



**COMPREHENSIVE EXAMINATION 2020**  
**IX – CHEMISTRY**  
**(SCIENCE GROUP)**

Time Allowed: 3 Hours

Marks: 85

**SECTION 'A'**  
**(MCQ's – MULTIPLE CHOICE QUESTIONS)**

(Marks: 17)

**Q.1:** Choose the correct answer for each from the given options.

(Time: 30min)

- 5 moles of water are equal to:  
\*80 g                      \*90 g                      \*100 g                      \*180 g
- The sum of the mole fractions of solute and solvent is equal to:  
\*0                              \*5                              \*2                              \*1
- The electronegativity of Fluorine is:  
\*2.1                              \*4.0                              \*2.5                              \*3.5
- Red ink is normally prepared from:  
\*Oak plant                      \*Linseed oil                      \*Silver nitrate                      \*Brazil wood
- Which one of the following is a liquid metal:  
\*Silver                              \*Gold                              \*Mercury                              \*Bromine
- Symbols of the elements were suggested by:  
\*John Dalton                      \*J.J. Thomson                      \*J.J. Berzelius                      \*Ritcher
- Coca-cola contains this acid:  
\*Carbonic acid                      \*Acetic acid                      \*Boric acid                      \*Formic acid
- One Coloumb:  
\*96500 Faraday                      \*96800 Faraday                      \*96560 Faraday                      \*96600 Faraday
- Neither definite shape nor definite volume is the property of:  
\*Solid                              \*Liquid                              \*Gas                              \*None of these
- The pH value of distilled water is:  
\*7.35-7.45                      \*7.8                              \*7.2                              \*7.0
- The formula of sodium hydrogen carbonate is:  
\*Na<sub>2</sub>CO<sub>3</sub>                      \*NaHCO<sub>3</sub>                      \*Na<sub>2</sub>CO<sub>3</sub> .10H<sub>2</sub>O                      \*NaHCO<sub>3</sub>. H<sub>2</sub>O
- The heat evolved during the formation of one mole of water from H<sub>2</sub> and O<sub>2</sub> is:  
\*118 KJ/mol                      \*186 KJ/mol                      \*286 KJ/.mol                      \*300 KJ/mol
- The electrolyte used in the lead storage battery:  
\*H<sub>2</sub>SO<sub>4</sub> (dil)                      \*H<sub>2</sub>SO<sub>4</sub> (conc.)                      \*HCl                              \*HNO<sub>3</sub>
- Diamond is used as an abrasive because it is:  
\*Hard                              \*Soft                              \*Cubic                              \*Bad conductor of electricity
- This gas is also called "Marsh gas":  
\*methane                              \*ethane                              \*water gas                              \*butane
- Urea which is an organic compound was first synthesized by:  
\*Wohler                              \*Arhenius                              \*Bohr                              \*Rutherford
- The General formulae of Alkanes is:  
\*C<sub>n</sub>H<sub>2n</sub>                              \*C<sub>n</sub>H<sub>2n-2</sub>                              \*C<sub>n</sub>H<sub>2n+2</sub>                              \*None of these



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**IMPORTANT INSTRUCTIONS:**

This Paper consisting of Short-Answer Questions (Section 'B') and Descriptive-Answer Questions (Section 'C'). Its total duration is 2 1/2 hours only and also draw diagrams where necessary.

**SECTION 'B' (SHORT – ANSWER QUESTIONS)**

(Marks: 40)

**NOTE:** Answer any 10 questions from this section.

- i. Write down ONE contribution of each of the following scientists towards Chemistry: (ANY 4)
- (a) J.J. Berzelius      (b) Scheele      (c) J.J. Thomson      (d) J. Priestly      (e) Mendeleev  
(f) Jabir Bin Hayyan      (g) J. Black      (h) Al-Razi      (i) Al-Beruni      (j) Lavosiour

**OR**

Define Chemistry and write down the name of its ANY FOUR branches? OR What do you mean by scientific approach in chemistry? How will you differentiate between Hypothesis and Theory?

