

# GOVERNMENT CENTENNIAL MODEL SCHOOL BOYS BANNU

## QUESTION BANK OF COMPLETE BOOK OF 9<sup>th</sup> CLASS (Chemistry)

### CHAPTER 1<sup>ST</sup> FUNDAMENTAL OF CHEMISTRY (SET I)

#### Introduction

1. Define science.
2. Draw flow sheet of classification of matter.
3. What is Chemistry?
4. Atom may or may not exist independently. Justify?
5. What is matter? Show classification of matter.
6. What is valency? .
7. What is meant by variable valency?

#### Muslim period

1. What were principal goal of Muslim chemist?
2. Write contributions of Muslim scientists in field of chemistry.

#### Branches of chemistry

8. Define industrial chemistry and analytical chemistry.
9. How can you differentiate between organic and inorganic chemistry?
10. Give the scope of biochemistry.
11. Define Biochemistry.
12. Write any four branches of chemistry.
13. What is nuclear chemistry?
14. Explain in which branch we measure quantity of compound.
15. What is environmental chemistry?
16. Define Physical Chemistry.
17. What is difference between organic and inorganic chemistry?

#### Basic definitions

18. How does homogeneous mixture differ from heterogeneous mixture?
19. State three reasons why do you think air is a mixture and water a compound.
20. Explain why hydrogen and oxygen are considered elements whereas water a compound.
21. What is the significance of the symbol of an element?
22. what are elements and compounds. Give 2 example of each.
23. Every compound is a molecule, but every molecule is not a compound. Justify

24. Element and compound are pure substances. While mixture is not a pure substance. How?
25. Why is air considered as a homogeneous mixture?
26. What are the three differences between element and compound?
27. Mixture of sand in water, baking soda in water and oil in water is homogeneous or heterogeneous. Give reasons for your choice.
28. State the reasons soft drink is a mixture and water are a compound..
29. Write difference between heterogeneous and homogeneous mixture?
30. Write difference between monoatomic molecule and heteroatomic molecule.
31. Write difference between mono atomic and Poly atomic molecule.
32. Write difference between micro molecule and macro molecule.
33. Classify the following into elements compound and mixture.
  - (i) He and H      (ii) CO and Co (iii) Water and milk
  - (iv) Gold and brass.      (v) Iron and steel.
34. Which one has more molecules: 9g of water or 9g of sugar?
35. What is a symbol and how to write a symbol?
36. Explain 4 properties of gallium along with symbol.
37. Difference between compound and mixture.
38. What are coinage metals?
39. What is formula of compound and how to write it?
40. Although copper and cobalt start from letter but have diff symbol
41. Why elements in compound lose their identity.
42. Write three differences between compound and mixture.
43. Define and explain types of mixture.
44. Write the composition of following mixtures.
  - (i) Air (ii) Soil      (iii) Milk      (iv) Brass

### **Atomic number and mass number**

45. Define empirical formula with example.
46. If  $n = 6$ . What will be the molecular formula of a compound with empirical formula CH?
47. Define nucleon number and proton number.
48. Define atomic mass and atomic number along with representation.
49. Why atomic mass is related to no of protons not electron?
50. An atom has 3 neutrons, and 3 electrons find it's A and Z
51. Define and explain isotope of carbon.
52. Differentiate between molecular formula and empirical formula.
53. Define formula unit and formula mass with example.

54. Why C12 is taken as standard.
55. Differentiate gram formula mass and Gram molecular mass?
56. Differentiate molecular mass and Formula mass.
57. What is avg atomic mass and how to calculate it?
58. Define atomic mass unit. Why is it needed?
59. Differentiate between molecular mass and formula mass. Which of the following will be molecular formula?  
H      b) O      c) NaCl      d) KI      e) H<sub>2</sub>SO<sub>4</sub>
60. Which one has more atoms: 10 g of Al or 10 g of Fe?
61. What is atomic number and mass number?
62. What are the types of chemical formula?
63. Write difference between atomic mass and mass number.
64. Brass and bronze are not pure substances. How?
65. What is molecular formula? How molecular formula is derived from empirical formula?
66. What is empirical formula of acetic acid (CH<sub>3</sub>COOH)? Find its molecular mass?
67. Write chemical formula and chemical names of given substances.  
i) Marsh gas    iii) lime    ii) Chile salt Peter    iv) bleaching powder

#### **Relative atomic mass and atomic mass unite.**

68. What is the relative atomic mass? How is it related to gram?
69. Differentiate between Average atomic mass and relative atomic mass.
70. Mass of 1 atom of C-12 is equal to  $1.993 \times 10^{-23}$  g. How?
71. How 1 a.m.u is equal to  $1.67 \times 10^{-27}$  kg?
72. Why is Carbon-12 taken as Standard atom?

#### **Chemical species**

1. What is a radical?
2. What is ion? What are its types?
3. Why ion is a charged particle?
4. Why cation is a positive charged particle?
5. Why anion has a negative charge?
6. Why free radical has no charge? .
7. Differentiate between atom and ion.
8. Differentiate between molecule and molecular ion.
9. How are cation and anion formed?
10. Differentiate between ion and atom.
11. How chemical specie is classified?
12. What are the types of molecular ion?
13. Draw a sketch showing types of chemical species.
14. How will you form Mg<sup>+2</sup> and Cl<sup>-1</sup>?

15. How  $O^{2-}$  is formed?
16. Define free radicals? How are they generated?
17. Differentiate between ions and free radicals.
18. Write any four differences between atom and ion.
19. Write any four differences between atom and molecule?
20. Write any four differences between ion and free radical?
21. Write any four differences between anion and cation.
22. Give 2 examples of simple cation and molecular cation.

### **Molecule**

23. Differentiate between homoatomic and heteroatomic molecules with examples.
24. Define molecule and its types.
25. What is difference between formula unit and molecule?
26. What are the types of Molecules based on size?
27. What are the types of Molecules based on nature of atoms?
28. What are the types of Molecules based on number of atoms?

### **Avogadro's number and Mole**

1. What is Avogadro's number?
2. Define mole and write its unit along with example.
3. Mole is the measure of amount. How?
4. What is Gram atomic mass and Gram molecular mass.
5. Define gram atomic mass, gram formula mass, gram molar mass, gram molecular mass.

### **Chemical calculations**

1. How many atoms of sodium are present in 3 moles of sodium and what is the mass of it?
2. How many particles are in 100 g of water?
3. How many particles are present in 1 ton of glucose?
4. Calculate number of moles of propane in 100 g of propane( $C_3H_8$ )
5. Calculate the average atomic mass of lithium isotopes.
6. Calculate the mass of  $3.011 \times 10^{23}$  molecules of  $CO_2$ .
7. How many moles are present in 40g of Na atoms?
8. What are mole-mass and mole-particles calculation
9. What is the formula mass of  $Fe(OH)_3$ ?
10. How many grams are in 3.2 moles of  $H_2O$ ?
11. Calculate Molar mass of  $Al_2(SO_4)_3$  and  $NH_4OH$
12. Calculate number of molecules in 60 g of  $CO_2$

## **CHAPTER 2<sup>ND</sup> STRUCTURE OF AN ATOM**

### **Introduction**

1. What is carbon dating.
2. Write down uses of 4 elements in daily life.

### **Theories and experiment related to atomic structure.**

3. How testing prevailing theories bring about changes in them?
4. Why most of the volume occupied by the atom is empty? Explain.
5. What is Dalton's atomic model?
6. What are main postulates of Dalton's atomic model?

### **Rutherford's atomic model**

1. Why is nucleus considered for mass and energy of the atom?
2. Why Rutherford's atomic model couldn't explain chemical properties of elements.
3. On what basis Rutherford said atomic spectrum is a continuous spectrum?
4. Describe that Rutherford made to the development of atomic theory.
5. Why Rutherford used gold foil in his experiment?
6. Why Rutherford used Lead box in his experiment?
7. What were the reasons for Rutherford's atomic model failure?
8. Why Rutherford atomic model also known as planetary model?
9. Why out of 20000 alpha rays only 2 bounces back at the original way?
10. Why are some alpha particles deflected with very small angle some were deflected with very large angle?
11. Discuss that Rutherford atomic model did not explain the stability of atom?
12. How Rutherford atomic theory is differed from Bohr's atomic theory?
13. Write 4 main points of Rutherford's atomic model.
14. What are three observations made by Rutherford.
15. What experiment was performed for nucleus discovery.
16. What are the materials used by Rutherford?
17. What 3 conclusions did Rutherford make in his experiment.
18. Why Rutherford's atomic model couldn't explain stability of atom.

### **Neil Bohr's atomic model**

19. Draw Bohr's model for the following atoms indicating the location for electron, protons and neutrons:
  - a. Potassium (Atomic No 19, Mass No. 39)
  - b. Silicon (Atomic No. 14 Mass No.28)
  - b. Argon (Atomic No.18 Mass No. 39)

20. How can we explain that the energy of an orbit is fixed?
21. What Neil Bohr said about angular momentum of electron.
22. Draw Bohr atomic model for chlorine (atomic no. 17, mass no. 35) and indicate the location of electrons, protons and neutrons.
23. How Bohr explain energy of electron when it revolves orbit?
24. Write 4 main postulates of Neil Bohr's atomic model.
25. Write down the value of plank constant?
26. Why an electron when jumps from lower energy level to high energy level absorb energy.?
27. Why angular momentum of an electron increases from lover energy level to higher energy level.?

### **Fundamental particles of an atom**

28. An atom is electrically neutral, why?
29. Can you identify an atom without knowing number of neutrons in it?
30. What is the difference between electron and proton?
31. Atomic symbol of silicon is  $^{14}\text{Si}$  28. what information do you get from it?
32. How number of electrons in particular shell can be calculated. Find number of electrons K, L, M, N shell.
- 33.

