



# Atomic Structure

## 1. 'Atomic theory' of matter was given by

- (A) Avogadro (B) Dalton  
(C) Newton (D) Pascal

**Ans. (B)** [SSC MTS Exam. 2014]

**Exp:** Atomic theory of matter was given by John Dalton. According to this theory, matter is made up of extremely small indivisible and indestructible particles called Atoms.

## 2. Atomic size is of the order of—

- (A)  $10^{-8}$  cm (B)  $10^{-10}$  cm  
(C)  $10^{-13}$  cm (D)  $10^{-6}$  cm

**Ans. (A)**

**Exp:** Atomic size is of the order of  $10^{-10}$  m or  $10^{-8}$  cm. Atomic size is the distance from the nucleus to the Valence Shell (outermost shell) of an atom.

## 3. The fundamental particles that composed on atom are –

- (A) Proton, electron, meson  
(B) Proton, electron, photon  
(C) Proton, electron, neutron  
(D) Proton, electron, deuteron

**Ans. (C)** [SSC MTS 2006, SSC CHSL 2013]

**Exp:** All atoms except hydrogen atoms are composed of three fundamental particles, namely electrons, protons and neutrons.

## 4. The size of the nucleus is measured in:

- (A) amu (B) angstrom  
(C) cm (D) Fermi

**Ans. (D)** (SSC CGL 2015)

**Exp:** The size of the nucleus is measured in fermi (1 fermi =  $10^{-15}$  m)

## 5. The radius of an atomic nucleus is of the order of—

- (A)  $10^{-10}$  cm (B)  $10^{-13}$  cm  
(C)  $10^{-15}$  cm (D)  $10^{-8}$  cm

**Ans. (B)**

**Exp:** The radius of an atomic nucleus is of the order of  $10^{-15}$  m or  $10^{-13}$  cm.

## 6. Nucleus of an atom consists of.

- (A) Proton (B) Neutron  
(C) Proton and Neutron  
(D) Electron, Proton and Neutron

**Ans. (C)** [SSC Section Officer (Audit) 2003]

or

**The fundamental particles present in the nucleus of an atom are**

- (A) Electron, proton (B) Proton, neutron

(C) Neutron, electron (D) Neutron, positron

**Ans. (B)** [SSC Tax Asst. (Income Tax & Central Excise) 2004]

or

**Which among the following is present inside the nucleus of an atom?**

- (A) Protons and Neutrons  
(B) Electrons and Protons  
(C) Neutrons and Electrons  
(D) Neutrons, Protons, Electrons

**Ans. (A)** (SSC CHSL 2016)

**Exp:** All atoms except hydrogen atom, are composed of three fundamental particles, namely electrons, protons and neutrons. Protons and neutrons are present inside the nucleus.

## 7. Which of the following is not a nucleon?

- (A) Proton (B) Electron  
(C) Neutron (D) Positron

**Ans. (B)** [SSC CGL 2013]

**Exp:** In the given options, electron is not a nucleon because it is present in shells, while proton, neutron and positron are present in nucleus.

## 8. According to Rutherford's atomic model, the electron inside an atom are—

- (A) Stationary (B) Centralized  
(C) Non-stationary (D) None of these

**Ans. (C)** (SSC CHSL 2016)

**Exp:** According to Rutherford's atomic model, the electron inside an atom can not be stationary. The electrostatic attraction between electrons and nucleus gets used up in revolving the electrons around the nucleus.

## 9. Rutherford's $\alpha$ -scattering experiment related to the size of the—

- (A) Nucleus (B) Atom  
(C) Electron (D) Neutron

**Ans. (A)**

**Exp:** Rutherford bombarded very thin gold foil with  $\alpha$ -particle. This is known as Rutherford's famous  $\alpha$ -particle scattering experiment. On the basis of experiment Rutherford proposed the nuclear model of atom which explains the size of nucleus.

## 10. Discovery of the nucleus of an atom was due to the experiment carried out by—

- (A) Bohr (B) Rutherford  
(C) Moseley (D) Thomson

**Ans. (B)**

**Exp:** Rutherford bombarded very thin gold foil with  $\alpha$ -particle. This is known as Rutherford's famous  $\alpha$ -particle scattering experiment. On the basis of experiment, Rutherford proposed the nuclear model of atom.

**11. The atomic number of carbon is 6 and its atomic mass is 12. How many are there protons in the nucleus of carbon?**

- (A) 6 (B) 12  
(C) 18 (D) zero

**Ans. (A)** [SSC CGL Exam. 2002]

**Exp:** Atomic number of carbon is 6.  
 $Z = p = e$ , So, number of protons in carbon atom will be 6.

**12. When Helium atom loses electron, then it becomes—**

- (A) Proton (B) Positive Helium ion  
(C) Negative Helium ion (D) Alpha Particle

**Ans. (B)** [SSC CGL Exam, 2015]

**Exp:** When Helium atom loses electron, then it forms positive helium ion.  $\text{He} \rightarrow \text{He}^+ + e^-$

**13. Which of the following particle is negatively charged ?**

- (A) Proton (B) Neutron  
(C) Positron (D) Electron

**Ans. (D)** [SSC LDC 2005]

**Exp:** Electron bears -ve charge.

Particle	Discoverer	Mass	Charge
Proton	Goldstein	$1.672 \times 10^{-27} \text{ kg}$	$+1.6 \times 10^{-19} \text{ C}$
Neutron	Chadwick	$1.674 \times 10^{-27} \text{ kg}$	Neutral
Positron	Anderson	$9.1 \times 10^{-31} \text{ kg}$	$+1.6 \times 10^{-19} \text{ C}$
Electron	Thomson	$9.1 \times 10^{-31} \text{ kg}$	$-1.6 \times 10^{-19} \text{ C}$

**14. The absolute value of charge on electron was determined by—**

- (A) J.J. Thomson (B) R.A. Millikan  
(C) Rutherford (D) Chadwick

**Ans. (B)**

**Exp:** The absolute value of charge on electron was determined by- R.A. Millikan in 1909 by Oil drop method.

**15. Electrons move around the nucleus in**

- (A) Translatory (B) Spin  
(C) Orbital (D) Vibrational

**Ans. (C)**

**Exp:** Electrons revolve around the nucleus in circular paths of fixed energy are called stationary states or Orbits.

**16. An atom has 2 electrons in K-shell, 8 electrons in L-shell and 6 electrons in M - shell. The number of s - electrons present in that element is —**

- (A) 6 (B) 5  
(C) 7 (D) 10

**Ans. (A)** [SSC CHSL 2012]

**Exp:** K = 2 electrons  
L = 8 electrons  
M = 6 electrons  
Total = 16 electrons

Electronic configuration

$1s^2, 2s^2 2p^6, 3s^2 3p^4$

Total No. of s electrons = 6

**17. The proton is heavier than an electron by**

- (A) 187 times (B) 1837 times  
(C) 3837 times (D) 2827 times

**Ans. (B)**

**Exp:**  $m_p = 1.0072766 \text{ amu}$   
 $m_e = 0.000549 \text{ amu}$

Comparative mass of proton is 1837 times heavier than an electron.

**18.  $\text{CN}^-$  ion is isoelectronic with —**

- (A)  $\text{N}_2$  (B) CO  
(C) both a & b (D) None

**Ans. (C)**

**Exp:** Isoelectronic species have same no. of electrons.

C = 6	$\text{CN}^- = 6 + 7 + 1 = 14$
N = 7	$\text{N}_2 = 7 + 7 = 14$
O = 8	$\text{CO} = 6 + 8 = 14$

**19. Which of the following is the maximum number of electrons that can be present in M-shell?**

- (A) 2 (B) 8  
(C) 18 (D) 32

**Ans. (C)**

[SSC DP SI Exam 2014]

**Exp:** Maximum number of electrons in a given shell =  $2n^2$   
Where n represents number of shell.

Value of n = 1, 2, 3 .....

So, maximum number of electrons in M ( $3^{\text{rd}}$ ) shell =  $2 \times 3^2 = 18$

**20. Which among the following will be a negative ion ?**

- (A) If it has more electrons than protons  
(B) If it has more electrons than neutrons  
(C) If it has more protons than electrons  
(D) If it has more protons than neutrons

**Ans. (A)**

[SSC CHSL 2016]

**Exp:** For electrically neutral  $z = p = e$

for positive ion (cation),  $Z = p > e$

for negative ion (Anion),  $Z = p < e$

positive ion is formed after removal of electrons while negative ion is formed by gaining of electrons.

**21. Electrons in the highest energy level of an atom are called \_\_\_\_\_.**

- (A) Valence protons (B) Orbital protons  
(C) Valence electrons (D) Orbital electrons

**Ans. (C)**

[SSC CHSL 2016]

**Exp:** Electrons in the highest energy level of an atom are called Valence electrons or outermost shell electrons. Only these electrons participate in chemical bond formation.

**22. Fe has 26 protons in its nucleus. What are the number of electrons in  $\text{Fe}^{2+}$  (II) ion?**

- (A) 24 (B) 26 (C) 28 (D) 13

**Ans. (A)**

[SSC CHSL 2016]

**Exp:** We know that

for an atom  $z = p = e$

for cation  $z = p > e$

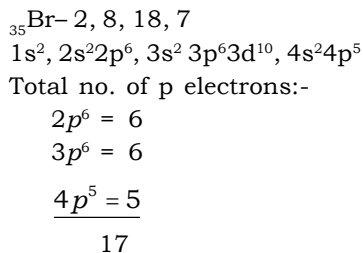
Iron (Fe) has 26 protons in its nucleus so it has also 26 electrons. But in  $\text{Fe}^{2+}$  ion, iron has 2 less electrons so it has 24 electrons.

## 23. Number of p-electrons in bromine atom:

- (A) 12 (B) 15  
(C) 7 (D) 17

**Ans. (D)**

**Exp:** Electronic Configuration of Bromine:-



## 24. Which of the following has maximum Mass?

- (A) Electron (B) Proton  
(C) Neutron (D) Nucleus of Hydrogen

**Ans. (C)**

[SSC CGL 2013]

**Exp:** Amu = Atomic Mass Unit

Atomic mass unit is defined as the Quantity of element is equal to 1/12 of the mass of an atom of carbon ( $\text{C}^{12}$ ).

Mass of the following is given as.

Electron = 0.000549 (amu)

Proton = 1.00728 (amu)

Neutron = 1.00867 (amu)

Nucleus of Hydrogen = 1.00783 (amu)

So neutron has maximum mass.

## 25. The mass of proton and mass of \_\_\_\_\_ is same.

- (A) Neutron (B) Electron  
(C) Isoprone (D) Alpha particle

**Ans. (A)**

**Exp:** Mass of proton & mass of neutron is same.

Mass of the following is given as.

Electron = 0.000549 (amu)

Proton = 1.00728 (amu)

Neutron = 1.00867 (amu)

## 26. The nuclear particle having no mass and no charge, but only spin is

- (A) Proton (B) Neutrino  
(C) Meson (D) Electron

**Ans. (B)**

[SSC CGL Exam. 2013]

**Exp:** The neutrino is so named because it is electrically neutral. It has very small mass & charge. It has spin only.

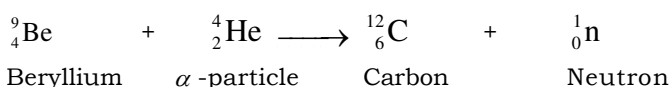
## 27. Who is awarded by Noble prize for the discovery of Neutron?

- (A) Chadwick (B) Rutherford  
(C) Neil Bohr (D) Roentgen

**Ans. (A)**

[SSC LDC 2005]

**Exp:** Neutron is discovered by J. Chadwick in 1932 by Beryllium with  $\alpha$ -particle that he is awarded by Nobel prize. Neutron is a Neutral particle.



## 28. The electronic configuration of a dipositive ion $\text{M}^{2+}$ is 2, 8, 14 and its atomic mass is 56. The number of neutrons in the nucleus would be:

- (A) 30 (B) 32 (C) 34 (D) 42

**Ans. (A)**

**Exp:**  $\text{M}^{2+} = 2, 8, 14$

As metal is dipositive

$Z = 2 + 8 + 14 + 2 = 26$

$n = A - Z = 56 - 26 = 30$

where  $n$  = no. of neutrons

$Z$  = Atomic No.

$A$  = Mass No.

## 29. The triad of nuclei is isotone in :

- (A)  ${}^6\text{C}^{14}$ ,  ${}^7\text{N}^{15}$ ,  ${}^9\text{F}^{17}$  (B)  ${}^6\text{C}^{12}$ ,  ${}^7\text{N}^{14}$ ,  ${}^9\text{F}^{18}$   
(C)  ${}^6\text{C}^{14}$ ,  ${}^7\text{N}^{14}$ ,  ${}^9\text{F}^{17}$  (D)  ${}^6\text{C}^{14}$ ,  ${}^7\text{N}^{14}$ ,  ${}^9\text{F}^{19}$

**Ans. (A)**

**Exp:** Since  ${}^6\text{C}^{14}$ ,  ${}^7\text{N}^{15}$  and  ${}^9\text{F}^{17}$  have the same number of neutrons equal to 8 ( $14 - 6 = 8$ ,  $15 - 7 = 8$ ,  $17 - 9 = 8$ ), these nuclei are isotonic with each other.