- ii. Calculate the No. of Electrons, Protons and Neutrons in the following: (Any 4)
- (a)  ${}_8\text{O}^{17}$       (b)  ${}_{16}\text{S}^{-2}$       (c)  ${}_{92}\text{U}^{234}$       (d)  ${}_{12}\text{Mg}^{+2}$       (e)  ${}_8\text{O}^{18}$   
(f)  ${}_6\text{C}^{13}$       (g)  ${}_{13}\text{Al}^{+3}$

**OR**

State the Law of Constant Composition or Law Reciprocal Proportion or Law of Multiple Proportion and Law of Conservation of Mass with Examples? OR Define Electrolysis and write its THREE uses? OR Define Electrolysis? Explain the electrolysis of molten **NaCl** and **H<sub>2</sub>O**.

- iii. Write Chemical Formulae of the following: (ANY 4)

- (a) Oleum      (b) Baking Soda      (c) Cryolite      (d) Slaked Lime  
(e) Copper Pyrite      (f) Quicklime      (g) Haemetite      (h) Iron Pyrite      (i) Bauxite  
(j) Carnalite      (k) Potash Alum      (l) Pearl Ash      (m) Caustic Soda  
(n) Epsom Salt      (o) Oil of Vitriol      (p) Soda Ash

**OR**

Write down the names and formulae of ANY FOUR ores of Copper or Iron or Aluminium? OR Define Radioactivity? Write any THREE Properties of  $\alpha$ ,  $\beta$  and  $\gamma$  radiations? OR Write FOUR Differences between Solution & Suspension? OR Define Suspension and its THREE applications in daily life?

- iv. Draw the electronic structures of the following molecules: (ANY 4)

- (a)  $\text{H}_3\text{O}^+$       (b)  $\text{C}_2\text{H}_2$       (c)  $\text{H}_2\text{O}$       (d)  $\text{NH}_4^+$       (e)  $\text{O}_2$

**OR**

Define the following terms (ANY 4):

- (a) Molar Mass      (b) Mass Number  
(c) Radioactivity      (d) Mole  
(e) Avogadro's Number      (f) Electronegativity  
(g) Atomic Mass      (h) Empirical Formula  
(i) Atomic Number      (j) Ionisation Energy  
(k) a.m.u      (l) Atomic Radius      (o) Electron Affinity

**OR** Define Chemical Reaction. Write down the name of all types of Chemical Reactions (with Examples and Balance Chemical Equations).

**OR**

Define Addition Reaction OR Double Displacement Reaction OR Decomposition Reaction and give its one Example with the help of an equation?

- v. Write **FOUR** differences between Covalent and Coordinate Covalent Bond? OR What is Salt? Define THREE types of salts with examples. OR Define Water of Crystallization? Write the names and chemical formulae of three hydrated salts. OR Write ANY FOUR Properties of Covalent Compounds? OR Write ANY FOUR differences between ionic and covalent bond?

OR

What is Electrovalent Bond? Describe it with the Help of Formation of NaCl (Sodium Chloride)?

OR

Define Refining of Petroleum and write THREE fractions of it? OR Write ANY FOUR Uses of Potash Alum OR Hydrogen Gas OR Water Gas OR Bleaching Powder OR Chlorine Gas OR Hydrogen Peroxide OR Sulphuric Acid? OR Water Glass. OR Silica Gel?

- vi. Balance the following equations: (Any 4)



- vii. Calculate the mass of  $\text{CH}_4$   $\text{NO}_2$  which is required to prepare 0.5 M solution in  $250 \text{ cm}^3$ ?

[ H = 1 , C = 12 , N = 14 , O = 16 ]

OR

A solution is prepared by dissolving 1 mole of ethyl alcohol in 3 moles of water. Calculate the mole fraction of each component? OR

Chlorine is naturally found in two stable isotopes  ${}^{35}_{17}\text{Cl}$  and  ${}^{37}_{17}\text{Cl}$  in the proportion of 75% and 25% respectively. Calculate its average atomic mass.

- viii. Define Solubility? Write the names of **THREE** factors which effect Solubility. Also describe the Law of Solubility of Pressure?