### **Electronic configuration**

34. Distinguish between shell and sub-shell.
35. Why are electrons fill 1<sup>st</sup> in 4s and then 3d?
36. How many sub-shells are there in N shell?
37. Give notation for sub-shell of M shell?
38. List the sub-shell of M shell in order of increasing energy.
39. Which orbital in each of the following pairs is lower in energy?  
2s, 2p b. 3p, 2p c. 3s, 4s
40. How many electrons can be placed in all the sub shells in the n=2 shell?
41. What is electronic configuration. Write electronic configuration of  
Nitrogen                      b) oxygen                      c) carbon
42. What is the difference between shell and sub shell?
43. An atom having electronic configuration is  $1s^2, 2s^2, 2p^4$ . Find number of electrons and protons in it. Also identify atom.
44. Arrange the following orbital in increasing order of energy level.  
2s, 3s, 2p, 3p, 1s, 4s

45. How many sub shells in M and N shell? Also arrange them increasing order of energy.
46. Why does an electron first fill 2p subshell and then 3s subshell?
47. Define electronic configuration?
48. Why doesn't calcium follow  $2n^2$  rule of electronic configuration?
49. Potassium has electronic arrangement 2,8,8,1 What is its proton number and draw its electronic structure.
50. What is Auf-bau rule?
51. Potassium has electronic arrangement 2,8,8,1 What is its proton number and draw its electronic structure.
52. Mass number of an atom indicates total number of proton and neutrons in the nucleus. Can you identify an atom without any neutron?
53. Sodium has 11 protons and 12 neutrons. Write the electronic configuration of sodium atoms.
54. Explain Auf Bua principle.
55. Sketch the structure of atom.
56. Draw the shapes of s, p and d subshells/Orbitals.
57. How many Orbitals are there in P and D subshells?
58. Why half-filled Orbital is stable. Give example.
59. Write difference between shell and subshells?
60. Which principle explain filling of electrons in various sub shell. Explain
61. How many orbitals present in each sub shell?  
 a) s                      b) p                      c) d                      d) f
62. Why 4s subshell is filled first before 3d?

### Isotopes

7. What are isotopes? Give two examples.
8. How can you differentiate Heavy water from ordinary water?
9. Isotopes have same chemical properties but different physical properties why?
10. Draw the structure of hydrogen isotopes.
11. Why isotopes are different from each other?
12. Write four uses of isotopes.
13. Find number of electrons, protons and neutrons in  $C^{12}$ ,  $C^{13}$ ,  $C^{14}$ .
14. Why the chemical properties of the isotopes are same, but the physical properties are different?
15. Draw the structure of Cl isotopes?
16. X-14 is a radioactive isotope used to estimate the age of substances. How many electrons, protons and neutrons are there in this isotope. Valence shell electronic configuration of X is  $2s^2, 2p^2$ .

17. Naturally occurring carbon has three isotopes C-12, C-13 and C-14 select isotopes that has greater number of electrons.
18. Which isotopes of carbon is used to estimate the age of carbon contain substances?
19. How many neutrons are present in  $^{234}\text{U}_{92}$ ?
20. Two isotopes of chlorine are Cl-35 and Cl-37. How are these isotopes differed? How they are alike?
21. Draw structure of carbon isotopes.
22. Draw structure of U238, U235, U234.
23. Draw structure of uranium isotopes.
24. Write four uses of isotopes.
25. Write one use of given isotopes.  
i) C14 iii) Am241 ii) P32 iv) Kr85

## CHAPTER 03 PERIODICTABLE AND PERIDICITY OF PROPERTIES

### (SET II)

#### Introduction

1. define periodic table.
2. What do you know about the term” dual nature of matter”?
3. Define Doberiener triads.
4. Give example of Doberiener Triads.
5. Describe Newland of octaves.
6. Describe Drawbacks or Newland of octaves.
7. Who was Mendeleev?
8. Describe Mendeleev's periodic law.
9. Write down Drawbacks of Mendeleev's periodic table.
10. Who introduced the name of periodic table?
11. What is sketch of Mendeleev’s periodic table.
12. What are Newland octaves. Give example?
13. What are rare earth elements. Give three examples.

#### Modern periodic table

1. Describe Modern periodic law.
2. Write down significance of atomic number.



3. Why is group IA called Alkali metals group?
4. Why group IIA is called Alkaline earth metals group?
5. Why is Hydrogen placed with Alkali metals?
6. Why Hydrogen is not Alkali metal?
7. Write difference between noble metals and noble gases.
8. Why S block contains 2 groups?
9. Why P block has 6 groups?
10. Why is f block placed separately at the bottom of periodic table?
11. Why periodic table is called periodic table?
12. Why do scientists need to make a periodic table?
13. What is the purpose of periodic table?
14. Why Mendeleev's Periodic table was modified?
15. Why noble gases elements are known as Zero group elements.
16. What is the difference between inner transition elements and outer transition elements?
17. Why group 17 or VIIA elements are known as Halogens.
18. Why group VIIIA elements are known as Noble gases or inert gases or zero group.
19. What are the names of groups in P block? Give reasons for their assigned names.
20. What are the names of groups in S block? Give reasons for their assigned names.
21. Which elements are known as Alkaline earth metals. And why?
22. Write any four properties Of Gallium element.
23. Explain why elements from Group I are more reactive than Group-II
24. Write a valence shell electronic configuration on an element present in 3rd period and 3 group.
25. Write the valence shell electronic configuration of
  - a. Alkali Metals
  - b. Alkaline earth metals
  - c. Halogen
  - d. Noble gases
26. Imagine you are standing at the top of Neon-20 nucleus. How many kinds of subatomic particles you see looking down into the nucleus and those you would see looking out from the nucleus?
27. Find the position of following elements in periodic table.
  - a. Na
  - b. Cl
  - c. Ca
  - d. Al
28. Why alkaline earth metals are known as s block elements.
29. Identify s and p block elements from following by using electronic configuration.
  - a. Na

- b. Be
  - c. F
  - d. O
30. Use the 3<sup>rd</sup> member of each group from IA, II A, and VII A to judge the number of valence electron in an atom is same as that of group number.
  31. Why the improvement in Mendeleev's periodic table was made?
  32. Define groups and periods.
  33. Why He and Ne are noble gases?
  34. How would you differentiate modern and Mendeleev's periodic table?
  35. Write three differences between transition and representative elements?
  36. Differentiate groups and periods in periodic table.
  37. What is the difference Between modern periodic law and Mendeleev's periodic law?
  38. define group number and period number.
  39. How many groups and periods present in Modern period table?
  40. How many blocks are present in Modern Period table?
  41. How are elements arranged into four blocks?
  42. Define transition elements.
  43. Who were alchemists?
  44. Write down the names of elements belonging to group 1?
  45. In which pattern modern periodic table was arranged?
  46. How many elements are in first period and what are their names and symbols? ■
  47. How many elements are placed in 4<sup>th</sup> period?
  48. From which element lanthanide series starts?
  49. From which period actinide series is start?
  50. Define lanthanides. In which period it belongs?
  51. Define actinides in which period it belongs?
  52. How many elements present in 3<sup>rd</sup> period? Write their name and symbols.
  53. How many periods are considered to be normal periods?
  54. What is the reason of arranging elements in group'?
  55. What do you mean by period function?
  56. Why are the elements called s p-block elements?
  57. How many members are in group 17? Is there any liquid, what is its name?

### Electronic configuration

1. Electronic configuration of some elements is as follows. Explain which of these have almost similar chemical properties.
  - a.  $X=1s^2, 2s^2, 2p^4$
  - b.  $Y=1s^2, 2s^2, 2p^2$

- c.  $Z = 1s^2, 2s^2, 2p^6, 3s^2, 3p^4$
2. Identify the one which forms a dipositive cation. Justify your answer.
  - a.  $X = 1s^2, 2s^2, 2p^4$
  - b.  $Y = 1s^2, 2s^2, 2p^2$
  - c.  $Z = 1s^2, 2s^2, 2p^6, 3s^2, 3p^4$
3. Electronic configuration of four elements is given below.
  - i.  $1s^2, 2s^2$
  - ii.  $1s^2, 2s^1$
  - iii.  $1s^2$
  - iv.  $1s^2, 2s^2, 2p^5$
4. Which of these elements is
  - a. An alkali metal.
  - b. Alkaline earth metal
  - c. Noble gas
  - d. Halogen
5. How would you differentiate the  $2n^2$  rule and the aufbau rule?
6. Why do K and L shells have different energies?
7. Do L and M shells have same or different energies. Why?

