



Date :16.01. 2020

**CHEMISTRY**  
**SCIENCE Paper-2**  
*(Two hours)*  
*Class-X*

Answers to this paper must be written on the paper provided 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.

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**Section I** is compulsory. Attempt *any four* questions from **Section II**.

The intended marks for questions or parts of questions are given in brackets [ ].

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**SECTION I [40 Marks]**

Attempt *all* questions from this Section

**Question 1**

- (a) Identify the gas evolved in each case [Formula is not acceptable]: [5]
- (i) When the products of reaction of bromoethane and alkali, react with sodium metal.
  - (ii) When dilute nitric acid reacts with copper metal.
  - (iii) When divalent nitride reacts with warm water.
  - (iv) When few crystals of potassium nitrate are heated in a hard glass test tube.
  - (v) When sodium propionate is heated with sodalime.
- (b) What do you see when, [5]
- (i) Dry red rose petals are dropped into a jar of sulphur dioxide gas.
  - (ii) When concentrated sulphuric acid is added to cane sugar.
  - (iii) When sodium hydroxide is added in excess to lead nitrate solution.
  - (iv) When barium nitrate solution is added to sodium sulphate solution, followed by addition of dilute nitric acid.
  - (v) Lead monoxide is heated with coke.
- (c) Select the correct answer from the choices A,B,C and D in each case: [5]
- (i) Dilute sulphuric acid will produce a white precipitate when added to solution of,
    - A: Sodium nitrate
    - B: Zinc nitrate
    - C: Copper nitrate
    - D: Lead nitrate

- (ii) The gas law which related the volume of a gas to the number of molecules of the gas is,  
A: Gay-Lussac's law  
B: Boyle's law  
C: Avogadro's law  
D: Charle's law
- (iii) The metallic compound reduced to metal by electrolysis is ,  
A: Iron[III] oxide  
B: Copper[II] oxide  
C: Magnesium oxide  
D: Silver[I] oxide
- (iv) The I.U.P.A.C name of the product of the reaction of boiling chloroethane with alcoholic caustic potash is,  
A: Ethane  
B: Ethene  
C: Ethylene  
D: Ethyne
- (v) The elements arranged in correct order of increasing ionization energy are:  
A: C, F, Li, Be  
B: B, N, O, Li  
C: S, P, Si, Al  
D: Mg, Al, S Cl

(d) Write the balanced equation for the following: [5]

- (i) When zinc sulphide ore is heated in oxygen.  
(ii) Preparation of a non-volatile acid from a volatile acid using a non-metal.  
(iii) Sodium sulphite reacts with dilute hydrochloric acid.  
(iv) Iron reacts with greenish yellow gas.  
(v) When manganese [IV] oxide is heated with concentrated hydrochloric acid.

(e) From the following list of substances, choose one substance in each case which matches the description (i) to (v) given below: [5]

**[Lead chloride, Zinc sulphide, Sodium carbonate, Lead nitrate, Ammonium carbonate, Calcium chloride, Calcium sulphite, Zinc carbonate, Silver nitrate]**

- (i) An insoluble salt formed by reaction between a metal and a non-metal.  
(ii) A carbonate insoluble in water.  
(iii) An insoluble salt formed from two soluble salt solutions one of which is sodium chloride solution.  
(iv) A salt which decomposes on heating to give a metal as a residue.

(v) A normal salt formed by reaction between an insoluble carbonate and dilute acid.

(f) Give reasons: [5]

(i) Ionic compounds exist as hard solids but covalent compounds exist as soft solids, liquids or gases.

(ii) Sodium argentocyanide is used as an electrolyte during electroplating with silver.

(iii) Zinc is used in galvanizing iron.

(iv) Alkali metals are good reducing agents.

(v) Ethanol is used in thermometers.

(g) Give a word\phrase for the following: [5]

(i) Formation of ions from molecules.

(ii) A bond formed by a shared pair of electrons with both electrons coming from the same atom.

(iii) The metal hydroxide soluble in water.

(iv) A reaction in which hydrogen of an alkane is replaced by another element like chlorine.

(v) Separation of ore and gangue by preferential wetting.

(h) (i) State Gay-Lussac's law [1]

(ii) The number of molecules and moles in 19.86 grams of  $\text{Pb}(\text{NO}_3)_2$ . [2]  
[Pb=207, N=14, O=16]

(iii) Two vessels 'X' and 'Y' of equal volumes contain ammonia and nitrogen under similar conditions of temperature and pressure. If vessel 'X' contains 'a' moles of ammonia, state the number of moles of nitrogen in vessel 'Y'. [N=14, H=1] [1]

(iv) State the 'gram molar volume' of 3 moles of hydrogen. [1]

## SECTION II (40 Marks)

*Attempt any four questions from this Section*

### Question 2

(a) By drawing an electron dot diagram, show the lone pair effect leading to the formation of ammonium ion from ammonia gas and hydrogen ion. [2]

(b) An element 'A' is placed in group 2 and third period of the periodic table. With reference to the element 'A' answer the following questions: [4]

(i) Identify the element 'A'.