OR

Write **TWO** Chemical and **TWO** Physical differences between Metals and Non-Metals?

OR

Compare any **FOUR** Physical Properties of Diamond and Graphite? OR Define Alloy and Write the composition and one use of Brass, Bronze and Nichrome? OR What are Thermochemical Reactions and Enthalpy of a reaction? Describe each atleast with one Example (Chemical Equation is Necessary).

OR

A current of 0.25 Ampere was passed through a Solution of Copper Sulphate for 60 minutes. Calculate the Mass of Copper metal deposited on the Cathode. Electrochemical Equivalent of Copper is  $3.294 \times 10^{-7} \text{ kg / C}$  OR Calculate the amount of silver deposited at cathode when a 10 ampere electric current is passed through a solution of  $\text{AgNO}_3$  for 1 hour. (Electrochemical Equivalent of Silver =  $0.001118 \text{ g/C}$ )

OR

What are Metalloids? Write THREE Differences between metals and non-metals.

- ix. What are Double Salts? Write the Name and Formulae of any **THREE** double Salts.

OR

Define Avogadro's Number? Calculate the number of atoms present in one gram of Oxygen OR Calcium. [ Ca = 40 , O = 16 ]

Which element possess ONE or SEVEN Electrons in their Outermost Shell? Mention the Group. Also write **THREE** general properties of that group.

- x. Define pH ? Find pH & pOH of KOH solution whose Concentration is 0.01 M? OR Write FOUR Postulates of Kinetic Molecular Theory of Gases.

OR

Define Avogadro's Number and Mole? Calculate the No. of molecules in 11g of  $\text{CO}_2$ ?

[ C = 12 , O = 16 ]

- xi. Write **FOUR** Sailable features of Mendeleev's Periodic Table?

- xii. State the following Laws:

(a) Graham's Law

(d) Newland's Law of Octave

(b) Henry's Law

(e) Dobereiner's Law of Triads

(c) Modern Periodic Law

**OR** State and Explain Faraday's 1<sup>st</sup> and 2<sup>nd</sup> Law of Electrolysis? **OR** What are Isotopes? Write Name & Structures of Isotopes of Hydrogen.

**OR** Differentiate between Soap and Detergents? **OR** What are Plastics? Write the names of their main groups. **OR** Explain the types of iron.

**OR** What are Soaps? Describe the raw materials used in the preparation of soap.

xiii. Define Paraffins? Write the Formulae of Alkane, Alkene and Alkyne containing Six Carbon Atoms.

**OR**

What is Ozone? How can ozone be prepared from Oxygen? Write its **TWO** Important Uses. **OR** Why Methane is called Marsh Gas? Write **TWO** methods for the preparation along with the balanced chemical equations.

xiv. Write down the main features of Dalton's Atomic Theory? **OR** What is Aqua Regia? How does it dissolve gold. **OR** Write **FOUR** differences between Oxidation & Reduction.

**OR**

Define the following Terms:

- (a) Aliphatic Hydrocarbons
- (b) Alicyclic Hydrocarbons
- (c) Aromatic Hydrocarbons

**OR** Explain Stepwise Chlorination of methane giving four chemical equations.

**OR** Differentiate between Ordinary Water and Heavy Water? (Any 4) **OR** Define Hard, Soft and Heavy Water? **OR** What is meant by isomerism? Discuss chain isomerism with an example.

**OR**

Write **FOUR** Characteristics of Alkali Metals or Halogens or Transition metals or Noble Gases? **OR** Write **ANY FOUR** Characteristics of Cathode Rays?