## 30. The unrelated member of the following group is

- (A) Helium ion (B) Neutron  
(C) Proton (D) Cyclotron

**Ans. (D)**

**Exp:** Cyclotron is a type of particle accelerator invented by Ernest Lawrence. It is used to accelerate charged particles to high energies.

## 31. The antiparticle of an electron is

- (A) Positron (B) Proton  
(C) Alpha particle (D) Beta particle

**Ans. (A)**

[SSC CGL Exam. 2016]

**Exp:** Antiparticle of an electron is positron because it has same mass and charge (but opposite sign) like an electron.

## 32. Which two basic forces are able to provide an attractive force between two neutrons?

- (A) Gravitational and Electrostatic forces  
(B) Some other forces  
(C) Gravitational and Nuclear forces  
(D) Electrostatic and Nuclear forces

**Ans. (C)**

[SSC CHSL 2012]

**Exp:** Gravitational and nuclear forces are able to provide an attractive force between two neutrons. However, nuclear forces are stronger than gravitational forces. Nuclear forces also act between neutron-proton and proton-proton.

## 33. Cathode rays are-

- (A) Stream of  $\alpha$ -particles  
(B) Stream of electrons  
(C) Electromagnetic waves  
(D) Radiations

**Ans. (B)**

[SSC Stenographer 2012]

**Exp:** A Cathode Ray is a beam of electrons in a vacuum tube travelling from the negatively charged electrode (Cathode) at one end to the positively charged electrode (anode) at the other, across a voltage difference between the electrodes. They are also called Electron Beams.

**34. When cathode rays strike a target of high atomic weight, they give rise to**

- (A) -rays (B) and rays  
(C) X-rays (D) Positive rays

**Ans. (C)** [SSC CGL Re-Exam. 2013]

**Exp:** When cathode rays strike a solid target of high atomic weight and high melting point such as molybdenum tungsten, etc they give rise to a highly penetrating radiations called the X-rays.

**35. J.J. Thomson proposed a model which is generally called ..... model.**

- (A) Cream and cake (B) Plum and pudding  
(C) Plum and cake (D) Cream and pudding

**Ans. (B)** [SSC CPO Exam. 2016]

**Exp:** J.J. Thomson proposed that an atom possesses a spherical shape in which the positive charge is uniformly distributed. The electrons are embedded into it. This model is known as **plum pudding, raisin pudding or watermelon Model.**

**36. Match column-I and column-II**

- | Column-I             | Column-II                            |
|----------------------|--------------------------------------|
| A. Thomson model     | 1. Dual nature of electron           |
| B. Rutherford model  | 2. Nuclear theory                    |
| C. Bohr's model      | 3. Plum pudding model                |
| D. De-Broglie theory | 4. Concept of quantization of energy |

- (A) A-3, B-4, C-2, D-1  
(B) A-2, B-4, C-1, D-2  
(C) A-2, B-1, C-3, D-4  
(D) A-3, B-2, C-4, D-1

**Ans. (D)**

**Exp:**

- |                      |                                     |
|----------------------|-------------------------------------|
| A. Thomson Model     | → Plum Pudding Model                |
| B. Rutherford Model  | → Nuclear theory                    |
| C. Bohr's Model      | → Concept of quantization of energy |
| D. De-Broglie theory | → Dual Nature of Electron           |

**37. Atomic number of an atom gives the number of which of the following?**

- (A) Electrons (B) Protons  
(C) Neutrons (D) Neutrons and Protons

**Ans. (B)** [SSC CHSL Exam. 2016]

**Exp:** Atomic number is equal to number of protons present in nucleus. It is a characteristic of a chemical element.

**38. Which of the properties of the element is a whole number?**

- (A) Atomic mass (B) Atomic number  
(C) Atomic radii (D) Atomic volume

**Ans. (B)**

**Exp:** Atomic number is a whole number because it is equal to number of protons present in nucleus.

**39. Element having atomic number 29 is related to -**

- (A) s-Block (B) d-Block  
(C) p-Block (D) f-Block

**Ans. (B)** [SSC CGL 2013]

**Exp:** d block elements have electronic configuration  $(n-1)d^{1-10} ns^{0-2}$ .

Cu is d block element because it has following electronic configuration

$1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^1$

**40. Electronic configuration of calcium atom can be written as:**

- (A) [Ne],  $4p^2$  (B) [Ar],  $4s^2$   
(C) [Ne],  $4s^2$  (D) [Kr],  $4p^2$

**Ans.(B)**

**Exp:** Electronic configuration of calcium atom:-

Ca = 2, 8, 8, 2

Electronic configuration =  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

Ar = 2, 8, 8 (Z = 18)

**41. The electronic configuration of chromium (Z = 24) is**

- (A) [Ne]  $3s^2 3p^6 3d^4, 4s^2$  (B) [Ne]  $3s^2 3p^6 3d^5, 4s^1$   
(C) [Ne]  $3s^2 3p^6 3d^1, 4s^2$  (D) [Ne]  $3s^2 3p^6, 4s^2 4p^4$

**Ans. (B)** [SSC CHSL 2016]

**Exp:** Cr (Z = 24) - 2, 8, 13, 1

[Ne]  $3s^2 3p^6 3d^5, 4s^1$

Half filled orbitals are more stable than partially filled orbitals.

**42. Two elements X and Y are isotonic having atomic weight 54 and 56 respectively. If the atomic number of X is 26, then the atomic number of Y is :**

- (A) 26 (B) 27  
(C) 28 (D) 30

**Ans (C)**

**Exp:** Isotones are the atoms in which the number of neutrons i.e., (A - Z) are equal. Thus if x is the atomic number of Y, then for  ${}_{26}X^{54}$  and  ${}_xY^{56}$  we have :

$54 - 26 = 56 - x,$

$\therefore x = 28$

**43. What is the formula of potassium ion in the noble state?**

- (A)  $K^+$  (B)  $K^{2+}$  (C)  $K^{2-}$  (D)  $K^-$

**Ans. (A)** [SSC CHSL 2016]

**Exp:**  ${}_{19}K - 2, 8, 8, 1$

Noble state means 8 electrons in valence shell. After removal of 1 electron K change into  $K^+$  ion.

$K^+ - 2, 8, 8$

**44. Atomic Number of Hydrogen is \_\_\_\_\_.**

- (A) 4 (B) 3  
(C) 2 (D) 1

**Ans. (D)** [SSC CHSL 2016]

**Exp:** Atomic number of hydrogen ( ${}_1H^1$ ) is 1. It has three isotopes name as protium ( ${}_1H^1$ ), deuterium ( ${}_1H^2$ ) and tritium ( ${}_1H^3$ ).



**45. Atomic number of which of the following elements is greater than that of Magnesium**

- (A) Neon (B) Fluorine  
(C) Sodium (D) Aluminium

**Ans. (D)** (SSC CHSL 2016)

**Exp:** Atomic number of Aluminium (Z = 13) is greater than that of Magnesium (Z = 12).

Element	Atomic numbers (Z)
Neon (Ne)	= 10
Fluorine (F)	= 9
Sodium (Na)	= 11
Aluminium (Al)	= 13

**46. Atomic number of which of the following elements is greater than that of Aluminium?**

- (A) Phosphorous (B) Neon  
(C) Magnesium (D) Sodium

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Atomic number of Phosphorous (Z = 15) is greater than that of Aluminium (Z = 13).

Element	Atomic numbers (Z)
Phosphorous (P)	15
Neon (Ne)	10
Magnesium (Mg)	12
Sodium (Na)	11

**47. Atomic number of which of the following elements is greater than that of Phosphorous?**

- (A) Aluminium (B) Silicon  
(C) Chlorine (D) Magnesium

**Ans. (C)** (SSC CHSL 2016)

**Exp:** Chlorine (Z = 17) has higher atomic no. than that of phosphorous (Z = 15).

Element	Atomic numbers (Z)
Phosphorous (P)	15
Aluminium (Al)	13
Silicon (Si)	14
Chlorine (Cl)	17
Magnesium (Mg)	12

**48. Atomic number of which of the following elements is greater than that of Neon?**

- (A) Oxygen (B) Magnesium  
(C) Nitrogen (D) Boron

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Magnesium (Z = 12) has greater atomic no. than that of Neon (Z = 10).

Element	Atomic numbers (Z)
Neon (Ne)	10
Oxygen (O)	8
Magnesium (Mg)	12
Nitrogen (N)	7
Boron (B)	5

**49. Atomic number of which of the following elements is greater than that of silicon**

- (A) Aluminium (B) Sulphur  
(C) Magnesium (D) Sodium

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Atomic No. of Sulphur (Z = 16) is greater than that of silicon (Z = 14).

Element	Atomic numbers (Z)
Silicon (Si)	14
Aluminium (Al)	13
Sulphur (S)	16
Magnesium (Mg)	12
Sodium (Na)	11

**50. Atomic number of which of the following elements is greater than that of Zinc**

- (A) Copper (B) Iron  
(C) Chromium (D) Bromine

**Ans. (D)** (SSC CHSL 2016)

**Exp:** Atomic number of Bromine (Z = 35) is greater than that of Zinc (Z = 30).

Element	Atomic numbers (Z)
Zinc (Zn)	30
Copper (Cu)	29
Iron (Fe)	26
Chromium (Cr)	24
Bromine (Br)	35

**51. Atomic number of which of the following elements is greater than that of Iodine**

- (A) Silver (B) Bromine  
(C) Platinum (D) Zinc

**Ans. (C)** (SSC CHSL 2016)

**Exp:** Atomic number of Platinum (Z = 78) is greater than that of Iodine (Z = 53).

Element	Atomic numbers (Z)
Iodine (I)	53
Silver (Ag)	47
Bromine (Br)	35
Platinum (Pt)	78
Zinc (Zn)	30

**52. Atomic number of which of the following elements is greater than the of potassium.**

- (A) Sulphur (B) Chlorine  
(C) Calcium (D) Argon

**Ans. (C)** (SSC CHSL 2016)

**Exp:** Calcium (Z = 20) has higher atomic no. than that of potassium (Z = 19).

**53. Atomic number of which of the following elements is greater than that of Calcium?**

- (A) Chlorine (B) Argon  
(C) Sulphur (D) Scandium

**Ans. (D)** (SSC CHSL 2016)

**Exp:** Scandium (Z = 21) has greater atomic no. than that of Calcium (Z = 20).

Element	Atomic numbers (Z)
Sulphur (S)	16
Chlorine (Cl)	17
Calcium (Ca)	20
Argon (Ar)	18
Potassium (K)	19

**54. Atomic number of which of the following elements is greater than that of Chlorine**

- (A) Potassium (B) Sulphur  
(C) Aluminium (D) Phosphorous

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Potassium ( $Z = 19$ ) has higher atomic no. than that of Chlorine ( $Z = 17$ ).

**55. Atomic number of which of the following elements is greater than that of Copper?**

- (A) Iron (B) Chromium  
(C) Zinc (D) Manganese

**Ans. (C)** (SSC CHSL 2016)

**Exp:** Zinc ( $Z = 30$ ) has higher atomic no. than that of Copper ( $Z = 29$ ).

Element	Atomic numbers (Z)
Iron(Fe)	26
Chromium(Cr)	24
Zinc (Zn)	30
Manganese (Mn)	25

**56. Atomic number of an atom gives the number of which of the following?**

- (A) Electrons (B) Protons  
(C) Neutrons (D) Neutrons and protons

**Ans. (B)** (SSC CGL 2016)

**Exp:** Atomic No. ( $Z$ ) is numerically equal to the number of protons present in the nucleus of an atom. Thus, Atomic Number ( $Z$ ) = number of protons.

**57. Atomic number of which of the following elements is greater than that of Fluorine?**

- (A) Sodium (B) Beryllium  
(C) Nitrogen (D) Boron

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Atomic Number of Sodium ( $Z = 11$ ) is greater than that of Fluorine ( $Z = 9$ ).

**58. Atomic number of which of the following elements is greater than that of Iron?**

- (A) Manganese (B) Cobalt  
(C) Calcium (D) Chromium

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Atomic number of Cobalt ( $Z = 27$ ) is greater than that of Iron ( $Z = 26$ ).

**59. Mass number is the sum of -**

- (A) Electrons and Protons  
(B) Protons and Neutrons  
(C) Electrons and Neutrons  
(D) Only Protons

**Ans. (B)** (SSC CHSL 2015)

**Exp:** Mass number ( $A$ ) = number of protons ( $p$ ) + number of neutrons ( $n$ ).

$$A = p + n \text{ or } Z + n (\because p = Z)$$

**60. The mass number of an atom is-**

- (A) Always less than its atomic number  
(B) Always more than its atomic number

(C) Always equal to its atomic number

(D) Sometimes more and sometimes equal to its atomic number

**Ans. (D)** [SSC CHSL 2010]

**Exp:** The mass number of an atom is equal to sum of number of neutrons and number of protons present in it, which is sometimes more or sometimes equal to its atomic number.