## Periodicity of properties

1. How do the properties of elements repeat after regular intervals?
2. Define atomic size and atomic radius.
3. Define periodicity of properties
4. Define the following terms.
  - i) Atomic radius ii) covalent radius.
5. Differentiate atomic radius and covalent radius.
6. How do atomic sizes vary in groups and periods?
7. Is atomic size rigidly fixed? How?
8. Write down the trends of atomic size in groups and periods in the periodic table.
9. Why does the atomic radius of elements increase down the group?
10. What is the reason for the decrease in atomic size from left to right in a period?
11. What is the S.I. unit of atomic radius?
12. Is Sulphur more likely to be similar to selenium. Or to chlorine in its chemical properties. Why?
13. Which set has the more similar chemical properties and why?
  - i) N, P, S ii) Li, C, F
14. How is periodicity of properties dependent upon the number of protons in an atom?
15. What is the covalent radius of given molecules?

i) Fluorine iii) bromine ii) Chlorine iv) iodine

16. What is the difference between Mendeleev's periodic law and Modern periodic law?

### **Ionization energy**

1. Define ionization energy. Write down its unit.
2. Which element in the given set has largest I.E given reason  
i) K, Ga, Se. ii) O, S, Se.
3. What is the trend of ionization energy in periodic table?
4. Why 2<sup>nd</sup> I.E is greater than 1<sup>st</sup> I.E.
5. Sodium first I.E is 496KJ/mol. While Magnesium first I.E is 738KJ/mol
6. Why Ne has highest I.E value of 2081KJ than Na I.E value 496KJ.
7. Why ionization energy decreasing from top to bottom in any group?
8. Why ionization energy increasing in a period?
9. Why the 2<sup>nd</sup> Ionization energy of an element is higher than first one?
10. Why the ionization energy of sodium is less than that of magnesium?
11. Why it is difficult to remove an electron from halogens?
12. Differentiate first IE and second IE. Give one example of each.
13. Why cesium atomic no.55 requires little energy to release its one electron present in the outer most shell?
14. Why group II A elements are less reactive than group IA?
15. Explain why Na has less I.E than K?
16. What are values of I.E of Aluminum?
17. Explain why 1<sup>st</sup> I.E of Na is less than Mg?
18. Why 2<sup>nd</sup> I.E of Na is higher than Mg?
19. What are the factors effecting ionization energy?
20. what is the trend of I.E in groups.?
21. Alkali metals I.E is less then I.E of Alkaline Earth metals. How?
22. Relate I.E and shielding effect.
23. Arrange the elements in increasing order of their energy also explain reason.
24. What type of elements has highest I.E and what type of elements has lowest I.E?  
Argue.
25. Two elements having electronic configuration  $1s^2, 2s^2, 2p^6$  and  $1s^2, 2s^2, 2p^6, 3s^2$ . I.E of one is 2080KJ/mol and other is 496 KJ/mol. Match each I.E with of the given electronic configuration. Give reason for your choice.

### **Atomic size**

1. Atomic size of K is higher than Na why?
  2. How atomic size of halogens vary in group. Explain with reason.
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## Electron affinity

1. Define electron affinity. Write down its unit.
2. Differentiate first EA and second EA. Give one example of each.
3. Why 2nd electron affinity is positive value. Why?
4. Why is energy absorbed in addition of 2nd electron?
5. Why energy is released in addition of 2nd electron.
6. Why Nitrogen Electron affinity is 0?
7. Oxygen 1st electron affinity is -141KJ and 2nd is +844KJ?
8. Write the two types of electron affinity.
9. Can you guess where the least electronegative element is located?
10. Which group has highest electronegativity and why?
11. What is the trend of electron affinity in group and period in the periodic table?
12. Why electron affinity decreases in a group?
13. Why electron affinity increases in a period?
14. Why value of 1<sup>st</sup> electron affinity is negative, and 2<sup>nd</sup> is positive?
15. Atom with poor shielding effect has High electron affinity value. How?
16. Relate E.A and Shielding effect.
17. How atomic size effect I.E and E.A.?
18. Which group has least E.A values and why?

## Shielding effect

1. What is shielding effect?
2. Why shielding remains constant in period?
3. Which of these have higher shielding effect?  
a. Cl.      B. Br
4. How does shielding effect decrease the forces of electrostatic attractions between nucleus and outermost electrons?
5. Shielding effect is more effective in groups. How?
6. Nuclear charge overcome Shielding effect in period. Justify.
7. Why Screening effect remain same from left to right in periodic table?
8. Why does the bigger size of atoms have more shielding effect?
9. Why the trend of electron affinity and electronegativity does same in a period?
10. Why shielding effect of electrons makes cation formation easy

## **Electronegativity**

1. Define electronegativity.
2. Argue which region of periodic table you will find the elements with relatively.
  - a. High electronegativity
  - b. Low electronegativity
3. Why noble gases are not very reactive?
4. write any 3 factors effecting electronegativity.
5. How electronic configuration Effect E.N?
6. Why fluorine is special in terms of electronegativity.
7. What is Pauling scale.
8. What are the trends of electronegativity in groups and periods?

## **CHAPTER 04 STRUCTURE OF MOLECULES**

### **Introduction Concept of chemical bonding**

1. State octet and duplet rules.
2. Describe the importance of noble gas electronic configuration.
3. Explain how elements/atoms attain stability?
4. What is the difference between intermolecular forces and intramolecular forces?
5. What is difference between physical and chemical bond.
6. Define duplet and octet rule.
7. Why do atoms form chemical bond?
8. How to atoms form chemical bond?
9. What are valence electrons and valence shell?
10. What are different types of chemical bond?
11. Write different types of physical bond
12. What are they ways atom get their stability?
13. What is valence concept of bonding?
14. What is orbital concept of bonding?
15. Define sigma and pi bond.
16. Write how elements attain the noble gases

## **Chemical bond**

17. Describe the ways in which bonds may be formed?
18. Explain how elements/atoms attain stability?
19. Why noble gases are non-reactive?

## **Types of chemical bond Ionic bond**

20. How does O form anion?
21. Describe the formation of cations for the following metal atoms:
22. Li (atomic no. 3)
23. Al (atomic no. 13)
24. How is an ionic bond formed? Explain with an example.
25. What are Ionic Compounds? Write two properties of Ionic Compounds?
26. Recognize the following compounds as having ionic bonds:
27. KCl    b.  $\text{AlCl}_3$     c.  $\text{MgF}_2$
28. Explain ionic bond and its formation in NaCl and  $\text{CaCl}_2$
29. How would you distinguish whether the particle is ionic or covalent?
30. Write any four differences between ionic compounds and covalent compounds.
31. What is the difference between ionic and covalent bond?
32. Explain ionic bond formation in KCl
33. . Explain electrovalent bond in  $\text{MgCl}_2$  formation.
34. Explain the bond nature of  $\text{AlCl}_3$  whether it is ionic or covalent.
35.  $\text{NH}_4\text{Cl}$  has all three bonds, ionic, covalent and dative. Discuss.
36. Identify ten common substances in and around your home and indicate whether you would expect these substances to contain ionic, covalent or metallic bond.

## **Covalent bond**

37. Explain formation of covalent bond between two nitrogen atoms.
38. What is the total number of shared electrons in a molecule of  $\text{CO}_2$ ?
39. What is a covalent bond? Describe the various types of covalent bonds. Give one example of each kind?
40. What is a polar covalent bond? Give two examples of the compounds containing polar covalent bond?
41. Describe the formation of covalent bond between two non-metallic elements.
42. Give two properties of Covalent Compounds?

43. How Polar and Non-Polar Compounds differ from each other? State Properties
44. Define covalent bond. Give two examples.
45. Which kind of atoms are involved in covalent bond formation.
46. What are adhesives. Give examples.
47. Draw single covalent bond in  $H_2, F_2, Cl_2$ .
48. Draw single covalent bond in  $CCl_4$  and  $CH_4$ .
49. Draw double covalent bond in Oxygen and carbon dioxide molecule.
50. Which one of the is uncombined atoms, molecules or consists of ions. i)  $H_2$ , ii) He  
iii)  $HCl$  iv)  $HgO$
51. Classify the following as ionic or covalent
52.  $CO_2$ ,  $NaCl$ ,  $H_2O$ ,  $C_6H_6$ ,  $MgCl_2$ ,  $HCl$
53. Draw triple covalent bond in  $N_2$  and  $HCN$  molecule.
54. How is covalent bond formed between two atoms? Give example.
55. What are the types of covalent bond on the basis of nature of atoms bonded 56. What are the types of covalent bond on the basis of numbers of electrons shared?
57. Draw the geometrical shape of ammonia and water

#### **polar bond and non-polar bond**

58. What is difference between polar and non-polar bond?
59. How would you differentiate polar molecules from non-polar molecules?
60. Give two examples of polar molecules and non-polar molecules
61. Classify the given molecules as polar and non-polar
62.  $H_2O$  ii)  $CO$  iii)  $CO_2$  iv)  $NH_3$
63. What is the electronegativity difference range of polar and non-polar molecules? Give example.
64. Calculate electronegativity difference of sodium chloride and Hydrochloric acid and tell whether the compound is ionic or covalent.
65. What are the types of bonds on the basis of electronegativity difference?

#### **Coordinate covalent bond.**

66. What is Dative Covalent Bond and give example?
67. Why dative bond is always polar?
68. Write formation of ammonium Ion.
69. How Hydronium ion is formed by dative bond.
70. What is the difference between polarity of  $NH_3$  and  $NH_4^+$ ?
71. Write dative bond formation in  $NH_3 \rightarrow BF_3$  molecule.
72. Write difference between covalent bond and Coordinate covalent bond.



73. Which of the following best describes...?
74. Which of the following properties is primarily attributed to metallic bonding?
- a) Sharing of electrons between atoms of the same element.
  - b) Sharing of electrons between atoms of different elements.
  - c) Transfer of electrons from one atom to another.
  - d) Sharing of electrons where one atom donates both electrons.

### **Metallic bond**

76. Define Metallic Bond?
77. What is malleability and ductility?
78. Why metals are good conductors of electricity?
79. What is electron sea model? Give example.
80. What is electron gas theory in metals?
81. Define metallic bond. Draw electron sea model of Na, Mg and Al.
82. Define delocalized electron.
83. Why valence electron become delocalized in metals.