(ii) How many valence electrons are present in element 'A'?

(iii) Is element 'A' an oxidizing or reducing agent?

(iv) Write the molecular formula of the hydroxide when 'A' reacts with water.

- (c) State the type of bonding in the following: [2]  
 (i) Non-metallic chloride  
 (ii) Ammonium chloride
- (d) Pick the odd one and give a reason for your choice: [2]  
 (i) Sucrose, Kerosene, Acetic acid, Carbon tetrachloride  
 (ii) Magnesium, Carbon, Sulphur, Aluminium

### Question 3

- (a) The following questions are pertaining to the laboratory preparation of hydrogen chloride gas: [4]  
 (i) Write the equation with condition.  
 (ii) Mention the drying agent.  
 (iii) Give one test to identify the gas.  
 (iv) State a safety precaution you would take during the preparation of hydrochloric acid.
- (b) For each of the salts A, B, C and D suggest a suitable method of preparation which relates to its description given below: [4]

**Note: Do not describe the procedure for the preparation. Refer only to the appropriate method.**

- (i) 'A' is a sodium salt.  
 (ii) 'B' is an insoluble lead salt.  
 (iii) 'C' is a soluble salt of copper.  
 (iv) 'D' is a soluble salt of magnesium.
- (c) Write the electron dot diagram for the following: [2]  
 (i) X=6 and Y=1  
 (ii) P=20 and Q=8

### Question 4

- (a) Name the product at cathode during the electrolysis of the following: [2]  
 (i) Molten lead bromide  
 (ii) Electro-refining of impure copper.
- (b) Give the balanced equation for the following conversions: [4]



D

Aluminium

- (c) Calculate the percentage of water of crystallisation in hydrated copper sulphate.  
[Cu=63.5, S=32, O=16, H=1] [1]
- (d) 67.2 litres of hydrogen combines with 44.8 litres of nitrogen to form ammonia under specific conditions as:  

$$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \longrightarrow 2\text{NH}_3(\text{g})$$
 Calculate the volume of ammonia produced. What is the other substance, if any, that remains in the resultant mixture? [2]
- (e) Calculate the mass of 40cc of carbon monoxide at s.t.p [C=12, O=16] [1]

### Question 5

- (a) Acidulated water is electrolyzed in Hofmann's Voltmeter to liberate two gases.  
In this context answer the following questions: [2]
- (i) Name the two gases evolved at each electrode.
- (ii) What is the ratio of gases evolved by volume?
- (b) Match the properties of sulphuric acid given in list-1 with list-2: [4]
- A: Acid property  
 B: Non volatile property  
 C: Oxidizing property  
 D: Dehydrating property
- (i) Action of concentrated sulphuric acid on sulphur.  
 (ii) Removal of water of crystallization from hydrated copper sulphate.  
 (iii) Preparation of hydrogen chloride gas.  
 (iv) Preparation of copper sulphate from copper carbonate.
- (c) Of the two gases, ammonia and hydrogen chloride gas, which is denser? Name the method of collection of this gas. [2]
- (d) Write a balanced equation for the reaction in which ammonia is oxidized by: [2]
- (i) a metal oxide  
 (ii) a gas which is not oxygen

### Question 6

- (a) Name the following: [3]
- (i) A metal which is unaffected by dilute or concentrated acids.  
 (ii) The non-metal present in stainless steel.  
 (iii) The colourless salt solution formed when zinc oxide reacts with caustic soda.
- (b) Using their structural formulae, identify the functional group by circling them: [2]
- (i) Butan-2-ol  
 (ii) Propanoic acid

- (c) Write a balanced equation for the following: [3]
- (i) Heating ethanol at 443K in the presence of concentrated sulphuric acid.
  - (ii) Bromine dissolved in carbon tetrachloride is passed through acetylene gas.
  - (iii) Ethanoic acid reacts with ethanol in the presence of a catalyst.

- (d) Using nitric acid as one of the reactants how would you obtain: [2]
- (i) Copper nitrate
  - (ii) Iron[III] nitrate

### Question 7

- (a) Ammonium chloride reacts with calcium hydroxide to liberate ammonia in the laboratory preparation. [2]

- (i) Calculate the mass of ammonia obtained from 21.4g of ammonium chloride.
- (ii) Calculate the volume of ammonia gas liberated when measured at STP at the same time.

[N=14, H=1, Cl=35.5, Ca=40, O=16]

- (b) A gaseous hydrocarbon weighs 0.70 grams and contains 0.60 grams of carbon. Find the molecular formula of the compound if its molecular weight is 70. [C=12, H=1] [2]

- (c) Find the vapour density of ethene. [1]

- (d) Differentiate between the following by giving a chemical test: [3]
- (i) Dilute sulphuric acid and hydrochloric acid.
  - (ii) Ammonium chloride and sodium chloride solution
  - (iii) Calcium carbonate and sodium carbonate

- (e) Write the role played by the following during the extraction of aluminium: [2]
- (i) Cryolite
  - (ii) Powdered coke