**61. An Element has Atomic number 17 and Mass number 36, then number of neutrons present in it-**

- (A) 17 (B) 19 (C) 36 (D) 53

**Ans. (B)** [SSC MTS 2008]

**Exp:**  $A = 36, Z = 17$

$$A = p + n$$

$$\text{So, } n = A - p$$

$$n = A - Z (\because Z = p)$$

$$n = 36 - 17 = 19$$

**62. Which of the following element has relative atomic weight that is made up to atom containing each of 17 protons, 18 Neutrons and 17 Electrons?**

- (A) 52 (B) 35 (C) 18 (D) 17

**Ans. (B)** [SSC Stenographer 2005]

**Exp:** Atomic weight = Atomic number (No of Protons) + No of neutrons,  $18 + 17 = 35$ .

**63. How many neutrons are there in  ${}_{92}\text{U}^{238}$  atom?**

- (A) 92 (B) 238 (C) 146 (D) 330

**Ans. (C)** [SSC DP SI Exam. 2014]

**Exp:**  $Z = p = 92$

$$A = 238$$

$$n = A - p = 238 - 92 = 146$$

**64. The number of neutrons present in an element having mass number 226 and atomic number 88 is:**

- (A) 88 (B) 138 (C) 314 (D) 50

**Ans. (B)** [SSC Combined Matric Level Exam. 2006]

**Exp:**  $Z = 88, A = 226$

$$Z = p = e = 88$$

$$n = A - p = 226 - 88 = 138$$

**65. Atomic mass of Oxygen is 16 and atomic number is 8. What is the mass in grams of 2 moles of oxygen gas?**

- (A) 8 (B) 64 (C) 32 (D) 16

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Molar mass =  $2 \times 16 = 32$  g.

$$\text{No. of moles} = 2$$

$$\text{Mass of 2 moles} = 2 \times 32 = 64 \text{ gm}$$

**66. The photoelectric effect is described as the ejection of electrons from the surface of a metal when-**

- (A) It is heated  
(B) It is placed in strong electric field

- (C) Electrons of suitable velocity impinge on it  
(D) Light of suitable frequency falls on it

**Ans. (D)** [SSC CGL 2013]

**Exp:** The phenomenon of ejection of electrons from the surface of a metal when light of suitable frequency strikes on it. This phenomenon is known as **Photoelectric effect**. The emitted electrons are called photoelectrons. Cesium (Cs), Rubidium (Rb) & Potassium (K) shows Photoelectric effect.

**67. The photoelectric emission from metal surface starts only when the incident light has a certain minimum**

- (A) Wavelength (B) Velocity  
(C) Frequency (D) Acceleration

**Ans. (C)**

**Exp:** Threshold frequency ( $\nu_0$ ): It is defined as for each metal, certain minimum frequency of light is needed to eject the electrons from the metal surface.

**68. Propagation of light quanta may be described by—**

- (A) Photons (B) Protons  
(C) Neutrons (D) Electrons

**Ans. (A)**

**Exp:** Quanta are described as discrete packets of energy. In terms of light quantum is known as **Photon**.

**69. The value of Planck's constant is—**

- (A)  $6.62 \times 10^{-34}$  J (B)  $6.62 \times 10^{-34}$  J.s  
(C)  $6.62 \times 10^{-34}$  erg.s (D) None of these

**Ans. (B)**

**Exp:** Planck's constant is represented by  $h$ .

$$h = 6.62 \times 10^{-34} \text{ J.s}$$

**70. If an electron and a photon have the same wavelength, then they will have the same**

- (A) Velocity (B) Linear momentum  
(C) Angular momentum (D) Energy

**Ans. (B)** [SSC CGL 2016]

**Exp:**  $E = h\nu$

$$E = \frac{hc}{\lambda} \quad \dots (i) \quad \left( \because \nu = \frac{c}{\lambda} \right)$$

$$E = mc^2 \quad \dots (ii)$$

$$\frac{hc}{\lambda} = mc^2$$

$$\lambda = \frac{h}{mc} = \frac{h}{p}$$

$$\lambda \propto \frac{1}{p}$$

**71. Which of the following particle has the dual nature of particle and wave?**

- (A) Neutron (B) Electron  
(C) Meson (D) Proton

**Ans. (B)** [SSC CGL 2015]

**Exp:** De Broglie predicted that small particles such as electrons should show wave like properties along with particle character. The wavelength ( $\lambda$ ) associated with a particle of mass  $m$  and moving velocity  $v$  is given in the relationship.  $\lambda$  represents wave nature &  $p$  represents particle nature.

$$\lambda = \frac{h}{p} = \frac{h}{mv} \quad (\because p = mv)$$

$h$  = Planck's constant

$p$  = Momentum

$m$  = Mass

$v$  = Velocity

**72. The concept of dual nature of radiation was proposed by—**

- (A) Max Planck (B) De-Broglie  
(C) Heisenberg (D) Pauling

**Ans. (B)**

**Exp:** De Broglie predicted that small particles such as electrons should show wave like properties along with particle character. The wavelength ( $\lambda$ ) associated with a particle of mass  $m$  and moving velocity  $v$  is given in the relationship.  $\lambda$  represents wave nature &  $p$  represents particle nature.

$$\lambda = \frac{h}{p} = \frac{h}{mv} \quad (\because p = mv)$$

$h$  = Planck's constant

$p$  = Momentum

$m$  = Mass

$v$  = Velocity

**73. "The position and velocity of a small particle like electron can not be simultaneously determined." This statement is—**

- (A) Heisenberg uncertainty principle  
(B) Pauli's exclusion principle  
(C) Aufbau principle  
(D) De-Broglie wave nature of electron

**Ans. (A)**

$$\text{Exp: } \Delta P \cdot \Delta x \geq \frac{h}{4\pi}$$

$$P = mv$$

$$m \Delta v \cdot \Delta x \geq \frac{h}{4\pi}$$

$$\Delta v \cdot \Delta x \geq \frac{h}{4\pi m}$$

$\Delta P$  = change in momentum

$\Delta x$  = change in position

$\Delta v$  = change in velocity

**74. Who discovered X-Ray?**

- (A) Wilhelm Roentgen (B) William Lee  
(C) X Lollswick (D) I Thompson

**Ans. (A)**

**Exp:** X-rays were discovered by Wilhelm Roentgen.

**75. By which one of the following, an old written material which can not be read easily, can be read?**

- (A)  $\gamma$  - rays (B) X - rays  
(C) IR - rays (D) Radio frequency waves

**Ans. (B)**

**Exp:** X-Rays are used to read an old written material because they have high penetrating power.

Uses of X-rays:

Detection of abnormalities of the skeletal system.

To detect structural deficits or cracks in metal objects.

To reveal stress related changes in building materials.

In examination of baggage in airports.

**76. Which one of the following is the correct sequence of wavelength of radiations?**

- (A) UV > Green > IR > Hard X - rays  
(B) IR > Green > UV > Hard X - rays  
(C) UV > Hard X - rays > IR > Green  
(D) IR > Hard X - rays > Green > UV

**Ans. (B)**

**Exp:** Increasing order of wavelength of Electromagnetic Radiations:-

Cosmic rays < Gamma rays < X-rays < U.V. rays < Visible radiation < I.R. < Microwaves < Radio waves

**Note:** Wavelength is inversely proportional to frequency.

**77. Which of the following is not Electromagnetic in nature?**

- (A) Cathode rays (B) X - rays  
(C) Gamma - rays (D) Infrared - rays

**Ans. (A)**

**Exp:** In the given options, cathode rays are not electromagnetic in nature. Electromagnetic waves are waves which can travel through the vacuum of outer space. They travel with the speed of light. These are Radio waves, Micro-waves, X-rays, Gamma Rays, Infra-Red waves etc.

**78. Wavelength of which of the following colours of the visible spectrum of light are maximum absorbed by green plants -**

- (A) Green and yellow (B) Red and blue  
(C) Green and red (D) Blue and yellow

**Ans. (B)**

**Exp:** Chlorophyll is present in leaves. Chlorophyll absorbs light in the red (Long wavelength) and the blue (short wavelength) region of the visible light spectrum.

**79. Which of the following is not true about X rays?**

- (A) Low power  
(B) Travel with the speed of light  
(C) Refracted  
(D) Can affect photographic plates

**Ans. (A)** (SSC CGL 2016)

**Exp:** The penetrating power of X-Rays is determined by the peak energy (KVp) of the voltage placed across the X-Ray tube. The higher the energy the greater the penetrating power.

**80. The reverse effect of X-ray emission is**

- (A) Raman effect (B) Compton effect  
(C) Zeeman effect (D) Photo-electric effect

**Ans. (D)** (SSC CGL 2016)

**Exp:** The production of X-ray is a reverse process of photoelectric effect. In photoelectric effect, Photons are incident on a metal surface and electrons are produced and X-rays are produced when target metal is bombarded by electrons.

**81. Which of the following has the lowest frequency?**

- (A) Visible light (B) Gamma rays  
(C) X-rays (D) Ultra violet rays

**Ans. (A)** (SSC CGL 2016)

**Exp:** The different type of radiations are arranged in the decreasing order of frequencies or Increasing order of wavelength as :

Cosmic rays, Gamma rays, X-rays, Ultraviolet radiations, Visible radiations, Infrared radiations, Microwaves and Radio waves.

**82. All isotopes of the same element have -**

- (A) Different atomic numbers and different atomic mass  
(B) Different atomic numbers and the same atomic mass  
(C) The same atomic number but different atomic mass  
(D) The same atomic number and the same atomic mass

**Ans. (C)** [SSC CGL Exam. 2016]

**Exp:** Atoms of an element having same atomic number but having different mass number are known as isotopes. eg:-  ${}_1\text{H}^1$ ,  ${}_1\text{H}^2$ ,  ${}_1\text{H}^3$

**83. Nuclides have same atomic number are called:**

- (A) Isotopes (B) Isobar  
(C) Isotones (D) Isoelectrons

**Ans. (A)** [SSC MTS 2013]

**Exp:** Nuclides having same atomic number are known as Isotopes. eg:-  ${}_7\text{N}^{14}$ ,  ${}_7\text{N}^{15}$

**84. Atoms of same element having different mass numbers are called -**

- (A) Isobars (B) Isotopes  
(C) Isotones (D) Isomers

**Ans. (B)** (SSC CGL 2016)

**Exp:** Atoms of an element having same atomic number but having different mass number are known as isotopes. eg:-  ${}_6\text{C}^{12}$ ,  ${}_6\text{C}^{14}$

**85. Chemical properties of isotopes**

- (A) Must be Same (B) Must be Different  
(C) Need not be Same (D) Need not be Different

**Ans. (A)** [SSC CGL Exam. 2016]

**Exp:** Chemical properties depend on number of valence electrons. Isotopes have same number of electrons. So they have same chemical properties.



**86. Atoms having the same number of protons but different number of neutrons are called:**

- (A) Isotopes (B) Cations  
(C) Higgs-boson (D) Anions

**Ans. (A)** [SSC CHSL Exam. 2015]

**Exp:** Atoms having the same number of protons but different number of neutrons are called isotopes.

**87. Atoms of different elements have**

- (A) Same atomic number and same electronic configuration  
(B) Different atomic number and same electronic configuration  
(C) Different atomic number and different number of valence electrons  
(D) Same number of electrons and neutrons

**Ans. (C)** [SSC CGL Re-Exam. 2013]

**Exp:** Atoms of different elements have different atomic number and different number of valence electrons.

**88. Atoms having same no of neutron but different no of electrons or protons are called-**

- (A) Isotopes (B) Isobars  
(C) Isotones (D) Allotropes

**Ans. (C)** [SSC Stenographer 2005]

**Exp:** Atoms having equal number of neutrons but different number of Electron or Protons are called Isotones.

For Example

${}_{14}\text{Si}^{30}$	${}_{15}\text{P}^{31}$
A = 30	31
Z = p = e = 14	15
n = A - p = 16	16

**89.  ${}^{40}_{18}\text{Ar}$ ,  ${}^{40}_{19}\text{K}$ ,  ${}^{40}_{20}\text{Ca}$  are called -**

- (A) Isotones (B) Isotopes  
(C) Isobars (D) None

**Ans. (C)** [Expected Question]

**Exp:** All have same mass no. but different atomic no. so they are known as Isobars.

**90. Isobars have -**

- (A) Same mass numbers but different atomic numbers  
(B) Different mass numbers but same atomic numbers  
(C) Same mass and atomic numbers  
(D) Different mass and atomic numbers

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Isobars have same mass number but different atomic number.