### **properties of metals.**

84. Why metals are Malleable and ductile but ionic compounds are not?
85. NaCl is not Malleable but copper is Malleable. Justify
- 86. Copper is very ductile element. Give reasons?
  - 87. Many pots and pans are made of steel instead of copper. Why?
  - 88. Write any four properties of metals.
  - 89. Which metals are in liquid states at normal temperature?
  - 90. Why metals are good conductors.
  - 91. Why do metals exhibit high electrical conductivity?
  - 92. Why do metals have high melting and boiling points?
  - 93. Which of the following properties is primarily attributed to metallic bonding?
- a) High reactivity
  - b) Brittle nature
  - c) Electrical conductivity
  - d) Low melting point

### **Lewis's structure**

94. Differentiate between Lone Pair and Bond Pair Electrons?

95. Find the number of electrons in valence shell of the following atoms using the periodic table:
96. Silicon    b. Sulphur    c. Bromine
97. Represent the formation of cations for the following metal atoms using electron dot structures:
98. K            B. Ca
99. Define Lewis structure. Give examples.
100. What is dot and cross structure.
101. What is bonded pair of electron. Write two molecules with 2 bonded pairs.
102. What is lone pair of electrons. How many lone pair of electrons are present in Nitrogen and Oxygen molecule?
103. Draw Lewis structures of given molecules
104. CO<sub>2</sub>, NH<sub>3</sub>, CO, H<sub>2</sub>O, BF<sub>3</sub>, BCl<sub>3</sub>, O<sub>2</sub>, O<sub>3</sub>, Cl<sub>2</sub>, N<sub>2</sub>, AlCl<sub>3</sub>, H<sub>2</sub>CO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>, CCl<sub>4</sub>, CH<sub>4</sub>,  
C<sub>2</sub>H<sub>4</sub>, HF, HBr,

### **Shapes of molecules Intermolecular forces**

105. Define Dipole-Dipole Interaction and give example?
106. Differentiate between hydrogen bond and dipole dipole interaction.
107. Write 3 applications of hydrogen bond
108. Why hydrogen bond is stronger than dipole dipole interaction
109. Which of the following substances are expected to form hydrogen bond, give reasons for your choices?
110. H<sub>2</sub>O    ii) CH<sub>3</sub>OH    ii) NH<sub>3</sub>
111. Give one example of each shape of molecules given
112. Tetrahedral    ii) triangular pyramidal
113. Trigonal planar    iv) linear
114. Why H<sub>2</sub>O is liquid while H<sub>2</sub>S is gas at normal temperature.
115. Which of the following form hydrogen bonds? Give reasons for each.
116. HF    i) C<sub>2</sub>H<sub>4</sub>    iii) NH<sub>4</sub><sup>+</sup>    iv) H<sub>2</sub>.
117. Write formation of hydrogen bond in water molecules
118. Write dipole dipole interaction in HCl molecules
119. Compare and explain the intermolecular forces present in water (H<sub>2</sub>O) and methane (CH<sub>4</sub>).
120. How do dipole-dipole interactions differ from other types of intermolecular forces
121. What factors affect the strength of dipole-dipole interactions

## **Hydrogen bonding**

- 122. What is meant by hydrogen bonding? Discuss the nature and consequences of hydrogen bonding?
- 123. Define and explain Hydrogen Bonding?
- 124. How does hydrogen bonding affect the physical properties of substances?
- 125. Can hydrogen bonding occur within a single molecule?
- 126. How water form four hydrogen bond per molecule

## **Topic : properties of ionic compounds and covalent compounds**

- 127. Write four properties of ionic compounds
- 128. Why ionic compounds are good conductors in solution form or molten form?
- 129. Why ionic compounds are not good conductors in solid form?
- 130. Greater the charges on the ions of an ionic compound, the higher will be its melting point. Give example for this reason.
- 131. Write one use of metals that depends on given properties.
  - i) Malleability    iii) Sonorous
  - ii) Lustrous      iv) ductility
- 132. What is correct name for given properties
- 133. Can be drawn into wires
- 134. Can be bent into sheets
- 135. Make a ringing sound when struck
- 136. Heavy for their volume
- 137. Why ionic compounds are good electrolytes than covalent compounds
- 138. Sodium chloride is a good electrolyte in its solution form. Give reason 141. KCl is good electrolyte in molten form. How?
- 142. What is the state of ionic compound? Give three examples.
- 143. Why ionic compounds are solid at room temperature.

## **CHAPTER 05 PHYSICAL STATE OF MATTER**

### **(SET III)**

#### **Introduction Gaseous state**

- 144. Why gases can be compressed easily?
- 145. Define Diffusion?
- 146. Define Pressure with unit?
- 147. Define Absolute Zero?

148. Why gases have less density as compared to liquid and solid?
149. Define Diffusion and explain its factors?
150. Explain why volume of a gas decreases on increasing pressure on it at constant temperature?
151. Why are the densities of gases being lower than liquid?
152. Why a gas is compressible but a solid is not compressible?
153. Express the pressure 400 mm Hg in kPa?
154. Define solid state and write its 4 properties
155. Smell of perfume spread over all room why
156. Differentiate between effusion and diffusion
157. Explain pressure exerted by gas and how to measure it
158. Gases are compressible why
159. Why water from water can be poured out
160. Why gas bubble come out of carbonated drink

#### **Laws related to gases.**

##### **Boyle law**

115. Define Boyle law and verify it experimentally.
116. Derive and explain Boyle law
117. Derive and explain Charles law
118. When we press the gas its temp gets high why
119. What is absolute temperature
120. When we heat the gas its volume increases 121. In hot summer we cannot fill the tire with more gas

##### **Charles law**

122. Define and explain Charles's Law?
123. Define Charles law and verify it experimentally.

##### **Liquid state**

124. Define Evaporation and explain its factors?
125. Define Melting Point?
126. Write effect of External Pressure on Boiling Point?
127. Is evaporation a cooling process?
128. What is the relation between atmospheric pressure and boiling point?
129. The water level in an aquarium decreases slowly even though the tank does not leak. What change of state is occurring?

130. Name two substances that are solids at 25°C. Name two substances that are liquid at 25°C.
131. Explain the effect of external pressure on boiling point.
132. What types of attractive forces do you expect between the molecules of HF and HCl?
133. Identify the process occurring in each of the following. 134. Mothballs slowly disappear.
135. A cold windshield becomes covered with ice when struck by raindrops.
136. Explain the terms:
- A. Evaporation                      B. Vapour pressure.
137. Why liquid has definite volume but indefinite shape
138. Explain evaporation on what factors does it depend
139. Why evaporation increases with surface area
140. How evaporation is related to IMF
141. How vapor pressure depends on size of molecule
142. Define boiling point and name its factors
143. How bp varies with height
144. How bp varies with IMF
145. Why food is cooked slowly at high hills
146. Why ink got mix in jar of water gradually
147. Why ice float on water

### **Vapour pressure**

148. How does temperature effect vapors pressure of a liquid?
149. Water boils at 120°C in pressure cooker, why?
150. Can you explain why it is taking longer time to cook at high altitude?
151. Can you make water boil at 70°C?
152. Why does evaporation lower the temperature of a liquid?

### **Freezing point**

153. Define Freezing Point?
154. Differentiate between boiling point and freezing point.

### **Solid state Types of solid**

155. Differentiation between Amorphous and Crystalline Solid?
156. What is Transition Temperature?
157. Glass softens over a range of temperature. Ice melts at specific temperature. Explain the reason behind it.
158. Why solids have definite volume and shape
159. What is melting point and how it depends on force of attraction

160. Why solids are dense  
 161. Diff bw amorphous and crystalline solid  
 162. Explain transition temperature with example  
 163. Why glass melt at wide range of temperature  
 164. Why evaporation causes cooling 165. Why allotropic forms of different elements exist?

### **Allotropy**

166. Define Allotropy and Explain?  
 167. Explain the allotropic form of any two solids.

## **CHAPTER 06 SOLUTION**

### **Introduction**

168. Define aqueous solution with example.  
 169. Define solution and give example. 170. Define solute and solvent.  
 171. Write the simplest way to distinguish between a solution and a pure liquid.  
 172. Why a solution is considered a mixture?  
 173. What is meant by aqueous solution.?  
 174. Define binary solution with example 175. Write not on the following.  
 A solution                      b solvent                      c solute 176.  
 Why water is use as universal solvent?

### **Saturated, unsaturated, super saturated**

177. What is difference between saturated and unsaturated solution?  
 178. Define super saturated solution.  
 179. Suppose the maximum amount of sodium acetate that dissolves in 100g of water at 0 C is 119g. And 170g at 100 C. If you add 170g of sodium acetate in 100g of water at 0 C, how much Will dissolve

### **Types of solution**

180. What is an alloy?  
 181. Give the example of a solution in which solvent is liquid and solute is gas.  
 182. Give two examples of liquid in liquid solution.

183. Give two examples of solid in solid solution.

184. Identify the type of solution.

a. Salt in water

b. Brass contains 80% Cu and 20% Zn

c. Air

d. Dental filling

4. What is commercial importance of solid in solid solution

5. What is amalgam?

6. Are gemstones solution?

### **Concentration of solution.**

185. What is meant by concentration?

186. Differentiate between dilute and concentrated solution.

187. What is meant by 0.85% m/v of NaCl

### **Percentage composition**

188. Define percentage mass /mass.

189. Define mass percentage volume/volume.

### **Molarity**

190. Define molarity. Write its unit and formula.

191. What is meant by molar concentration?

192. How will you prepare a 1 molar solution NaOH?

193. How much NaOH is required to prepare its 500 cm<sup>3</sup> of 0.4 M solution?

### **Solubility**

194. Why is water called a universal solvent?

195. What is meant by solubility? Write the name of factors affecting it.

196. What is the general principle of solubility?

197. What do you mean, like dissolve like? Explain with examples.

198. Why iodine is soluble in  $\text{CCl}_4$  and not in water?
199. How does the nature of attractive forces of solute-solute and solvent-solvent affect solubility?
200. How can you explain the solute-solvent interaction to prepare a  $\text{NaCl}$  solution?
201. Justify with example that solubility of a salt increases with the increase in temperature.
202. Why does the test tube become cold when  $\text{KNO}_3$  is dissolved in water?
203. How can you prepare  $500\text{cm}^3$  of  $0.2\text{M}$  of  $\text{KMnO}_4$  solution.
204. How can you convert  $20.5\text{M}$  solution of  $\text{HCl}$  into  $0.5\text{M}$   $\text{HCl}$ ?
205. Why ethanol dissolve in water but benzene does not?
206. Why solubility of  $\text{NaCl}$  in water is greater than glucose?
207. Why fish show sign of stress in home aquarium during hot days?
208. Gasoline and oil are soluble in each other why?