**OR**

Define the following: (Any 4)

- (a) Enthalpy
- (b) Standard Solution
- (c) Fusion
- (d) Boiling Point
- (e) Diffusion
- (f) Brownian Movement
- (g) Sublimation
- (h) Evaporation
- (i) Metalloid
- (j) Hydrogen Bond
- (k) Ampere
- (l) Heat of Neutralisation
- (m) Metallic Bond
- (n) Freezing Point
- (o) Saturated Solution
- (p) Unsaturated Solution
- (o) Titration
- (p) Coulomb
- (q) Electrochemical Equivalent

xv. Draw the structures of the following:

- (a) Diamond
- (b) Graphite
- (c) Triclinic Sulphur
- (d) Plastic Sulphur

**OR** What is Steel? State different types of steel according to their composition. **OR**

Reproduce **ANY TWO** of the following equations in the form of balanced chemical equations:

- (a) How can you prepare ethene from ethyl alcohol.
- (b) Zinc reacts with dilute hydrochloric acid to form Zinc chloride and Hydrogen gas.
- (c) Ethylene adds a bromine to form ethylene dibromide.
- (d) Ethene reacts with the hydrogen molecule to form ethane.
- (e) Carbon monoxide reacts with oxygen to form carbon dioxide.
- (f) Nitric oxide reacts with oxygen to form Nitrogen dioxide.
- (g) Methane is combusted with oxygen to form carbon dioxide and water vapours.
- (h) Ethene is combusted with oxygen to form carbon dioxide and water vapours.
- (i) Oxygen gas reacted with Hydrogen gas to form water.

**OR**

Give reasons of the following: (Any 2)

- (a) Why cold drinks are bottled under a CO<sub>2</sub> pressure greater than 1 atm.
- (b) Why are some alkali metals like sodium, potassium are soft while others are hard?
- (c) Why fish, Poultry and dairy products are spoil.
- (d) Why salt is dissolved in water but not in petrol.
- (e) How aquatic life survive under frozen water.

**SECTION 'C' (DESCRIPTIVE – ANSWER QUESTIONS)** (Marks: 28)

**NOTE:** Attempt any TWO questions from this Section.

**Q.3** (a) Describe the Industrial Preparation of Sulphuric Acid by Contact's Process with the help of balanced chemical equations and also Write **THREE** Uses of Sulphuric Acid? **OR**

State Lewis **OR** Bronsted Lowry Theory of Acids and Bases. Explain it with the help of Examples?

(b) What is Water Gas? Discuss Two Methods to Separate Hydrogen from Water Gas. **OR**

Describe how Bohr removed the defects in Rutherford's Atomic Model?

**Q.4** (a) With the help of the Labelled Diagram, Explain the Construction and Working of the Dry Cell? **OR**

Describe with the Help of Labelled Diagram, the Construction and Working of Lead - Storage Battery?

(b) What is Water Glass and Silica Gel? Write their Uses. **OR**

What is Allotropy? Differentiate between Rhombic and Monoclinic Sulphur. **OR**

Describe with Chemical Equations, the Manufacture of Washing Soda by Ammonia – Solvay Process?

**OR** Discuss the Laboratory method for the Preparation of Chlorine with the Balanced Chemical Equation and Draw the diagram?

**Q.5** (a) Describe the extraction of iron from haemetite ore in the blast furnace. Also write equations of chemical reactions. (Diagram is not required) **OR**

With the help of diagram, discuss the Extraction of Aluminium by Electrolysis of Pure Alumina ( $\text{Al}_2\text{O}_3$ ) through reference of cathode and anode reactions.

(b) Define the following:

- I. Isomerism                      II. Cracking                      III. Reforming                      IV. Refining of Petroleum  
V. Octane Number

**OR**

Define Electroplating? Describe Nickel or Chromium Plating with equations (Diagram is not required).

**Q.6.** (a) What do you mean by Hard water? Give the types of Hardness. How is hard water softened by Clark's Method and Zeolite (Permutit) process.

**OR**

What is Hydrocarbon? Explain with examples of classification of the hydrocarbons.

(b) How Ammonia is Prepared by Haber-Bosch Process, Also write **TWO** Physical and **TWO** Chemical Properties of Ammonia gas? **OR** What are Oxides? How they are classified? Describe normal oxides in detail.

**OR**

Define Dative Bond? Discuss the Coordinate Covalent Bonding in Ammonium ion ( $\text{NH}_4^+$ )

Marked with '**RED**' are the **MOST IMPORTANT QUESTIONS.**