**Eg:**  ${}^{14}_6\text{C}$ ,  ${}^{14}_7\text{N}$

**91. Who was the first to explain hydrogen spectrum?**

- (A) Dalton (B) Neil Bohr  
(C) Rutherford (D) J.J. Thomson

**Ans. (B)**

**Exp:** Neil Bohr was the first to explain Hydrogen spectrum there are five series in Hydrogen spectrum.

- |                    |                    |
|--------------------|--------------------|
| 1. Lyman series    | Ultraviolet region |
| 2. Balmer Series   | Visible region     |
| 3. Paschen Series  | Infrared region    |
| 4. Brackett Series | Infrared region    |
| 5. Pfund Series    | Infrared region    |

**92. Bohr's model can explain :**

- (A) Spectrum of hydrogen atom only  
(B) Spectrum of any atom or ion having one electron only  
(C) Spectrum of hydrogen molecule  
(D) Solar spectrum

**Ans. (B)**

**Exp:** Bohr's model can explain spectrum of any atom or ion having one electron only. eg:-  $\text{He}^+$ ,  $\text{Li}^{2+}$

**93. The value of Bohr radius of hydrogen atom is**

- (A)  $0.529 \times 10^{-7}$  cm (B)  $0.529 \times 10^{-8}$  cm  
(C)  $0.529 \times 10^{-9}$  cm (D)  $0.529 \times 10^{-10}$  cm

**Ans. (B)**

**Exp:**  $0.529n^2$  n = 1, radius is in  $10^{-8}$  cm. The value of Bohr radius of hydrogen atom is  $0.529 \times 10^{-8}$  cm

**94. If r is the radius of first orbit, the radius of nth orbit of the hydrogen atom will be :**

- (A)  $rn^2$  (B) rn  
(C) r/n (D)  $r^2n^2$

**Ans. (A)**

**Exp:** Radius of  $n^{\text{th}}$  orbit of hydrogen atom  $r_n = r \times n^2$

**95. When a metal is heated in a flame, the electrons absorb energy and jump to higher energy state.**

**On coming back to the lower energy state, they emit light, which we can observe in**

- (A) Raman spectra (B) Absorption spectra  
(C) Emission spectra (D) Fluorescence

**Ans. (C)** [SSC CGL Exam. 2013]

**Exp:** Emission spectra- It is obtained from the substances which emit light on excitation, i.e. either by heating substances on a flame or by passing electric discharge through gases at low pressure or by passing electric current through a thin filament of high melting point metal.

**96. Bohr's concept of the orbit in an atom was contradicted by**

- (A) De-broglie relationship  
(B) Uncertainty principle  
(C) Plancks hypothesis (D) Hunds rule

**Ans. (B)**

**Exp:** According to Heisenberg's Uncertainty principle, position & velocity of an object can not be measured simultaneously with accuracy which is in contradict to Bohr's theory.

- 97. The total energy of revolving electron in an atom**  
 (A) Cannot be negative  
 (B) Can have any value above zero  
 (C) Can never be positive  
 (D) Will always be positive

**Ans. (C)** [SSC CHSL Exam. 2010]

**Exp:** Potential energy of the electron is negative inside any atom. The electron also has Kinetic energy which can never be -ve because in expression, there is square of velocity i.e. always +ve & it is smaller in magnitude than the magnitude of potential energy.

Total energy = Kinetic energy + Potential energy

$$= \frac{1}{2}mv^2 - \frac{KZe^2}{r}$$

So, total energy of electron can never be positive.

- 98. The spectrum of helium is expected to be similar to that of:**

- (A) H (B) Na  
 (C) He<sup>+</sup> (D) Li<sup>+</sup>

**Ans. (D)**

**Exp:** He and Li<sup>+</sup> both have same number of electron so spectrum of He will be similar to Li<sup>+</sup>

- 99. When an electron drops from a higher energy level to a low energy level then:**

- (A) Energy is absorbed  
 (B) Energy is emitted  
 (C) Atomic number increases  
 (D) Atomic number decreases

**Ans. (B)**

**Exp:** If energy is absorbed, electrons goes to higher energy level from lower energy level. If energy is released, electrons drop from a higher energy level to a lower energy level

- 100. In Lyman series an electron jumps from higher energy level to**

- (A) K energy level (B) M energy level  
 (C) N energy level (D) L energy level

**Ans. (A)**

**Exp:** When electron returns to any of the lower energy levels, it emits energy. Lyman series is formed when the electron returns to the lowest energy state (K energy level) from high energy levels.

- 101. In which region of electromagnetic spectrum does the Lyman series of hydrogen atom lie?**

- (A) X-Ray (B) Ultraviolet Ray  
 (C) Visible (D) Infrared

**Ans. (B)**

**Exp:** Spectral lines for Hydrogen atom-

Series	Spectral region
Lyman	Ultraviolet
Balmer	Visible
Paschen	Infrared
Brackett	Infrared
Pfund	Infrared

- 102. The total number of orbitals in a principal shell are:**

- (A) n (B) n<sup>2</sup>  
 (C) 2n<sup>2</sup> (D) 3n<sup>2</sup>

**Ans. (B)**

[SSC CHSL 2016]

**Exp:** The total number of orbitals in a principal shell are n<sup>2</sup>.

- 103. The mercury and sodium street lamps light up because of-**

- (A) Atomic absorption (B) Electron absorption  
 (C) Atomic emission (D) Electron emission

**Ans. (C)**

[SSC CGL 2015]

**Exp:** The mercury and sodium street lamps light up because of Atomic emission. Atomic emission occurs when a valence electron in a higher energy atomic orbital returns to a lower energy atomic orbital.

- 104. The atomic orbital is—**

- (A) The Circular path of the electron  
 (B) Elliptical shaped orbit  
 (C) Three dimensional field around nucleus  
 (D) The region in which there is maximum probability of finding electron

**Ans. (D)**

**Exp:** The space or a three-dimensional region around the nucleus where there is maximum probability of finding an electron of a specific energy is called an atomic orbital.

- 105. Which of the following atoms has a nonspherical outermost orbital.**

- (A) H (B) Li  
 (C) Be (D) B

**Ans. (D)**

**Exp:** H = 1s<sup>1</sup>

Li = 1s<sup>2</sup>, 2s<sup>1</sup>

Be = 1s<sup>2</sup>, 2s<sup>2</sup>,

B = 1s<sup>2</sup>, 2s<sup>2</sup>, 2p<sup>1</sup>

S-orbital -  Spherical

P-orbital -  dumb-bell shape

- 106. Orientation of atomic orbital is controlled by -**

- (A) Principal Quantum number  
 (B) Magnetic Quantum number  
 (C) Electron spin quantum number  
 (D) Azimuthal Quantum number

**Ans. (B)**

[SSC MTS 2013]

**Exp:** Principal Quantum number describes the shell, size of orbital and energy of orbital.

Magnetic Quantum number describes the orientation of orbital.

Electron spin quantum number describes the orientation of the spin of electron.

Azimuthal Quantum number describes the three-dimensional shape of orbital.

**107. Two electrons in an orbital are differentiated by which of the following?**

- (A) Magnetic quantum number
- (B) Spin quantum number
- (C) Principal quantum number
- (D) Azimuthal quantum number

**Ans. (B)** [SSC CGL Exam. 2016]

**Exp:**  $\uparrow\downarrow$  = +1/2 one electron of orbital is clockwise and other electron of s-orbital is anticlockwise  $\downarrow$  = -1/2

**108. "All the four quantum numbers of two electrons in an atom are not the same." It is the law of —**

- (A) Hund's rule
- (B) Pauli's exclusion principle
- (C) Uncertainty Principle of Heisenberg
- (D) Avogadro's Law

**Ans. (B)** [SSC Section Officer (Audit) 1997]

**or**

**In a given atom, no two electrons can have the same value for all the four quantum number. This is called—**

- (A) Hund's rule
- (B) Pauli's exclusion principle
- (C) Uncertainty principle
- (D) Aufbau principle

**Ans. (B)**

**Exp:** According to Pauli's exclusion principle - No two electrons in an atom can have the same set of four quantum numbers. **or** Only two electrons may exist in the same orbital and these electrons must have opposite spin.

**109. When there are two electrons in the same orbital, they have:**

- (A) Same spin
- (B) Opposite spin
- (C) Same or opposite spin
- (D) No spin

**Ans. (B)** [SSC CGL 2002]

**Exp:** According to Pauli's exclusion principle only two electrons may exist in the same orbital and these electrons must have opposite spin.

**110. Which orbital is dumb- bell shaped?**

- (A) s-orbital
- (B) p-orbital
- (C) d-orbital
- (D) f-orbital

**Ans. (B)**

Orbital	Shape
s	Spherical
p	dumb bell
d	double dumb bell
f	diffused shape

**111. In an atom the order of filling up of the orbitals is governed by—**

- (A) Aufbau principle
- (B) Heisenberg's uncertainty principle

(C) Hund's rule

(D) Pauli's exclusion Principle

**Ans. (A)**

**Exp:** According to Aufbau principle in the ground state of the atoms, the orbitals are filled in order of their increasing order of energy.

**112. According to Aufbau principle, the correct order of energy of 3d, 4s and 4p orbitals is:**

- (A)  $4p < 3d < 4s$
- (B)  $4s < 4p < 3d$
- (C)  $4s < 3d < 4p$
- (D)  $3d < 4s < 4p$

**Ans. (C)**

**Exp:** According to  $(n + l)$  Rule:-

for 3d,  $n = 3$ ,  $l$  for d subshell = 2

$(n + l) = (3 + 2) = 5$

for 4s,  $n = 4$ ,  $l$  for s subshell = 0

$(n + l) = (4 + 0) = 4$

for 4p,  $n = 4$ ,  $l$  for p subshell = 1

$(4 + 1) = 5$

Greater the  $(n + l)$  value, greater the energy of subshell. When  $(n + l)$  value is same priority is given to less value of  $l$ . So, energy order is  $4s < 3d < 4p$

**113. The statement that the electron occupies available orbital singly before pairing occurs is called**

- (A) Einstein principle
- (B) Rutherford hypothesis
- (C) Pauli's exclusion principle
- (D) Hund's rule

**Ans. (D)**

**Exp:** According to Hund's rule pairing of electrons in the orbitals belonging to the same subshell does not take place until each orbital belonging to that subshell has got one electron each.

**114. Nitrogen atom has unpaired electrons. This can be explained as due to:**

- (A) Hund's rule
- (B) Aufbau Principle
- (C) Pauli's exclusion principle
- (D) Heisenberg's uncertainty principle

**Ans. (A)**

**Exp:** unpaired electrons in nitrogen atom can be explained by Hund's rule

$N = 2, 5$

$\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow \uparrow \uparrow$

$1s^2 \quad 2s^2 \quad 2p^3$

**115. Number of neutrons in an atom of hydrogen is**

- (A) One
- (B) Zero
- (C) Two
- (D) Three

**Ans. (B)**

[SSC CHSL 2014]

**Exp:** Hydrogen ( ${}^1_1\text{H}$ )

$Z = p = e = 1$

$A = 1$

$n = A - p = 0$

$1 - 1 = 0$

**116. The subatomic particle that does not have any electric charge is a/an \_\_\_\_.**

- (A) Electron (B) Proton  
(C) Neutron (D) All options are correct.

**Ans. (C)** (SSC CPO 2017)

**Exp:** Neutron is a subatomic particle that does not have any electric charge. Proton has positive charge while electron has negative charge.

**117. How is atomic mass number determined?**

- (A) By total number of protons  
(B) By total number of neutrons  
(C) By adding number of protons and neutrons  
(D) By total number of electrons

**Ans. (C)** (SSC CPO 2017)

**Exp:** Atomic Mass number is equal to the sum of number of protons & neutrons.

$$A = n + p$$

Where A = Atomic Mass number

n = no. of neutrons

p = no. of protons.

**118. What are the components of nucleus of an atom?**

- (A) Only Protons (B) Protons and Neutrons  
(C) Neutrons and Electrons  
(D) Only Neutrons

**Ans. (B)** (SSC CPO 2017)

**Exp:** Nucleus of an atom consists of proton & neutron. While electrons revolve around the nucleus in a circular paths, called as **Orbits**.

**119. What is the mass of one mole of a substance in grams is called?**

- (A) Nuclear Mass (B) Atomic Mass  
(C) Mass No. (D) Molecular Mass

**Ans. (D)** (SSC CPO 2017)

**Exp:** Molecular mass is the mass of one mole of a substance in gram.

**120. Which among the following is a negatively charged ion?**

- (A) Calcium ion (B) Zinc ion  
(C) Silver ion (D) Iodine ion

**Ans. (D)** (SSC CPO 2017)

**Exp:** Iodine ion ( $I^-$ ) is negatively charged as it is non-metal, it gains electron to form anion. As Ca, Zn & Ag are metals so, calcium ion ( $Ca^{2+}$ ), zinc ion ( $Zn^{2+}$ ) & silver ion ( $Ag^+$ ) are cations.