### **Comparison of solution, suspension and collide.**

209. Why don't suspension and solution show Tyndall effect while collide do? 210. Real solutions do not show Tyndall effect. Why?
211. What is the difference between colloids and suspension?
212. Classify the following into true and colloidal solutions.
213. Why does the colloid Tyndall effect?
214. How will you test whether a given solution is a colloidal solution or not?
215. Why are colloids quite stable?
216. How can you justify that milk is a colloid?
217. Which of the following will scatter light and why?  
A) Sugar solution      b) soap solution      c) milk of magnesia.
218. Why suspension and solution do not show Tyndall effect, while colloids do?
219. Why do we stir paint thoroughly before using it?
220. Why does suspension not form a homogeneous mixture?
221. Can you call colloid a solution?
222. 14. Identify solution, suspension and colloids from the following
  - a. Milk
  - b. Butter
  - c. Brass
  - d. Milk of Magnesia



223. Which is more concentrated?  
224. 100cm<sup>3</sup> of 0.1 M HCl, 0.1 M of Na OH.

## CHAPTER 7<sup>th</sup> ELECTROCHEMISTRY (SET IV)

### Introduction

1. What is electrochemistry?

### Oxidation and reduction

1. Explain the term of oxidation on the bases of electronic concept.

### Oxidation state and rules for assigning oxidation state.

2. What is oxidation state?
3. What is oxidation number of C in CO<sub>2</sub>?
4. Find the oxidation state of S in the following compounds:  
A) H<sub>2</sub>S      B) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>
6. What is the oxidation number of Cr in chromic acid (H<sub>2</sub>CrO<sub>4</sub>)?
7. What is the difference between valency and oxidation state?
8. What is the oxidation state of B in H<sub>3</sub>BO<sub>3</sub>?
9. Why is the oxidation state of hydrogen usually +1?
10. How is the oxidation state of an element determined?
11. What is the oxidation state of an element in its elemental form?
12. How is the oxidation state of a monoatomic ion determined?
13. What is the oxidation state of oxygen in most compounds?
14. How is the oxidation state of hydrogen usually assigned?
15. What is the sum of oxidation states in a neutral compound?
16. How does the oxidation state of an element change during a chemical reaction?
17. What is the oxidation state of a pure element in a chemical compound?
18. Define oxidation state. Copper has how many oxidation states?
19. Manganese has 6 different oxidation states. Write any four of them.
20. Transition elements have variable valencies. Give three examples.
21. Determine the oxidation number of carbon in CO and CO<sub>2</sub>.
22. What is oxidation number of Sulphur in the sulphate SO<sub>4</sub><sup>-2</sup> and sulphite ion SO<sub>3</sub><sup>-2</sup>.
23. Determine the oxidation number of phosphorus and chlorine in PCl<sub>3</sub> and PCl<sub>5</sub>
24. What is oxidation number of N in given species  
i) NO<sub>2</sub><sup>-1</sup> ii) NO<sub>3</sub><sup>-1</sup> iii) N<sub>2</sub> iv) HNO<sub>3</sub>?
25. In a neutral molecule, the algebraic sum of oxidation numbers of all the elements is zero. Prove with an example.
26. Write the rules for assigning oxidation number to Hydrogen and Oxygen in different compound.

27. In ions, the Algebraic sum of oxidation number is equal to the charge on the ion. Prove it with example.
28. Why is oxidation considered an increase in oxidation state?
29. How is the reduction state of an element determined?

### **Oxidizing and reducing agent**

1. Indicate which element is reduced in the following reaction.  

$$\text{Ca} + \text{Br}_2 \rightarrow \text{CaBr}_2$$
2. What is oxidizing agent? Give three examples.
3. Identify the oxidizing and reducing agent.
  - a.  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$
  - b.  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
4. Define reducing agent. Give three examples.
5. Write four characteristics of oxidizing agent.
6. Write four characteristics of reducing agents.
7. Write any three differences between oxidizing agent and reducing agent.
8. Why do metals typically act as reducing agents?
9. Why do nonmetals typically act as oxidizing agents?
10. Write the classical concept of oxidizing agent and reducing agent.
11. Write the electronic concept of oxidizing agent and reducing agent.
12. How would you differentiate oxidizing agent from reducing agent on basis of classical concept?
13. Why metals are good reducing agents.
14. Alkali metals are good reducing agent why?
15. Halogens are good oxidizing agent. Why?
16. Na is a good reducing agent while Cl is good oxidizing agent. Justify.
17.  $\text{Zn} + \text{CuO} \rightarrow \text{ZnO} + \text{Cu}$   
 Indicate which element is reduced and oxidized in the above reaction. Give reason for your choices.
18.  $\text{Sn}^{+2} + \text{Cl}_2 \rightarrow \text{Sn}^{+4} + 2\text{Cl}^{-1}$   
 Indicate and justify oxidizing agent and reducing in above reaction.
19.  $\text{H}_2\text{S}$  is a reducing agent. Justify
20.  $\text{CuO}$  is an oxidizing agent. Justify.
21. What information do you have about Wet Oxidation?
22. Explain redox reaction between aqueous solution of  $\text{CuSO}_4$  and Zn solid.
23. Why do oxidizing agents gain electrons?
24. How do reducing agents provide electrons?

### **Oxidation reduction reaction**

1. Identify reducing agent in the following reaction:  

$$\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$$
2. Explain one example from daily life which involves oxidation-reduction reaction?

3. Write two uses of redox reaction of daily life.
4. Why is oxidation considered the loss of electrons?
5. How is reduction defined in terms of electrons?
6. Why are oxidation and reduction always coupled reactions?
7. How does the transfer of electrons occur during redox reactions?
8. Why is oxygen often involved in oxidation reactions?
9. How does the transfer of electrons relate to the change in oxidation state?
10. How are redox reactions important in the corrosion of metals?
11. How do redox reactions play a role in the generation of electric current? Give one example.
12. How can oxidation and reduction be identified in a chemical equation?
13. Why is oxidation considered the opposite of reduction?
14. Identify the oxidation and reduction in following reaction.
  - a.  $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$
  - b.  $2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$
15. How do redox reactions affect the overall charge of a system?
16. Define redox reaction. Give two examples.
17. Define Oxidation and reduction.
18. What Is the classical concept of oxidation and reduction?
19. What is electronic concept of Oxidation and reduction?
20. How do oxidation and reduction reactions occur simultaneously?

### **Electrochemical cell**

1. What is electrochemical cell?
2. Define electrode and write its types.
3. Define Half Cell Reaction.
4. What are spontaneous and non-spontaneous reactions?

### **Concept of electrolyte**

1. Define electrolyte and give examples.
2. Differentiate between electrolyte and non-electrolyte.
3. Discuss the electrolysis of water.
4. Why NaOH is strong but  $\text{NH}_4\text{OH}$  is weak electrolyte?
5. What is the difference between strong and weak electrolyte?
6. Sodium hydroxide is strong electrolyte while ammonium hydroxide is weak electrolyte. Give reason.
7. Write the dissociation products of sodium hydroxide and ammonium hydroxide.
8.  $\text{CH}_3\text{COOH}$  is weak electrolyte. Discuss.
9. Which one is weak electrolyte, strong electrolyte, and non-electrolyte.
  - i) acetic acid ii) urea iii) hydrochloric acid iv) potassium hydroxide
10. Define a strong electrolyte.
11. What are some examples of strong electrolytes?
12. Name a common weak electrolyte.

13. Can a weak electrolyte conduct electricity effectively?
14. Define electrolysis.
15. What is the primary difference between strong and weak electrolytes?
16. Give an example of a non-electrolyte.
17. Do non-electrolytes dissociate in water?
18. Can non-electrolytes conduct electricity?
19. How do strong electrolytes dissociate in water?
20. Why do strong electrolytes conduct electricity well?
21. What happens when a weak electrolyte is dissolved in water?
22. Are all acids strong electrolytes? Explain with the help of an example.
23. Are all bases strong electrolytes? Explain with help of an example.
24. How does the conductivity of a solution change with electrolyte concentration?
25. Are strong electrolytes completely ionized in solution? Give examples of two strong electrolytes.
26. Can a compound be both a strong and weak electrolyte? Give examples.
27. Can non-electrolytes dissolve in water? Give 3 examples of non-electrolyte.
28. Are weak electrolytes good conductors of electricity? Give two examples.
29. Can non-electrolytes form ions in water? Give examples of non-electrolyte.
30. Why  $\text{CH}_3\text{COOH}$  is poor conductor while  $\text{NaOH}$  is good?

### **Electrolytic cell**

1. Write the complete reaction takes place in electrolytic cell.
2. List the possible uses of electrolytic cell.

### **Galvanic cell**

31. What is galvanic cell?
32. Write complete cell reaction of Daniel cell.
33. Sketch the Daniel cell, labeling the cathode, anode and the direction of flow of electrons.
34. How does a Galvanic cell work?
35. Why their negative charge on anode in case of Galvanic cell?
36. Why is a Galvanic cell also known as a voltaic cell?
37. What are the components of a Galvanic cell?
38. How does a Daniel cell differ from other electrolytic cells?
39. What is the purpose of the salt bridge in a Galvanic cell like the Daniel cell?
40. How does the Daniel cell generate electrical energy?
41. Which kind electrolyte gel is filler in salt bridge? Give two examples.
42. What is the function of electrolyte gel filled tube in Galvanic cell?
43. Discuss the nature of anode and cathode in Daniel cell.
44. How anode and cathode of Galvanic cell differ from electrolytic cell.
45. Redox reaction in Galvanic cell is spontaneous. Discuss
46. The redox reaction in electrolytic cell is nonspontaneous. Justify.
47. What is the half-cell reaction taking place at cathode in Daniel cell?
48. What is half-cell reaction taking place at anode in Daniel cell.

