are related to the preparation of ammonia: [6]



Answer the following questions:

(i) Why is the higher weight of ammonium chloride taken?

(ii) Why is conc. Sulphuric acid or anhydrous $CaCl_2$ not used for drying ammonia?

(iii) Can you use ammonium nitrate in the above reaction? Why?

(iv) Give two reasons why ammonia is collected by downward displacement of air?

(v) Give the balanced equation for this process.

(b) These are three elements A, B, C with atomic numbers 19, 8 and 17 respectively. [4]

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

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

Question 4

(a) A solution of hydrogen chloride in water is prepared. The following substances are added to separate portions of the solution. [5]

Sr. No.	Substances Added	Gas evolved	Odour
1	Calcium carbonate		
2	Magnesium ribbon		
3	Manganese (IV) oxide with heating		
4	Sodium Sulphide		
5	Sodium Sulphite		

(b) What is Nessler's reagent? What test does it give with ammonium salts? [2]

(c) Give reasons: [3]

(i) Inert gases have zero valency.

(ii) The atomic size increases as we move down the group.

(iii) Solid sodium chloride does not conduct electricity.

Question 5

(a) Give one chemical test for hydrogen chloride gas. [1]

(b) Mr. Ram wants to electroplate his key chain with nickel to prevent rusting. For this electroplating: [5]

(i) Name the electrolyte.

(ii) Name the anode and the cathode.

(iii) Give the reactions occur at anode and at cathode.

(c) Complete the following paragraph using the options given in brackets: [4]

Alkenes are a homologous series of (i) _____ [saturated/unsaturated] hydrocarbons characterized by the general formula (ii) _____ [C_nH_{2n+2}/C_nH_{2n}]. Alkenes undergo (iii) _____[addition/substitution] reactions and also undergo (iv)_____[hydrogenation/dehydrogenation]to formalkanes.

Question 6

(a) Acidulated water is electrolysed in Hofmann's voltameter to liberate two gases. In this context answer the following questions: [5]

(i) Name the gases evolved at each electrode.

(ii) What is the material used for electrodes?

(iii) What is the ratio of gases evolved by volume?

(iv) Write the reactions at the cathode and at the anode.

(b) State the color changes observed when dil. hydrochloric acid is added to the following indicators. [3]

(i) Neutral litmus solution.

(ii) Alkaline phenolphthalein solution.

(iii) Methyl orange solution.

(c) Draw the structural formula of the two isomers of Butane. [2]

Question 7

(a) Give balanced equations for the conversions of: [4]

(i)Methane to Tetra chloromethane. (ii) Ethene to 1,2,di iodoethane.

(iii) Ethene to Ethane. (iv) Acetylene to Acetylene dichloride.

(b) Which of the given elements would you expect to be: [3]

[Ca, O, Ar, S, Be, He]

(i) Very stable?

(ii) In group 2 of the periodic table?

(iii)In group 16 of periodic table?

(c) Name the type of covalent bond (polar/non-polar) formed in the following molecules: [3]

(i) Hydrogen chloride (ii) Carbon tetrachloride (iii) Nitrogen