**121. Atomic Number is denoted by which alphabet?**

- (A) A (B) N (C) Z (D) E

**Ans. (C)** (SSC CPO 2017)

**Exp:** Atomic no. is the no. of protons present in nucleus of an atom. It is represented by Z.

**122. How are 'Cations' formed?**

- (A) Addition of electron (B) Removal of electron  
(C) Addition of proton (D) Removal of proton

**Ans. (B)** (SSC CPO 2017)

**Exp:** Cations are formed by removal of electrons.

Metals generally form cations as they are electropositive elements.

**123. How are 'anions' formed?**

- (A) Addition of electron (B) Removal of electron  
(C) Addition of proton (D) Removal of proton

**Ans. (A)** (SSC CPO 2017)

**Exp:** Anions are formed by addition or gaining of electron.

Generally non-metals form Anion as they are electronegative elements.

**124. Which amongst the following is not a Cation?**

- (A) Aluminium ion (B) Copper ion  
(C) Sulphate ion (D) Zinc ion

**Ans. (C)** (SSC CGL 2017)

**Exp:** Metals form cation as they are electron donors. So, Aluminium, copper & zinc form cation.

Aluminium ion  $Al^{3+}$

Copper ion  $Cu^{2+}$

Zinc ion  $Zn^{2+}$

Sulphate ion  $SO_4^{2-}$

So, sulphate ion is anion.

**125. What are isobars?**

- (A) Elements with same atomic number but different mass number  
(B) Elements with different atomic number but same mass number  
(C) Elements with different atomic number and different mass number  
(D) Elements with same atomic number and same mass number

**Ans. (B)** (SSC CGL 2017)

**Exp:** Isobars are the elements with different atomic number but same mass number.

eg:-  ${}_{18}Ar^{40}, {}_{20}Ca^{40}$

Argon & Calcium has same mass number i.e. 40 but different atomic number which are 18 and 20 respectively.

**126. Anions are formed by \_\_\_\_.**

- (A) Losing of electrons (B) Gaining of electrons  
(C) Gaining of neutrons (D) Losing of neutrons

**Ans. (B)** (SSC CGL 2017)

**Exp:** Anions are formed by gaining or addition of electrons. Generally, non-metals form Anions to become stable.



valence electrons = 7

valence electrons = 8

**127. Who discovered Proton?**

- (A) Ernest Rutherford (B) Friedrich Miescher  
(C) Goldstein (D) Henry Cavendish

**Ans. (C)** (SSC CGL 2017)

**Exp:** Goldstein discovered positively charged particles called as **protons**.





# Radioactivity & Nuclear Chemistry

## 1. Radioactivity is the fission of –

- (A) Nucleus (B) Ion  
(C) Atom (D) Molecule

**Ans. (A)** [SSC MTS 2013]

**Exp:** Radioactivity is the fission of unstable atomic nucleus. If  $n/p$  ratio is greater then nucleus will be unstable where  $n$  = no. of neutrons and  $p$  = no. of protons. Radioactivity is a phenomenon in which nuclei of certain elements undergo spontaneous disintegration.

## 2. What is the unit of the physical quantity, Radio Activity?

- (A) Radian (B) Becquerel  
(C) Steradian (D) Kelvin

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Units of Radioactivity –

- (a) Becquerel (b) Curie (c) Rutherford

So according to the options becquerel is unit of radioactivity.

## 3. Phenomenon of Radioactivity was discovered by –

- (A) Becquerel (B) Rutherford  
(C) Curie (D) Suri

**Ans. (A)** [SSC CGL 2015]

**Exp:** Radioactivity was discovered by Henri Becquerel (1895-96). For work in this field he, along with Marie Skodowska-Curie and Pierre Curie, received the 1903 Nobel Prize in Physics.

## 4. Radioactive decay of Uranium resulted the formation of final product–

- (A) Radium (B) Thorium  
(C) Polonium (D) Lead

**Ans. (D)** [SSC CGL Exam, 2005]

or

**Uranium eventually decays into a stable isotope of –**

- (A) Radium (B) Thorium  
(C) Lead (D) Polonium

**Ans. (C)** [SSC CPO Exam, 2011]

**Exp:** Lead (Pb) is the final product due to the radioactive decay of Uranium. This can be explained by radioactive disintegration series. Atoms having atomic no. greater than 82 are always unstable.

## 5. In India Nuclear Weapon was tested at –

- (A) Shri Hari Kota (B) Bangalore  
(C) Pokhran (D) Kanchipuram

**Ans. (C)** [SSC CPO 2007, SSC CHSL 2011]

**Exp:** Pokhran (District Jaisalmer in Rajasthan) is a testing range of India Nuclear Programme. India tested the first underground nuclear test on 18 May 1974 in Pokhran and after this five more nuclear test occurred in 11th & 13th May 1988.

## 6. Radioactivity is Measured by –

- (A) Calorimeter (B) Polarimeter  
(C) Barometer (D) Geiger – Muller counter

**Ans. (D)** [SSC CGL Exam, 2006]

or

**Device used for the detection and measurement of all types of radiation (alpha, beta and gamma)**

- (A) Geiger counter (B) Polarimeter  
(C) Calorimeter (D) Radiometer

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Radioactivity is measured by Geiger Muller counter. It is used to count charged particles emitted by a radioactive nuclei. It is based on ionisation of gases. The ionisation chamber consists of 90% argon and 10% ethyl alcohol.

## 7. Which one of the following is not a radioactive element?

- (A) Uranium (B) Thorium  
(C) Plutonium (D) Zirconium

**Ans. (D)** [SSC CPO 2005]

**Exp:** Elements having atomic number greater than 82 are all radioactive but zirconium has atomic no. 40. So it's not a radioactive element.

## 8. The most suitable unit to express the nuclear radius is–

- (A) Fermi (B) Angstrom  
(C) Micron (D) Nanometer

**Ans. (A)** [SSC CHSL 2015]

**Exp:** Fermi is the most suitable unit to express the nuclear radius, while atomic radius is measured in Angstrom.

1 Fermi =  $10^{-15}$  m, 1 Angstrom =  $10^{-10}$  m

## 9. The electron emitted in beta radiation originates from–

- (A) Inner orbits of atoms  
(B) Free electrons existing in nuclei  
(C) Decay of a neutron in a nuclei  
(D) Photon escaping from the nucleus.

**Ans. (C)** [SSC CHSL 2012]

**Exp:** In  $\beta$ -emission, a neutron of nucleus decays into a proton and a  $\beta$  particle (electron).

**10. Which one of the following element does not show radioactivity?**

- (A) Uranium (B) Thorium  
(C) Aluminium (D) Polonium

**Ans. (C)** [SSC CHSL 2014]

**Exp:** Elements having atomic number greater than 82 are all radioactive but Aluminium has atomic no. 13 so it does not show any radioactivity.

**11. Radioactive Noble Gas is-**

- (A) Xe (B) He  
(C) Ne (D) Rn

**Ans. (D)** [SSC Steno 2014]

**Exp:** There are 6 Noble Gases He, Ne, Ar, Kr, Xe, Rn out of these only Radon is radioactive Nobel gas.

**12. There is no change in radioactive element (Mass or charge) during -**

- (A) Gamma emission (B) Oxidation  
(C) Alpha emission (D) Beta emission

**Ans. (A)** [SSC MTS 2013]

**Exp:** During Gamma emission, no change takes place in radioactive element (mass or charge) Gamma rays are emitted due to secondary effects. After the emission of an alpha particle or beta particle, the nucleus is left behind in excited state. The excess of energy is released in the form of Gamma rays. Thus Gamma rays arise from energy rearrangements in the nucleus.

**13. Which of the following is a radioactive element?**

- (A) Cobalt (B) Uranium  
(C) Argon (D) Chromium

**Ans. (B)** [SSC CGL 2016]

**Exp:** Elements having atomic no. greater than 82 are radioactive in nature. In the given options, Atomic Number of Uranium is 92 so, it is a radioactive element.

**14. Which one of the following is radioactive?**

- (A) Cesium (B) Platinum  
(C) Strontium (D) Thorium

**Ans. (D)** [SSC Tax Asst. 2002]

**Exp:** Elements having Atomic no greater than 82 are radioactive in Nature. Atomic number of thorium is 90, so it is radioactive.

**15. Which one of the following is not a radio-active element?**

- (A) Uranium (B) Thorium  
(C) Radium (D) Cadmium

[SSC Selection Officer (Audit) 2008]

**Ans. (D)**

**Exp:** Elements having Atomic no greater than 82 are radioactive in Nature. Atomic no. of Cadmium is 48, so it is not radioactive.

**16. Radioactive samples are stored in lead boxes. Lead is used because it is:**

- (A) Heavy (B) Strong  
(C) Good absorber (D) Bad conductor

**Ans. (C)** [SSC CHSL 2009]

**Exp:** Lead is good absorber of radioactive radiations so radioactive samples are stored in lead boxes.

**17. The nuclear forces are -**

- (A) Charge independent (B) Spin independent  
(C) Charge symmetric (D) Long range.

**Ans. (A)** [SSC MTS 2011]

**Exp:** It is seen from experiment that the attractive force between two neutrons (n-n) is nearly equal to that between two protons (p-p) or between a proton and a neutron (p-n). Thus the nuclear force does not depend on the charge of the particle.

**18. The lightest radioactive element is**

- (A) Deuterium (B) Polonium  
(C) Tritium (D) Uranium

**Ans. (C)** [SSC CHSL 2016]

**Exp:** The lightest radioactive element is tritium. It is radioactive isotope of hydrogen.

**19. An element that does not occur in nature but can be produced artificially is**

- (A) Thorium (B) Radium  
(C) Plutonium (D) Uranium

**Ans. (C)** [SSC CHSL 2016]

**Exp:** Plutonium element does not occur in nature but can be produced artificially.

**20. Which of the following is a radioactive element?**

- (A) Cobalt (B) Uranium  
(C) Argon (D) Chromium

**Ans. (B)** [SSC CHSL 2016]

**Exp:** Elements having atomic no. greater than 82 are radioactive in nature. Atomic number of Uranium is 92, so it is radioactive element.

**21. Radioactive elements emit:**

- (A) Radiowaves (B) Infrared waves  
(C) Ultraviolet waves (D)  $\alpha$ ,  $\beta$  and  $\gamma$  radiations

**Ans. (D)** [SSC CHSL 2016]

**Exp:** Radioactive elements emit  $\alpha$ ,  $\beta$  and  $\gamma$  radiations. Emission of  $\gamma$  radiation takes place after emission of  $\alpha$  and  $\beta$  radiations.

**22. Which of the following caused radioactive pollution along the coast of Kerala?**

- (A) Plutonium (B) Zinc  
(C) Thorium (D) Radium

**Ans. (C)** [SSC CHSL 2016]

**Exp:** Monazite sand is an ore of thorium it is found near coastal area of Kerala. So thorium is responsible for radioactive pollution near Kerala coast.

**23. Which of the following elements is not radioactive?**

- (A) Radium (B) Plutonium  
(C) Zirconium (D) Uranium

**Ans. (C)** [SSC CAPF's SI & CISF ASI 2013]

**Exp:** Zirconium (Z = 40) is not radioactive element.

**24. Which of the following elements does not exhibit natural radioactivity?**

- (A) Uranium (B) Thorium  
(C) Aluminium (D) Polonium

**Ans. (C)** [SSC LDC 2014]

**Exp:** Aluminium having atomic number 13, does not exhibit natural radioactivity.

**25. The instability of a nucleus is due to :**

- (A) Higher electron-to-proton ratio  
(B) High neutron-to-proton ratio  
(C) Low electron-to-proton ratio  
(D) Low neutron-to-electron ratio.

**Ans. (B)**

**Exp:** When n/p ratio of nuclei is high, the nuclei do not lie in the stability belt and hence becomes unstable. Being unstable such nuclei undergo spontaneous radioactive disintegration.

**26. Which of the following nuclei is unstable ?**

- (A)  ${}^5_3\text{B}^{10}$  (B)  ${}^4_2\text{Be}^{10}$   
(C)  ${}^7_7\text{N}^{14}$  (D)  ${}^8_8\text{O}^{16}$

**Ans. (B)**

**Exp:** The nuclei having the same number of neutrons and protons are stable while the nuclei having different number of neutrons and protons are unstable. The number of neutrons (n) and protons (p) in the given nuclei are :

- (A)  ${}^5_3\text{B}^{10} \rightarrow p = 5, n = 10 - 5 = 5,$   
(B)  ${}^4_2\text{Be}^{10} \rightarrow p = 4, n = 10 - 4 = 6,$   
(C)  ${}^7_7\text{N}^{14} \rightarrow p = 7, n = 14 - 7 = 7$   
(D)  ${}^8_8\text{O}^{16} \rightarrow p = 8, n = 16 - 8 = 8.$

**27. A radioisotope will emit :**

- (A)  $\alpha$ -and  $\beta$ -particles simultaneously.  
(B)  $\beta$ -and  $\gamma$ -rays simultaneously.  
(C)  $\gamma$ -and  $\alpha$ -rays simultaneously  
(D)  $\alpha$ -or  $\beta$ -rays and then  $\gamma$ -rays.