49. Write half-cell reactions in Daniel cell.
50. What is galvanizing?
51. How galvanic cell is differed from electrolytic cell?
52. Write the working of the Daniel cell.
53. Define cell reaction. Write the cell reaction taking place in Daniel cell.
54. Define battery. Give example of battery.
55. Write four differences between galvanic cell and electrolytic cell.
56. What are electrochemical cells. Define the two types of electrochemical cells.

### **Nelson's cell**

1. What is the purpose of the Nelson cell in chemistry?
2. Write the chemical reactions of Nelson cell.
3. How does the Nelson cell facilitate the electrolysis of sodium chloride solution?
4. What are the key components of a Nelson cell?
5. Why is sodium chloride solution used as the electrolyte in the Nelson cell?
6. How is the Nelson cell different from other types of electrolytic cells?
7. What happens at the anode and cathode of the Nelson cell during electrolysis?
8. What are the products obtained from the Nelson cell electrolysis process?
9. Why is sodium hydroxide (NaOH) an important industrial chemical produced by the Nelson cell?
10. What are the gases produced during electrolysis of Brine?
11. Define Brine. How is Brine treated in Nelson cell?

### **Down's cell**

1. What is a Down's cell?
2. In down cell why  $\text{CaCl}_2$  is added in molten  $\text{NaCl}$ ?
3. How does a Down's cell work?
4. Why is a Down's cell used in the production of sodium metal?
5. What are the main components of a Down's cell?
6. How is electricity generated in a Down's cell?
7. What is the purpose of the molten electrolyte in a Down's cell?
8. Why is carbon used as an electrode in a Down's cell?
9. How is sodium chloride ( $\text{NaCl}$ ) converted into sodium metal in a Down's cell?
10. How sodium metal is manufactured from Fused  $\text{NaCl}$
11. Write the electrolysis of molten sodium chloride.
12. Why  $\text{CaCl}_2$  is added in Down's cell.
13. Write the reduction and oxidation occurring during electrolysis of fused sodium chloride.
14. How would you sum up the half cells reactions in Down's cell.
15. Draw a figure showing construction of Down's cell.
16. What are products obtained from down's cell.
17. Explain the shape of Down's cell.
18. Mention the products obtained at anode and cathode in Down's cell.

### **Electrolytic refining of copper**

1. Write cell reactions during electrolysis of Blistered copper.
2. What is electrolytic refining?
3. What is the purpose of electrolytic refining in copper production?
4. How does electrolytic refining work?
5. How electrolytic refining of Cu is carried out?
6. What is the role of anode and cathode in electrolytic refining?
7. What is anode mud during electrolysis of Blistered copper?
8. What is the electrolyte used in copper electrolytic refining?
9. How is copper purified from Blistered copper?
10. What is the impurity removed during copper electrolytic refining?
11. What are the products obtained from copper electrolytic refining?
12. What are the advantages of electrolytic refining over other methods?
13. How is the electrolytic cell composed for refining of copper from its ore?
14. Explain working of an electrolytic cell taking sodium chloride electrolysis as an example.
15. Define Blistered copper. How much voltage and optimum current density is used in copper electrolytic refining?
16. Sketch a figure showing refining of copper.

### **Dry cell**

1. How dry cell is composed?
2. How dry cell are used to make battery?
3. What is a dry cell?
4. Why is a dry cell called "dry"?
5. How does a dry cell work?
6. What are the components of a dry cell?
7. Why are dry cells commonly used in portable devices?
8. How is a dry cell different from a wet cell or a rechargeable battery?
9. Write cell reactions occurring at anode and cathode of dry cell.
10. Draw a labelled sketch of dry cell.
11. What is the internal structure of dry cell.
12. Write any four uses of electrochemical industries.
13. Discuss the nature of anode, cathode and electrolyte used in dry cell.

### **Battery**

1. What is battery write types of battery.
2. Describe how a battery produces electrical energy.

### **Electrochemical industries**

#### **Manufacture of sodium metals from fused NaCl**

#### **Manufacturing of NaOH from Brine**

1. Write chemical reactions that occur in Nelson's cell.

## **Corrosion and its prevention**

2. Explain how food and beverage industries deal with corrosion?
3. How corrosion inhibitors protect the metal from corrosion?
4. Design an experiment to demonstrate cathodic protection from corrosion.
5. How to prevent corrosion by enlisting few methods?
6. What is corrosion?
7. Why does corrosion occur?
8. How does corrosion happen?
9. How cathodic protection and alloying help the iron from corrosion?
10. What is the process of corrosion?
11. Why is corrosion a problem?
12. How can corrosion be prevented?
13. What are some common corrosion prevention techniques?
14. Why is surface coating effective in preventing corrosion?
15. How does cathodic protection work?
16. What are corrosion inhibitors? Give examples.
17. Define galvanizing. What is its purpose?
18. Why does iron rust?
19. How does rusting occur in iron?
20. What is the chemical process behind the formation of rust on iron?
21. Why is rusting a common issue specifically for iron?
22. How does the presence of water contribute to the rusting process?
23. What are the environmental factors that accelerate the rusting of iron?
24. Why does the presence of oxygen play a crucial role in the formation of rust?
25. How does the red-brown color of rust differ from the original color of iron?
26. What are the consequences of extensive rusting on iron structures?
27. What can be the possible methods to prevent iron from rusting?

## **Electroplating and its types.**

1. Why is electroplating used in various industries?
2. Why are metals electroplated?
3. How tin plating on steel is carried out?
4. How does electroplating work?
5. What is electroplating and what is its purpose?
6. Why is electroplating considered an important surface treatment technique?
7. How are different types of metals used in electroplating?
8. What are the common types of electroplating?
9. What are the reactions occurring at anode and cathode during zinc electroplating?
10. Write the names of electrolytes used in the following electroplating.
  - a. Zn
  - b. Cr
  - iii) Sn
  - iv) Ti
11. What is the procedure of electroplating?
12. With the help of a figure explain electroplating.

13. What is the nature of electrodes in electroplating?
14. Write any three purposes of electroplating.
15. How electroplating enhances beauty of jewelry made of inferior metals.
16. Write the anodic and cathodic reactions occurring during Tin electroplating.
17. Draw a figure showing procedure of Tin electroplating.
18. How electroplating is useful in prevention of corrosion.
19. How does gold electroplating enhance the appearance of jewelry?
20. What are the environmental implications of electroplating processes?
21. Why is electroplating gaining popularity in certain applications?

### **Rusting of iron**

25. Rusting completes in how many redox reactions?

### **Electroplating of tin, zinc and chromium on steel.**

26. What materials do you need to electro plate copper onto an iron nail? Make a diagram showing how these materials should be arranged.
27. Why tin-plated steel is used to make food cans?
28. What is metallic coating? Write its importance.
29. Write importance of tin plating?

## **Chapter 8<sup>th</sup> CHEMICAL REACTIVITY**

### **Introduction**

#### **Metals**

1. In a group the reactivity of metals with oxygen increases? Give example.
2. Define metals. Which groups in periodic table contain metals?
3. Select whether Metallic character increases or decreases in group? Give reason for your choice.
4. Select whether Metallic character increases or decreases in periods? Give reason for your choice.
5. In order to decide whether an element is metallic or nonmetallic, which test is conducted? Explain with the help of an example.
6. Write the composition percentage of given metals present in earth's crust.
 

i. Al	iii) iron
ii. K	iv) sodium.
7. Discuss the conductance of metals. How it is tested.
8. Metals form basic oxide. Give two examples.
9. What is the common state of metals? Give examples.



10. Metals are good conductors. Why?
11. Metals are Malleable and ductile. Why?
12. In group reactivity of metals with oxygen increases? give example.
13. What is the variation of metallic character across period?
14. Justify that metals become positively charged ion in solution.
15. What are metalloids. Mention out the metalloids from periodic table.
16. How do metals occur naturally in earth's crust?
17. Metals are electrons donor, how?
18. Metals are electropositive in nature. Justify your answer with help of an example.
19. Why are metals considered good conductors of electricity and heat?
20. How do metals obtain their characteristic luster or shine?
21. What are the main physical properties of metals that distinguish them from non-metals?
22. Why do metals have high malleability and ductility?
23. How are metals classified into different groups based on their characteristics?
24. Why do metals tend to form positive ions when they undergo chemical reactions?
25. How do metals react with acids and why does it produce hydrogen gas?
26. Metals form ionic chlorides. Justify with the help of an example.
27. Give some important applications of platinum.
28. Briefly discuss the commercial uses of silver.
29. Pure gold is not used in ornaments why?
30. State the physical properties of metals.
31. Identify at least two groups which contain only metals elements.
32. Which metal is work for metal work?
33. Why reactivity of metals increases down the group?
34. How can we distinguish a metal from non-metal by simple physical method?
35. What do you mean by malleable and ductile?
36. What is the nature of metallic oxides?

### **Electropositive or metallic character**

1. Rank each set of elements in order of increasing metallic character:  
a) Al, Na, Mg    b) Na, Li, K
2. Which element is more metallic Mg or Al? Explain.
3. What do you mean by metallic character?
4. Design an experiment to show that iron is more reactive than copper.
5. Why Ca is more electropositive than Mg?
6. Identify the element which has more metallic character. A. Na, K. B. Be, Na
7. How electro positivity depends upon size and nuclear charge of an atom?
8. Why electro positivity decreases from left to right in periods?
9. What is the relationship between the electro positivity and ionization energy?

### **Alkali metals**

1. Why it is advisable not to pick sodium metal with fingers.
2. Identify the position of potassium and calcium in the periodic table.