**Ans. (D)**

**Exp:** A radioisotope first emits  $\alpha$  or  $\beta$  particle and becomes unstable. Then it emits  $\gamma$ -rays

**28. Unstable substances exhibit higher radioactivity due to :**

- (A) Low p/n ratio (B) High p/n ratio  
(C) p/n = 1 (D) None of these

**Ans. (A)**

**Exp:** The nuclei having high n/p ratio or low p/n ratio are unstable so they are highly radioactive.

**29. Which among the following is false about alpha particles ?**

- (A) They have high ionizing power  
(B) They have high penetrating power

(C) They have high kinetic energy

(D) They are positively charged helium nuclei

**Ans. (B)** [SSC CHSL 2016]

**Exp:** Alpha particles have small penetrating power due to relatively larger size. They are stopped by a piece of aluminium foil of 0.1 nm thickness.

**30. Which type of reaction produces the most harmful radiation?**

- (A) Fusion (B) Fission  
(C) Chemical reaction (D) Photo Chemical

**Ans. (B)** [SSC CGL 2011]

**Exp:** Nuclear Fission type nuclear reactions produce the most harmful radiations. Products of Nuclear fission are usually unstable and radioactive in nature while products of fusion are usually stable and non-radioactive in nature.

**31. The element which is commonly used in nuclear reactor for producing electricity in nuclear fission is**

- (A) Radium (B) Plutonium  
(C) Uranium (D) Deuterium

**Ans. (C)** [SSC S. Officer (Audit) 2001]

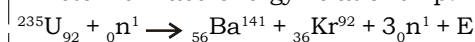
**Exp:** Uranium - 235 is commonly used in nuclear reactors for producing electricity in nuclear fission. Uranium is a fissile material.

**32. High amount of energy is released in the explosion of atomic bomb is due to-**

- (A) Conversion of Mass into energy  
(B) Conversion of Chemical Energy into thermal energy.  
(C) Conversion of Mechanical energy into nuclear energy  
(D) Conversion of neutrons into Protons

**Ans. (A)** [SSC MTS 2013]

**Exp:** The release of energy takes place because in this reaction some mass is lost, since mass of the reactants is more than the mass of the products. The mass lost is converted into energy which is released in the reaction. The energy released is calculated with the help of Einstein's mass energy relationship:-  $E = mc^2$

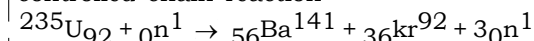


**33. Nuclear Power Reactor acts on the Principle of-**

- (A) Fission (B) Fusion  
(C) Thermal Heating  
(D) Combined Effect of all three given above

**Ans. (A)** [SSC Tax Asst. 2008]

**Exp:** Nuclear power reactor acts on the principle of nuclear fission. In nuclear reactor energy is produced by the controlled chain reaction



**34. Name the particle that is most essential to continue the chain reaction during the fission of Uranium-**

- (A) Electron (B) Proton  
(C) Neutron (D) Positron

**Ans. (C)** [SSC Matric Level 2002, 2011]

**Exp:** Neutron particle is the most essential to continue the chain reaction during the fission of Uranium. After disintegration, three neutrons are produced among these two are absorbed while remaining third neutron initiates chain reaction.

**35. Who Invented the nuclear reactor?**

- (A) Enrico Fermi (B) Adolf Gaston Eugen Fick  
(C) Sandford Fleming (D) Benoit Fourneyron

**Ans. (A)** [SSC CHSL 2016]

**Exp:** Enrico Fermi was an Italian physicist who invented nuclear reactor. Nuclear reactor is also known as an **Atomic Pile** or **Atomic Reactor**.

**36. The two elements which are used to absorb the neutrons in nuclear fission during chain reaction -**

- (A) Boron and Cadmium  
(B) Boron and Plutonium  
(C) Cadmium and Uranium  
(D) Uranium and Boron

**Ans. (A)** [SSC CGL 2011, SSC CPO 2010]  
**or**

**Control rods used in the nuclear reactor are made of :**

- (A) Fe (B) Graphite  
(C) Cd (D) Be

**Ans. (C)**

**Exp:** The function of control rods used in the nuclear reactor is to control the number of neutrons. This is achieved by using the rods of cadmium or boron as control rods which absorb the neutrons and thus control their number.

**37. Graphite is used as a..... in nuclear reactors.**

- (A) Fuel (B) Lubricant  
(C) Moderator (D) Electric Insulator

**Ans. (C)** [SSC CGL 2008]

**Exp:** Moderator slowdown the speed of fast moving neutrons. The most commonly used moderators are Ordinary water and Graphite. The most efficient moderator is Helium. The next most efficient one is heavy water ( $D_2O$ ) but this is so expensive. So it is used only in research reactors.

**38. Which one of the following used as a moderator in nuclear reactor?**

- (A) Uranium (B) Radium  
(C) Thorium (D) Graphite

**Ans. (D)** [SSC CHSL 2012]

**Exp:** Moderator slowdown the speed of fast moving neutrons. The most commonly used moderators are Ordinary water and Graphite. The most efficient moderator is Helium. The next most efficient one is heavy water ( $D_2O$ ) but this is so expensive. So it is used only in research reactors.

**39. Heavy water used as a coolant in nuclear reactor. Heavy Water is:**

- (A) Water rich in Minerals  
(B) Ozonised water  
(C) Water containing Minerals of Heavy metals  
(D) Water containing heavy Isotopes of Hydrogen atom

**Ans. (D)** [SSC CHSL Exam, 2014]

**Exp:** Heavy water ( $D_2O$ ) contains heavy isotope of hydrogen atom (Deuterium). Liquid alloy of sodium and potassium is also used as coolant: It takes away the heat to the exchanger.

**40. In nuclear reactor, Neutrons are slowdown by the-**

- (A) Fissionable Product (B) Moderator  
(C) Controlling rod (D) Coolant system

**Ans. (B)** [SSC CGL 2013]

**Exp:** In nuclear reactor neutrons are slowdown by the moderator. The most commonly used moderators are Ordinary water and Graphite.

**41. Alpha particles are .....**

- (A) Twice the mass of beta particles  
(B) Negatively charged  
(C) Just like helium nuclei  
(D) Lower in ionizing power as compared to gamma rays

**Ans. (C)** [SSC CHSL 2016]

**Exp:** Alpha particles are formed after the removal of 2<sup>+</sup> electrons from helium atom. So alpha particles are just like helium nuclei.

**42. The radiation that can penetrate deepest in our body**

- (A) UV-radiation (B) Alpha-particles  
(C)  $\beta$ -particles (D) Gamma-particles

**Ans. (D)** [SSC CGL 20015]

**Exp:** Due to high velocity and non material character gamma rays are more penetrating than alpha, beta and X-rays.

**43. The isotope of Uranium used in atomic reactors is**

- (A)  $U^{235}$  (B)  $U^{236}$   
(C)  $U^{237}$  (D)  $U^{232}$

**Ans. (A)** [SSC Section officer (Audit) 2008]

**Exp:** Uranium 235 is used as fuel in atomic reactor.

**44. Which of the following can be used to absorb neutrons to control the chain reaction during nuclear fission?**

- (A) Boron (B) Heavy water  
(C) Uranium (D) Plutonium

**Ans. (A)** [SSC CGL 2011]

**Exp:** Boron or Cadmium rod is used to absorb neutrons to control the chain reaction during nuclear fission. When these rods completely push into reactor this position is known as shutdown of nuclear reactor.

**45. Which of the following is used as a moderator in nuclear reactors?**

- (A) Thorium (B) Graphite



(C) Cesium (D) Radium

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Graphite is used as a neutron moderator in nuclear reactor. Heavy water is the best neutron moderator.

**46. Which of the following Radiations, is not emitted during radioactivity?**

- (A)  $\alpha$  rays (B)  $\beta$  rays  
(C)  $\gamma$  rays (D) Cathode rays

**Ans. (D)** (SSC CHSL 2016)

**Exp:** Cathode rays are not emitted during radioactivity. A radioisotope first emits  $\alpha$  or  $\beta$  particle and becomes unstable. Then it emits  $\gamma$ -rays

**47. Which of the following has the minimum penetrating power?**

- (A)  $\alpha$  - ray (B)  $\beta$  - ray  
(C)  $\gamma$  - ray (D)  $\delta$  - ray

**Ans. (A)** [SSC CAPFs SI, CISF ASI & Delhi 2005]

**Exp:**  $\alpha$  - particles, being more massive have minimum penetrating power.

**48. U-235 belongs to which member of series?**

- (A) Thorium series (B) Actinium series  
(C) Uranium series (D) Neptunium series

**Ans. (B)** [SSC CPO 2016]

**Exp:** Uranium (U-235) belongs to actinium series. Actinium is also known as  $(4n + 3)$  series.

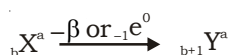
- $4n$  for Thorium series  
 $4n + 1$  for Neptunium series  
 $4n + 2$  for Uranium series  
 $4n + 3$  for Actinium series

**49. Loss of a  $\beta$  - particle is equivalent to**

- (A) Increase of one proton only  
(B) Decrease of one neutron only  
(C) Both (A) and (B) (D) None of these

**Ans. (C)**

**Exp:** If an isotope  ${}_bX^a$  loses a particle, it is converted into  ${}_{b+1}Y^a$ .



- No. of protons in X = b  
No. of protons in Y = b + 1  
No. of neutron in X = (a - b)  
No. of neutrons in Y = a - (b + 1) = a - b - 1

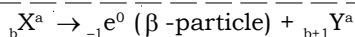
Obviously Y has one more proton (increase of proton) and one less neutron (decrease of one neutron) than X.

**50. Isobar of a nuclide is formed by :**

- (A) one  $\alpha$ -emission (B) one  $\beta$ -emission  
(C)  $(\alpha + \beta)$  emission (D)  $(2\alpha + 2\beta)$  emission.

**Ans. (B)**

**Exp:** Isobars are nuclides which have same mass numbers(A) but different atomic numbers (Z). During  $\beta$  - decay, no changes in mass number takes place.

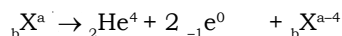


**51. An element X loses  $\alpha$  and two  $\beta$  particles in three successive stages. The resulting element will be:**

- (A) an Isobar of X (B) an Isotope of X  
(C) X itself (D) an Isotone of X

**Ans. (B)**

**Exp:** When X loses one  $({}_2\text{He}^4)$  and two  $({}_1e^0)$  particles, the mass number of the daughter element is 4 units less than that of X and the atomic number is the same as that of X.



Thus the daughter element is the isotope of X.

**52. Which of the following element belongs to 4n series ?**

- (A) Pb-206 (B) Pb-207  
(C) Pb-208 (D) Bi-209

**Ans. (C)**

**Exp:** 4n series is that in which the mass number of all the members of the series are exactly divisible by 4. Since it is only 208 which is completely divisible by 4, Pb-208 belongs to 4n series.

**53. Nuclear reactors are based on :**

- (A) Nuclear fission (B) Natural radioactivity  
(C) Nuclear fusion  
(D) Spontaneous chemical reaction

**Ans. (A)**

**Exp:** In the nuclear reactor energy is produced by the fission of  $\text{U}^{235}$ .

**54. Which of the following is a thermonuclear reaction ?**

- (A)  ${}_{92}\text{U}^{238} + {}_0n^1 \rightarrow {}_{93}\text{Np}^{239} + {}_{-1}e^0$   
(B)  $4 {}_1\text{H}^1 \rightarrow {}_2\text{He}^4 + 2 {}_{+1}e^0$   
(C)  ${}_{92}\text{U}^{238} + {}_6\text{C}^{12} \rightarrow {}_{98}\text{Cf}^{246} + 4 {}_0n^1$   
(D)  ${}_{13}\text{Al}^{27} + {}_2\text{He}^4 \rightarrow {}_{15}\text{P}^{30} + {}_0n^1$

**Ans. (B)**

**Exp:** Since in nuclear reactions (B), lighter nuclei of  ${}_1\text{H}^1$  fuse together to form heavier helium nucleus ( ${}_2\text{He}^4$ ), it is a nuclear fusion reaction. Since nuclear reactions can take place only at extremely high temperatures only ( $> 10^6 \text{ K}$ ), these reactions are known as thermo-nuclear reactions.

**55. In a nuclear reactor heavy water is to :**

- (A) Transfer the heat from the reactor  
(B) Provide high speed neutrons for fission reaction  
(C) Reduce the speed of fast moving neutrons  
(D) Increase the speed of neutrons.

**Ans. (C)**

**Exp:** Heavy water is used as moderator. The function of a moderator is to reduce the speed of fast moving neutrons and transfers the heat from the reactor.