3. What are alkali metals?
4. How are ionization energies values varying for group I and group II elements on descending the group?
5. How does sodium acts as reducing agent and write down its reaction also?
6. Why is ionization energy of sodium being more than potassium?
7. Why is ionization energy of sodium being less than Mg?
8. What is the trend of variation in densities of alkali metals?
9. Why are alkali metals highly reactive?
10. How do alkali metals react with water?
11. Alkali metals have low ionization energies. Justify.
12. Alkali metals are more powerful reducing agent then Alkaline earth metals. Why?
13. What are some common properties of alkali metals?
14. Why are alkali metals stored in oil?
15. How do alkali metals react with halogens?
16. What is the most reactive alkali metal and why?
17. Write Occurrence of alkali metals.
18. Why I.E of K is less than Na?
19. Which of these have more I.E and why? A. Metals, non-metals
20. What is spodumene? Write its formula.
21. What do you know about Occurrence of lithium, sodium, potassium and Francium?
22. Write names of alkali metals for increasing order of reactivity. Justify your choice.
23. Justify the order of reactivity Lithium < sodium < potassium.
24. Write reaction of sodium Lithium with water.
25. What color flames are produced when sodium, lithium and potassium are burnt in oxygen.
26. Why are alkali metals stored in airtight containers?
27. How do alkali metals form positive ions?
28. What is the trend in reactivity of alkali metals down the group?
29. Why are alkali metals soft and can be cut with a knife?
30. How sodium, lithium and potassium react with chlorine
31. What are the products when Li, Na and K are treated with Oxygen gas.
32. Why potassium reacts with halogens more vigorously than sodium.
33. Write chemical equations showing hydrogen gas is released when Na, Li and K are added in water.
34. Why is potassium stored in kerosene oil?
35. What is the difference between beryl and spodumene.
36. What are some practical uses of alkali metals?
37. Why are alkali metals typically found in nature as compounds?
38. how do alkali metals react with acids?
39. What is the atomic structure of alkali metals?
40. why do alkali metals have low melting and boiling points?
41. How do alkali metals behave in the presence of moisture?
42. What is the relationship between atomic size and reactivity in alkali metals?
43. How do alkali metals react with oxygen?

44. How do alkali metals interact with nonmetals?
45. What are some differences between alkali metals and alkaline earth metals?
46. why are alkali metals referred to as "Group 1 elements" in the periodic table?
47. What is the general electronic configuration of alkali metals?
48. Why are alkali metals not found freely in nature?

### **Alkaline earth metals**

1. What is the importance of Mg?
2. Arrange the following oxides in order of decreasing basic character. BeO, CaO, MgO, SrO.
3. What are alkaline earth metals?
4. How basic character of oxides is varied in period?
5. What is the difference in the reactivity's of group I and group II elements?
6. Compare and contrast the properties of alkali and alkaline earth metals.
7. Which element is more metallic Mg or Al?
8. Why ionization energies of alkaline earth metals are higher than alkali metals?
9. How O reacts with group II metals?
10. Why the second ionization energy of Mg is than the first ionization energy?
11. Why are alkaline earth metals called "alkaline"?
12. What are the alkaline earth metals in the periodic table?
13. How do alkaline earth metals differ from alkali metals?
14. What is the general electronic configuration of alkaline earth metals?
15. Why are alkaline earth metals less reactive than alkali metals?
16. What are the physical properties of alkaline earth metals?
17. Write Occurrence of Alkaline Earth metals.
18. Write Occurrence of beryllium, calcium, magnesium and radium.
19. How calcium is important to living bodies.
20. Why do calcium and magnesium not occur free in nature?
21. How do alkaline earth metals react with water?
22. Why are alkaline earth metals typically found in compounds rather than in their elemental form?
23. What is the trend in atomic radius for alkaline earth metals?
24. Prepare a list of 4 compounds made of alkali and Alkaline Earth metals.
25. Identify the use and importance of any four compounds made of alkali and Alkaline Earth metals in daily life.
26. How do alkaline earth metals form ionic compounds?
27. What are the common uses of alkaline earth metals?
28. Why are alkaline earth metals important in biological systems?
29. What is the trend in reactivity for alkaline earth metals down the group?
30. How do alkaline earth metals react with halogens?
31. What are the melting and boiling points of alkaline earth metals?
32. Why are alkaline earth metals used in fireworks?
33. What is the trend in ionization energy for alkaline earth metals?
34. How do alkaline earth metals react with oxygen?

35. What are the common oxidation states of alkaline earth metals?
36. Why are alkaline earth metals commonly used as reducing agents?
37. What is the relationship between the ionization energy and atomic radius of alkaline earth metals?
38. How do alkaline earth metals react with acids?
39. What are the similarities and differences between the physical properties of alkaline earth metals?
40. Why are alkaline earth metals denser than alkali metals?
41. What are some compounds formed by alkaline earth metals?
42. How do alkaline earth metals form alloys with other metals?
43. What is the effect of increasing atomic number on the properties of alkaline earth metals?
44. Why are alkaline earth metals less reactive than alkali metals towards water?
45. Beryllium 2<sup>nd</sup> I.E is 1757.1 KJ/mol greater than in its 1<sup>st</sup> I.E 899kJ/mol. Justify.
46. I.E values of alkaline earth metals decrease down the group. Why.
47. Which of the given properties of alkali metals and alkaline earth metals are increasing or decreasing in groups.
  - a. Melting point                      iv) hardness
  - b. Densities                              v) conductivity
  - c. Reducing power                  vi) electro positivity
48. Discuss the trend of the given properties for alkaline earth metals in its group.
  - a. Melting point                      iv) hardness
  - b. Densities                              v) conductivity

## Sodium

1. What is the atomic number and symbol of sodium?
2. How does sodium appear in its pure form?
3. What is the position of sodium in the periodic table?
4. What is the melting point of sodium?
5. How reactive is sodium with water?
6. What type of bond does sodium typically form?
7. How does sodium react with chlorine to form a compound?
8. Sodium surface rapidly tarnishes in air. How?
9. Is sodium malleable or ductile? Why or why not.
10. Write any four physical properties of sodium.
11. Compare the appearance of sodium, calcium and magnesium.
12. Write the any four chemical properties of sodium.
13. Write any four chemical reactions of Sodium.
14. Write chemical reactions of Sodium with the given substances.
  - a. H<sub>2</sub>                                      iii) Cl<sub>2</sub>
  - b. O<sub>2</sub>                                      iv) MgO
15. Write the chemical name and chemical formula of a compound yielded when sodium is treated with Sulphur.
16. How does sodium act as a reducing agent.
17. Justify sodium as a powerful reducing agent.

18. Write any four uses of sodium.
19. Metals such as titanium and magnesium can be prepared by using sodium. Write the reactions to justify your answer.
20. Write two chemical reactions in which sodium halides are the products.
21. Reaction between water and sodium is exothermic. Discuss
22. What is the density of sodium?
23. How does sodium ionize to form a positive charge?
24. what is the atomic mass of sodium?
25. What is the atomic number and symbol of sodium?
26. How does sodium appear in its pure form?
27. What is the melting point of sodium?
28. How reactive is sodium with water?
29. What type of bond does sodium typically form?
30. How does sodium react with chlorine to form a compound?
31. What is the density of sodium?
32. How does sodium ionize to form a positive charge?
33. What is the atomic mass, mass number and atomic number of sodium?
34. How does the presence of sodium ions affect the color of a flame?
35. What is the electron configuration of sodium?
36. How does sodium react with oxygen?
37. What is the melting and boiling point of sodium?
38. How does sodium behave as an alkali metal?
39. What is the typical oxidation state of sodium?
40. How does sodium react with acids?
41. What is the molar mass of sodium?
42. How does sodium react with halogens?
43. How does sodium participate in the formation of ionic compounds?
44. How sodium behaves when treated with water.
45. How does sodium form a protective oxide layer on its surface?
46. What is the hardness of sodium?
47. Discuss the lightness of sodium.
48. How does sodium react with nonmetals?
49. What is the reactivity trend of sodium within the alkali metal group?
50. How does sodium react with sulfur to form a compound?
51. What are some common applications of sodium in industry?

**Topic: magnesium**

52. What are the three common combined states of magnesium? Write names and Formula.
53. What is occurrence of magnesium?
54. What is the position of magnesium in periodic table?
55. Write any four physical properties of magnesium.
56. Is magnesium Malleable and ductile.? Why or why not.
57. Compare the density of sodium, magnesium and calcium.
58. Compare the conductivity of sodium and magnesium.

59. Write any four chemical properties of magnesium.
60. Write any four chemical reactions of magnesium.
61. Write chemical reactions of Mg with the given substances.
- |           |            |
|-----------|------------|
| a. $H_2$  | iii) $O_2$ |
| b. $H_2O$ | iv) $N_2$  |
62. Magnesium reacts with halogens to form halides. Give examples in the form on chemical equation.
63. What is difference between dolomite and duralumin.
64. What are duralumin and magnelium.
65. Write any four uses of Magnesium.
66. What is Epsom salt? Write any four uses of Epsom salt.
67. Write chemical equations showing reaction of Mg with strong acids such as HCl and  $H_2SO_4$ .
68. What will be the products when magnesium ribbon is added in sulphuric acid and Hydrochloric acid.
69. Magnesium reacts with nitrogen forming their respective nitrides. Show this in chemical equation form.
70. How oxides of calcium and magnesium are converted into their hydroxide. Write the equations.
71. Describe the burning of magnesium in air to form magnesias.
72. Write chemical equation showing formation of nitrides and hydride using magnesium as starting material.
73. Write chemical reactions of Mg with non-metals.