**56. Which one of the following takes place during a nuclear fusion?**

- (A) A heavy nucleus bombarded by neutrons breaks up
- (B) A heavy nucleus breaks up spontaneously
- (C) Two light nuclei combine to form a heavy nucleus
- (D) A light nucleus breaks up spontaneously

**Ans. (C)** [SSC CGL 2016]

**Exp:** Nuclear fusion : A nuclear reaction in which two lighter nuclei are fused together to form a heavier nuclei is called as Nuclear Fusion. Fusion reactions are also called as thermonuclear reactions.

**Note:** Hydrogen bomb and energy of stars (Sun) are due to on Nuclear Fusion.

**57. The energy of the Sun is mainly due to**

- (A) Nuclear fission
- (B) Radioactivity
- (C) Heat
- (D) Nuclear fusion

**Ans. (D)** [SSC Matric Level 2002]

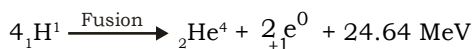
**Exp:** The energy of the Sun and stars is due to fusion reaction.

**58. The source of enormous energy of Sun is :**

- (A) Fission of uranium
- (B) Fusion of hydrogen nuclei to form helium nucleus.
- (C) Fusion of deuterium and tritium
- (D) Fission of tritium to form helium.

**Ans. (B)**

**Exp:** In the Sun, four hydrogen atoms (protons) get fused to give one  ${}_2\text{He}^4$  nucleus with the emission of two positrons ( ${}_1e^0$ ). A large amount of energy is also produced.

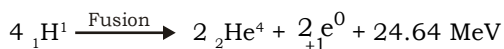


**59. The radiant energy of Sun is due to :**

- (A) Disintegration
- (B) Nuclear fission
- (C) Nuclear fusion
- (D) Combustion.

**Ans. (C)**

**Exp:** The radiant energy of the sun is due to the fusion of four  ${}_1\text{H}^1$  nuclei to form one  ${}_2\text{He}^4$  nucleus with the emission of two positrons ( ${}_1e^0$ ). In this reaction, a large amount of energy is also produced.

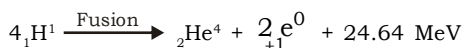


**60. Nuclear fusion is the source of energy in :**

- (A) Atomic bomb
- (B) Hydrogen bomb
- (C) The Sun
- (D) The Moon.

**Ans. (C)**

**Exp:** In the Sun, four hydrogen atoms (protons) get fused to give one  ${}_2\text{He}^4$  nucleus with the emission of two positrons ( ${}_1e^0$ ). A large amount of energy is also produced.



**61. The First Time atomic bomb was released at-**

- (A) Nagasaki
- (B) Hiroshima
- (C) Tokyo
- (D) Hongkong

**Ans. (B)** [SSC MTS 2011]

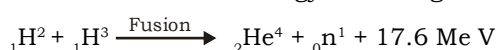
**Exp:** First time atomic bomb was released by America at Hiroshima Japan on 6 August named Little boy ( ${}^{235}\text{U}$ ) and on 9th August 1945 at Nagasaki named Fatman ( ${}^{239}\text{Pu}$ )

**62. Hydrogen Bomb is based upon the Principle of-**

- (A) Controlled Nuclear Fission
- (B) Uncontrolled Nuclear Fission
- (C) Controlled Nuclear Fusion
- (D) Uncontrolled Nuclear Fusion

**Ans. (D)** [SSC CGL 2011]

**Exp:** Energy produced in hydrogen bomb is due to the nuclear fusion reactions between deuterium ( ${}_1\text{H}^2$ ) and tritium ( ${}_1\text{H}^3$ ) nuclei. This fusion gives helium nucleus ( ${}_2\text{He}^4$ ) and one neutron ( ${}_0n^1$ ). In this reactions, an uncontrolled amount of energy is also generated.



**63. How many countries explode the atom bomb before India?**

- (A) 5
- (B) 4
- (C) 6
- (D) 3

**Ans. (A)** [SSC CGL 2005]

**Exp:** USA (1945), USSR (1949), UK (1952), France (1960), China (1964) exploded atom bomb before India (1974).

**64. Who developed Hydrogen Bomb?**

- (A) Wernher Von Braun
- (B) J. Robert Oppenheimer
- (C) Edward Teller
- (D) Samuel Cohen

**Ans. (C)** [SSC 2016]

**Exp:** Hydrogen Bomb was discovered by Edward Teller. Hydrogen bomb is based on nuclear fusion. It is 1000 times more powerful than atom bomb.

**65. Who developed atom bomb?**

- (A) Warner Wan Bron
- (B) J. Robert Openheimer
- (C) Edward Taylor
- (D) Samuel Koehen

**Ans. (B)** [SSC CGL 2002]

**Exp:** Atom bomb was developed by J. Robert Openheimer. Manhattan Project was responsible for the creation of the first functioning atomic bomb.

**66. Atomic explosion is triggered by**

- (A) Thermo nuclear reaction
- (B) Chemical reaction
- (C) Controlled chain reaction
- (D) Uncontrolled chain reaction

**Ans. (D)** [SSC CGL 2011]

**Exp:** Atomic explosion is triggered by uncontrolled chain reaction (nuclear fission).

**67. What were the names of Atom Bombs dropped on Japan?**

- (A) Little Boy & Fat Man
- (B) Little Man & Fat Boy
- (C) Little Girl & Fat Woman
- (D) Little Woman & Fat Girl

**Ans. (A)** [SSC CHSL 2016]

**Exp:** Little boy & Fatman atom bombs were dropped on Japan by America during second world war.

**68. Nuclear bombs were dropped on Hiroshima and Nagasaki during the \_\_\_\_\_.**

- (A) World War I (B) Asian War I  
(C) Gulf War II (D) World War II

**Ans. (D)** [SSC CHSL 2016]

**69. The fissile material commonly used in atomic bomb is (are) :**

- (A)  ${}_{92}\text{U}^{235}$  (B)  ${}_{92}\text{U}^{238}$   
(C)  ${}_{94}\text{Pu}^{239}$  (D)  ${}_{90}\text{Th}^{232}$

**Ans. (A)**

**Exp:** The atomic bomb contains two pieces of  $\text{U}^{235}$  each of sub-critical mass. One piece is called wedge and the other is called target. The size of the fissile material,  $\text{U}^{235}$  should not be less than the critical mass.

**70. Atom bomb is based on :**

- (A) Nuclear fusion (B) Nuclear fission  
(C) Induced radioactivity (D) Disintegration

**Ans. (B)**

**Exp:** The large amount of energy is produced by the fission of large piece of  ${}_{92}\text{U}^{235}$  by the neutrons in Atom Bomb.

**71. The radio-active element used in heart pacemakers is**

- (A) Uranium (B) Deuterium  
(C) Plutonium (D) Radium

**Ans. (C)** [SSC Section Officer (Audit) 2001]

**Exp:** Plutonium is formed in nuclear power reactors from uranium. Early heart pacemakers used  $\text{Pu-238}$  as the power source.

**72. Which of the following Isotope is used in the production of Nuclear Energy?**

- (A) U-239 (B) U-235  
(C) U-238 (D) U-236

**Ans. (B)** [SSC CGL 2010]

**Exp:** U-235 is used in the production of Nuclear energy. In Nuclear reactor, energy is produced by the controlled chain reaction.

**73. Tritium is an Isotope of –**

- (A) Oxygen (B) Hydrogen  
(C) Phosphorous (D) Nitrogen

**Ans. (B)** [SSC CHSL Exam, 2013]

**Exp:** Tritium ( ${}^3\text{H}$ ) is an isotope of hydrogen. It is the lightest radioactive element.

**74. Find the odd one out of following?**

- (A) Trombay (B) Tarapur  
(C) Kalpakkam (D) Narora

**Ans. (A)** [SSC Steno Exam, 2014]

**Exp:** Trombay is odd one out of given options because there is no nuclear reactor but rest of places has Nuclear reactor.

**Note:-** Rawatbhata, Kakrapar, Kaiga & Kudan-Kulum also have nuclear reactors.

**75. In the treatment of skin disease the radioactive isotope used is–**

- (A) Lead (B) Cobalt  
(C) Phosphorous (D) Iodine

**Ans. (C)** [SSC Steno 2012]

**Exp:** Radioactive Phosphorous –  ${}^{32}\text{P}$  is used in the treatment of skin disease.

**76. Curie point is the temperature at which–**

- (A) Matter becomes radioactive  
(B) Metal loses Magnetic Properties  
(C) Metal loses conductivity  
(D) Transmutation of Metal occurs

**Ans. (B)** [SSC CGL 2010]

**Exp:** On heating metal at temperature greater than Curie temperature metal loses its magnetic properties –

Metal	–	Curie temperature ( $^{\circ}\text{C}$ )
Fe (Iron)	–	770
Co (Cobalt)	–	1130
Ni (Nickel)	–	358

**77. What is the name of the system, which uses radioactivity to decide the period of materials of pre-historic period?**

- (A) Radium dating (B) Uranium dating  
(C) Carbon dating (D) Deuterium dating

**Ans. (C)** [SSC Section Officer 2001]

**Exp:** Radio carbon dating – By using the half life period of  ${}^{14}\text{C}$ , it is possible to determine the age of various objects. In living material the ratio of  ${}^{14}\text{C}$  to  ${}^{12}\text{C}$  remains constant. When the tissue in an animal or plant dies,  ${}^{14}\text{C}$  decreases because the intake and utilization of  ${}^{14}\text{C}$  do not occur. Therefore in the old tissue the ratio of  ${}^{14}\text{C}$  to  ${}^{12}\text{C}$  would decrease, depending on the age of this tissue.

**78. The proper rays for radio carbon dating are :**

- (A) UV rays (B) IR rays  
(C) Cosmic rays (D) X-rays.

**Ans. (C)**

**Exp:** Cosmic rays have neutrons (present in the upper atmosphere) convert  ${}^7_3\text{N}^{14}$  to radioactive  ${}^6_6\text{C}^{14}$ .

${}^7_3\text{N}^{14} + {}^1_0\text{n}^1$  (present in the cosmic rays)  $\rightarrow {}^6_6\text{C}^{14}$  (radioactive carbon) +  ${}^1_1\text{H}^1$

**79. For which purpose is Radiocarbon dating technique is used?**

- (A) To estimate soil contamination  
(B) To estimate the amount of water in fossils  
(C) To estimate the age of fossils  
(D) To estimate the quality of soil

**Ans. (C)** [SSC CHSL 2016]

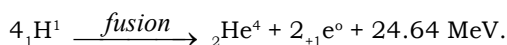
**Exp:** Radio carbon dating – By using the half life period of  ${}^{14}\text{C}$ , it is possible to determine the age of various objects. In living material the ratio of  ${}^{14}\text{C}$  to  ${}^{12}\text{C}$  remains constant. When the tissue in an animal or plant dies,  ${}^{14}\text{C}$  decreases because the intake and utilization of  ${}^{14}\text{C}$  do not occur. Therefore in the old tissue the ratio of  ${}^{14}\text{C}$  to  ${}^{12}\text{C}$  would decrease, depending on the age of this tissue.

80. Which of the following reaction is the main cause of energy radiated from Sun?

- (A) Nuclear fission (B) Nuclear fusion  
(C) Chemical reaction (D) Diffusion reaction

Ans. (B) (SSC CPO 2017)

**Exp:** The main cause of energy radiated from Sun is Nuclear fusion. In the Sun, four hydrogen atoms (protons) get fused to give one  ${}^4_2\text{He}$  nucleus with the emission of two positrons ( ${}^0_{+1}\text{e}$ ). A large amount of energy is produced.



81. Which of the following is used as control rods in Atomic reactor?

- (A) Sodium (B) Uranium  
(C) Graphite (D) Boron

Ans. (D) (SSC CPO 2017)

**Exp:** Boron or Cadmium rod is used to absorb neutrons to control the chain reaction during nuclear fission.

82. Which of the following is used as coolant in Atomic reactor?

- (A) Water (B) Uranium  
(C) Graphite (D) Boron

Ans. (A) (SSC CPO 2017)

**Exp:** Coolant is a device in nuclear reactor which is used to remove heat generated from it & transfers to electrical generators (for electricity generation) & environment. Water is used as an coolant in Nuclear Reactor.

83. Which of the following is used as moderator in atomic reactor?

- (A) Sodium (B) Uranium  
(C) Graphite (D) Boron

Ans. (C) (SSC CPO 2017)

**Exp:** Moderators slow down the speed of fast moving neutrons. The most commonly used moderators are Graphite & Ordinary water.

84. Which of the following is a characteristic of an exothermic reaction?

- (A) Release of heat (B) Absorption of heat  
(C) Doesn't involve any change in temperature  
(D) None of the option is correct

Ans. (A) (SSC CGL 2017)

**Exp:** Exothermic reactions are those in which heat is released. The energy of reactants is more than the energy of products.

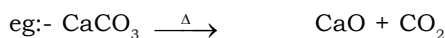
**eg:-** Nuclear reactions are exothermic reactions.