**Topic: calcium**

74. Write any four physical properties of calcium.
75. What is the melting point and boiling point of calcium?
76. Is calcium Malleable and ductile? Why or why not?
77. Compare the conductivity of magnesium and calcium.
78. What is the position of calcium I periodic table?
79. Write any four chemical properties of calcium.
80. Write any four chemical reactions of Calcium.
81. Write chemical reactions of Ca with the given substances.
- |           |            |
|-----------|------------|
| a. $H_2$  | iii) $O_2$ |
| b. $H_2O$ | iv) $N_2$  |
82. Calcium reacts with halogens to form halides. Give examples in the form on chemical equation.
83. Write any 4 name of naturally occurring ores of Mg and Ca.
84. Write chemical equations showing reaction of Ca with strong acids such as HCl and  $H_2SO_4$ .
85. What will be the products when Calcium is added in sulphuric acid and Hydrochloric acid.
86. Calcium reacts with nitrogen forming their respective nitrides. Show this in chemical equation form.

87. CaO (lime) is a one the product of calcium. Write any four uses of lime.
88. Write any four uses of calcium.
89. How oxides of calcium and magnesium are converted into their hydroxide. Write the equations.
90. Describe the burning of calcium in air to form magnesias.
91. Write chemical equation showing formation of nitrides and hydride using calcium as starting material.

### **Soft and hard metals**

1. Differentiate between hard and soft metals.
2. WHY Mg is harder than Na?
3. Why is Cu used for making electrical wires?
4. Why are soft metals like lead and tin used in soldering?
5. how are soft metals distinguished from hard metals based on their physical properties?
6. What are some common applications of soft metals in various industries?
7. Why do soft metals have lower melting points compared to hard metals?
8. What are the typical melting points of metals and how does it affect their applications?
9. How do hard metals like steel and titanium differ from soft metals in terms of strength and durability?
10. What are some examples of hard metals used in construction and engineering?
11. How will you differentiate transition metals from group IA and group IIA metals?
12. Compare sodium with iron.
13. Classify which of the given set of elements are soft or hard metals. Give reason for your choice.
  - a. Sodium, calcium, lithium
  - b. Copper, platinum, iron
14. How do the atomic structures of soft metals differ from hard metals?
15. Compare the melting points and boiling points of sodium and iron.
16. Iron is harder than sodium. Why?
17. Why iron is less reactive than sodium.
18. Why iron settles at the bottom of water while sodium floats.
19. Compare the tensile strength of sodium with iron.
20. Why are soft metals more malleable and ductile compared to hard metals?
21. How Ionization energies of soft metals differ from ionization energies of hard metals.
22. Write any three differences between soft and hard metals.
23. How will you differentiate Sodium as soft metals from iron as hard metals?
24. Define soft and hard metals. Give two examples of each.
25. Group IA and IIA metals are fairly reactive then transition metals. Why?

### **Inertness of noble metals**

1. why silver and gold are less reactive?

2. Define noble metals. Give three examples.
3. Why noble metals are valuable?
4. Why noble metals have a tendency of low reactivity.
5. Noble metals are relatively inert and found free in nature. Why?
6. Classify which of the given set of elements are more and less reactive. Give reason for your choice.
  - a. Sodium, calcium, lithium
  - b. Osmium, iridium, platinum
7. Classify which of the given set of elements are noble elements. Give reason for your choice.
  - a. Sodium, calcium
  - b. Gold, platinum
8. Why silver is precious element?
9. Why is silver considered a noble element.
10. Write any three uses of silver.
11. Why is gold a precious element?
12. Write any three uses of Gold.
13. Why is platinum an expensive element.
14. Why is platinum categorized as noble element?
15. Due to which properties of platinum, it is known as expensive and noble element.
16. Why platinum is suitable for making jewelry and ornaments.
17. Write four uses of platinum.
18. Platinum is useful for dental fillings. Why?
19. Give four reasons why gold is used in manufacturing jewelries.
20. What are the four properties of gold that make it perfect for making jewelries.
21. Why copper or silver is added to gold and make its alloy.
22. Gold is used in standard laptops. Why?
23. Gold is one of the most useful elements in dentistry. Give three reasons.
24. Write four properties of gold.
25. Write any four properties of silver.
26. Write any four properties of platinum.
27. Write any four properties of noble metals. Give examples.
28. What are the four forms in which silver can occur in nature.
29. Pure gold is not used for ornaments, why?
30. Why are metals often used in construction and structural applications due to their strength and durability?
31. Make a list of 4 elements which are found in uncombined state in nature.

### **Non-metals**

49. Arrange the following elements in order of increasing non-metallic character. Si, Al, P.
50. What is aqua regia?
51. Which factors affect the non-Metallic character?
52. Define nonmetals. Which groups in periodic table contain nonmetals.



53. Select whether non-metallic character increases or decrease in group? give reason for your choice.
54. Write the names of metal and non-metal occur in liquid form.
55. Select whether non- metallic character increases or decrease in periods, ? give reason for your choice.
56. Which non-metal may be a conductor in its one allotropic form?
57. Non-Metals form covalent chlorides. Justify with the help of an example.
58. Nonmetals form acidic oxides. Give two examples.
59. What is the common state of non-metals? Give examples.
60. Non-metals are bad conductors of heat and electricity. Why?
61. Non-metals are not Malleable and ductile. Why?
62. Justify that non-metals become negatively charged ion in solution.
63. Nonmetals are electron acceptor. How?
64. Nonmetals are electronegative in nature. Justify ur answer with help of an example.
65. Why are non-metals important in our daily lives?
66. How do non-metals differ from metals in terms of their physical properties?
67. What are the main characteristics of non-metals?
68. Why do non-metals generally have low melting and boiling points?
69. How do non-metals conduct electricity compared to metals?
70. What are some examples of non-metals found in nature?
71. Nonmetals are good oxidizing agents. Why?
72. How do non-metals participate in chemical reactions?
73. Why are non-metals often used as insulators?
74. What are non-metals?
75. On what factor does non-metallic character depend?
76. Write the characteristics of metals and non-metals?
77. Which of the following displacement reaction will not occurs?  

$$\text{Cl}_2 + 2\text{NaF} \rightarrow 2\text{NaCl} + \text{F}_2$$

$$\text{Br}_2 + 2\text{KI} \rightarrow 2\text{KBr} + \text{I}_2$$

$$\text{I}_2 + 2\text{KBr} \rightarrow 2\text{KI} + \text{Br}_2$$
78. Why N form compounds with alkaline earth metals directly?
79. Write down the names of least reactive of noble metals?
80. Why don't nonmetal react with dilute acids while metals do react with acids?
81. Why is the O called non-metal?

### **Electronegative character**

26. Discuss the electronegative character of non-metals.

### **Halogens**

27. What are halogens?
28. Why group viiiA elements are known as halogens?
29. Can F<sub>2</sub> oxidize all the halides ions to free halogen?
30. Design an experiment to differentiate between Cl<sup>-</sup> and I<sup>-</sup>.
31. Arrange the following in order to increase acidic strength. HF, HI, HBr, HCl

32. Write the physical properties of halogens.
33. What happens during displacement reaction in halogen?
34. Write down the reaction of chlorine with sodium hydroxide with balance equation.
35. Why is HF weak acids?
36. How can we distinguish a substance is metal or non-metal with the help of an acid?
37. Give the non-metallic trend of halogens.
38. Why F is more non-metallic than Cl?
39. Halogens are highly electronegative elements in periodic table. How?
40. Define halogens. What is position of halogens in periodic table.
41. Why are halogens classified as a group on the periodic table?
42. How do halogens react with metals?
43. What are the physical properties of halogens?
44. Why are halogens highly reactive?
45. How are halogens used in water treatment?
46. What are the common uses of halogens in everyday life?
47. Why are halogens used as disinfectants?
48. How do halogens form ionic compounds?
49. What is the most reactive halogen?
50. How do halogens react with non-metals?
51. How do halogens react with alkali metals?
52. How are halogens involved in the formation of halogen acids?
53. What is the role of halogens in the bleaching of paper and textiles?
54. Why do halogens have a higher electronegativity than other elements?
55. How do halogens react with hydrogen to form hydrogen halides?
56. Define displacement reaction. How do halogens show displacement reaction?
57. Write any four chemical reactions of halogens.
58. Write any four chemical properties of halogens.
59. What are the color of different halogens at room temperature?
60. What is the state of halogens at room temperature?
61. Discuss that halogens are good oxidizing agents.
62. Order reactivity of halogens is  $\text{F} > \text{Cl} > \text{Br} > \text{I} > \text{At}$  What does it mean.
63. Write the reaction between sodium bromide and chlorine gas.
64. How chlorine gas displaces Br from sodium bromide.
65. What is bleaching powder. How it formed from halogen.
66. Write any four physical properties of halogens.
67. Write chemical reactions of halogens with given substances.
  - i. Metals    iii) nonmetals
68. Halogens oxidizes certain compound. Give three examples with chemical equations.
69. Write four reactions of halogens with other nonmetals.
70. Write chemical reactions of halogens with given substances.
  - i. Oxygen    iii) phosphorus
  - ii. Copper    iv) potassium
71. Describe and explain what will happen when bromine water is added to potassium iodide solution.

72. Describe and explain what will happen when chlorine gas is passed through sodium bromide solution.
73. Why I<sub>2</sub> cannot oxidize other halogens into free state?
74. Chlorine reduces itself and oxidizes other compounds. Give three examples.
75. Fluorine reactions with oxygen to form fluorine monoxide and dioxide. Give chemical reaction for the two.
76. Halogen can form ionic halides. Give two chemical reactions for this statement.
77. Halogen can produce strong reducing agents such as HCl, HBr, HI and HF. Justify.
78. Compare the electronegativity of F, Cl, Br, I and At
79. Why are halogens used in the treatment of drinking water?
80. Infer the identity of given halogens.
- i. found in period 3, can kill germs in swimming pools.
  - ii. Only non-metal reddish brown in color
  - iii. Most Electronegative halogen
  - iv. Black solid and when heated it forms a purple vapor.

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