85. What is an endothermic reaction?

- (A) Reaction in which heat is released.  
(B) Reaction in which heat is absorbed.  
(C) Reaction in which neither heat is released nor absorbed.  
(D) None of these.

Ans. (B) (SSC CGL 2017)

**Exp:** The reactions in which heat is absorbed are called as endothermic reactions.



For decomposition of  $\text{CaCO}_3$ , energy is given in the form of heat & energy is absorbed.



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# Redox Reactions

## 1. What happens in an Oxidation reaction?

- (A) Protons are lost (B) Electrons are lost  
(C) Neutrons are lost (D) Electrons are gained

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Removal of electrons occur in Oxidation process.

**eg:-**  $\text{Mg (s)} \rightarrow \text{Mg}^{2+} + 2\text{e}^-$

## 2. Which among the following is not a characteristic of Oxidation reaction ?

- (A) It involves addition of hydrogen  
(B) It involves addition of oxygen  
(C) It involves loss of electrons  
(D) It involves addition of electronegative element

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Addition of  $\text{H}_2$  is a Reduction process. While Oxidation is defined as:-

(a) Addition of Oxygen or electronegative element:-

**eg:-**  $2\text{Mg(s)} + \text{O}_2(\text{g}) \rightarrow 2\text{MgO(s)}$

(0) (+2) Oxidation Number

(b) Removal of Hydrogen:-

**eg:-**  $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow 2\text{HCl} + \text{S}$

(-2) (0) Oxidation Number

(c) Loss of Electrons :-

**eg:-**  $\text{Fe(s)} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$

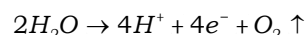
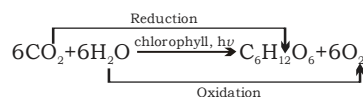
(0) (+2) Oxidation Number

## 3. The liberation of oxygen during photosynthesis is due to \_\_\_\_\_.

- (A) Hydrolysis of carbohydrates  
(B) Photolysis of water (C) Reduction of  $\text{CO}_2$   
(D) Breakdown of chlorophyll

**Ans. (B)** (SSC CGL 2016)

**Exp:** The liberation of oxygen during photosynthesis is due to photolysis of water. Photolysis of water is the process of breakdown of water molecule into protons & Oxygen under the influence of light during photosynthesis reaction.



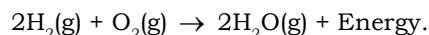
In this reaction  $\text{O}_2$  is obtained from water.

## 4. When Hydrogen combusts in air, then formed-

- (A) Ammonia (B) Water  
(C) Methane (D) Carbonic acid.

**Ans. (B)** [SSC Matric Level 1999, SSC Steno 2010]

**Exp:** When Hydrogen burns in air, then it forms water and energy is released. This is used in Hydrogen fuel.



## 5. Browning of paper in old books is caused by

- (A) Frequent use (B) Lack of aeration  
(C) Collection of dust (D) Oxidation of cellulose

**Ans. (D)** [SSC MTS Exam, - 1999]

**Exp:** Browning of paper in old books is caused by oxidation of cellulose. This phenomenon is called as foxing (stains of Reddish brown colour).

## 6. Oxygen has (+) oxidation number only in

- (A)  $\text{OF}_2$  (B)  $\text{Cl}_2\text{O}$   
(C)  $\text{H}_2\text{O}$  (D)  $\text{N}_2\text{O}$

**Ans. (A)** [SSC Steno. 2011]

**Exp:** Oxygen has (+)ve oxidation no. only in  $\text{OF}_2$ .

Let the oxidation no. of O be x.

then

$$x + 2(-1) = 0$$

$$x = +2$$

## 7. The oxidation number of nickel in $\text{K}_4[\text{Ni}(\text{CN})_4]$ is

- (A) 0 (B) +4  
(C) -4 (D) +8

[SSC MTS 2013]

**Ans. (A)**

**Exp:** The oxidation no. of Ni in  $\text{K}_4[\text{Ni}(\text{CN})_4]$  is 0

Let the oxidation no. of Ni be x.

then

$$4(+1) + x + 4(-1) = 0$$

$$x = 0$$

## 8. The oxidation number of sulphur in $\text{S}_8$ , $\text{S}_2\text{F}_2$ and $\text{H}_2\text{S}$ respectively are

- (A) 0, +1 and -2 (B) +2, +1 and -2  
(C) 0, +1 and +2 (D) -2, +1 and -2

**Ans. (A)**

**Exp:** The oxidation no. of sulphur in  $\text{S}_8$ ,  $\text{S}_2\text{F}_2$  and  $\text{H}_2\text{S}$  respectively are 0, +1 and -2.

In homoatomic molecule ( $\text{S}_8$ ) oxidation no. of an element is zero.



Let the oxidation no. of S be x

$$2x + 2(-1) = 0$$

$$x = +1$$



Let the oxidation no. of S be x

$$2(+1) + x = 0$$

$$x = -2$$

9. Nitrogen forms a variety of compounds in all oxidation states ranging from–

- (A) – 3 to +5 (B) –3 to +3  
(C) –3 to +4 (D) –3 to +6

Ans. (A) [SSC Const. (GD) 1999]

Exp: Nitrogen shows oxidation states from –3 to +5 in various compounds.

for eg:

In  $\text{NH}_3$  oxidation state of Nitrogen is –3 while in  $\text{HNO}_3$  oxidation of Nitrogen is +5.

10. Oxidation state of Fe in  $\text{Fe}_3\text{O}_4$  is –

- (A)  $\frac{3}{2}$  (B)  $\frac{4}{5}$   
(C)  $\frac{5}{4}$  (D)  $\frac{8}{3}$

Ans. (D)

Exp:  $\text{Fe}_3\text{O}_4$

Let the oxidation number of Fe be x  
 $3x + 4(-2) = 0$

$$x = +\frac{8}{3}$$

11. The oxidation state of Cr in  $\text{K}_2\text{Cr}_2\text{O}_7$  is –

- (A) +7 (B) +6 (C) +3 (D) +2

Ans. (B)

Exp:  $\text{K}_2\text{Cr}_2\text{O}_7$

Let the oxidation number of Cr be x  
 $2(+1) + 2x + 7(-2) = 0$

$$x = +6$$

12. In  $\text{H}_2\text{O}_2$ , oxidation state of oxygen is

- (A) –2 (B) –1 (C) 0 (D) –4

Ans. (B) (SSC CHSL 2016)

Exp: In  $\text{H}_2\text{O}_2$ , oxidation state of oxygen is –1.

Let the oxidation number of O be x

$$2(+1) + 2x = 0$$

$$x = -1$$

13. In which of the following compounds transition metal has zero oxidation state?

- (A)  $\text{CrO}_5$  (B)  $\text{Fe}_3\text{O}_4$   
(C)  $\text{FeSO}_4$  (D)  $\text{Fe}(\text{CO})_5$

Ans. (D) (SSC CHSL 2016)

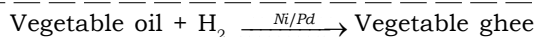
Exp: Oxidation of CO is zero. So oxidation no. of Fe in  $\text{Fe}(\text{CO})_5$  is zero.

14. Cooking oil is converted into vegetable ghee by the process of–

- (A) Hydrogenation (B) Oxidation  
(C) Condensation (D) Crystallization

Ans. (A) [SSC CPO 2011]

Exp: Vegetable oils are converted into vegetable ghee when vegetable oils are reacted with Hydrogen gas in the presence of catalyst Ni/Pd. This process is known as Hydrogenation or Reduction of vegetable oil. During this process trans fat is formed.



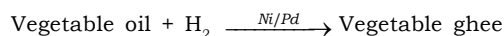
or

In the Industrial production of vegetable ghee, the process involved is –

- (A) Dissociation (B) Reduction  
(C) Oxidation (D) Ionization

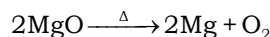
Ans. (B)

Exp: Vegetable oils are converted into vegetable ghee when vegetable oils are reacted with Hydrogen gas in the presence of catalyst Ni/Pd. This process is known as Hydrogenation or Reduction of vegetable oil. During this process trans fat is formed.



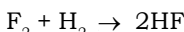
Reduction is defined as:-

1. Removal of Oxygen or electro-negative element



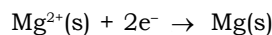
(+2) (0) Oxidation Number

2. Addition of Hydrogen:-



(0) (–1) Oxidation Number

3. Gain of electrons.



(+2) (0) Oxidation Number

15. Which of the following causes Rusting of iron?

1. Oxidation  
2. Reduction  
3. Chemical reaction with oxygen  
4. Chemical reaction with  $\text{CO}_2$   
(A) 1 and 2 (B) 2 and 3  
(C) 3 and 4 (D) 1 and 3

Ans. (D) [SSC CHSL 2011]

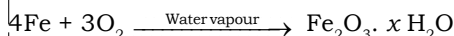
Exp: In the presence of Moisture and oxygen, oxidation occurs due to which a Reddish-Brown Layer is deposited on iron. This Reddish brown Layer on iron is called **Rust**. Its chemical formula is  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ . Deposition of rust on metals is called **Rusting**.

16. Rusting of Iron is –

- (A) Due to oxidation (B) Due to carbonation  
(C) Due to epoxidation (D) Due to corrosion

Ans. (A) [SSC Tax Asst. 2007]

Exp: Rusting of iron is due to oxidation of iron. In oxidation loss of electrons or increase in oxidation no. takes place in atom.



17. The rusting of iron metal in air needs both–

- (A) Carbon dioxide and Moisture  
(B) Water and Paint (C) Oxygen and grease  
(D) Oxygen and Moisture

Ans. (D) [SSC CGL 2014]

Exp: Both  $\text{O}_2$  & Water are needed for rusting to occur.

or

**Which of the following is required for the rusting of iron?**

- (A) Oxygen and carbon dioxide  
(B) Oxygen and water  
(C) Only carbon dioxide (D) Only oxygen

**Ans. (B)** [SSC CPO 2011]

**Exp:** Rust is hydrated iron oxide ( $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ ). The presence of water and oxygen is essential for the rusting of iron. Impurities in the iron, the presence of water vapour, acids, salts and carbon dioxide hastens rusting. Pure iron does not rust in dry and carbon dioxide free air.

**18. What is Rusting of Iron?**

- (A) Physical change (B) Electric change  
(C) Photo Chemical change  
(D) None of the above

**Ans. (D)** [SSC MTS 2013]

**Exp:** Rusting of iron is a chemical change. Chemical changes are the changes in which new product is formed and properties of this new product is completely different from the base substances. The product formed by the chemical change cannot be reversed in its base matter  
**Example** Rusting of Iron, curdling of Milk, cooking of food, burning of candle etc.

**19. Iron rusts quickly in –**

- (A) Rain water (B) Distilled water  
(C) Sea water (D) River water

**Ans. (C)** [SSC CGL 2014]

**Exp:** Iron reacts with oxygen in the presence of water and air and forms rust. Water containing salt (such as sea water) cause rusting of iron faster.

**20. The rusting of iron–**

- (A) Decreases its weight (B) Increases its weight  
(C) Remains same (D) Can't say (unpredictable)

**Ans. (B)** [SSC MTS 2008]

**Exp:** Rusting of iron is a chemical process. By rusting weight of iron increases due to deposition of hydrated iron oxide layer.

**21. The coating of thin layer of zinc on steel or iron object is known as**

- (A) Hot dipping (B) Tinning  
(C) Galvanising (D) Electroplating

**Ans. (C)** [SSC MTS 1999]

**Exp:** The coating of thin layer of zinc on steel or iron object is known as galvanising. Galvanising process is used to protect iron from rust.

**22. The metal, used to galvanise iron to protect it from rusting is**

- (A) Zinc (B) Chromium  
(C) Lead (D) Antimony

**Ans. (A)** [SSC MTS 2002]

**Exp:** Zinc metal is used to galvanise iron to protect it from rusting.

**23. Which metal does not undergo corrosion due to the formation of Oxide layer?**

- (A) Copper (B) Iron  
(C) Aluminium (D) Zinc

**Ans. (C)** [SSC MTS Exam, - 2002]

**Exp:** Aluminium metal does not rust or corrode in moist conditions. Its surface is protected by layer of aluminium oxide ( $\text{Al}_2\text{O}_3$ ). This prevents metal comes into contact with air and oxygen.

**24. The metal chiefly used for galvanising iron is:**

- (A) Zinc (B) Mercury  
(C) Cadmium (D) Tin

**Ans. (A)** [SSC MTS Exam, - 2006]

**Exp:** Zinc metal is chiefly used for galvanising iron because zinc is more reactive than iron.

**25. The process of deposition of a layer of Zinc over water pipes for being protected from rusting is known as–**

- (A) Depositing a Layer of Zinc  
(B) Formation of alloy  
(C) Vulcanization (D) Galvanization

**Ans. (D)** [SSC CGL, MTS 2011, 1991, 2002, 2001]

**Exp:** The process of deposition of a layer of Zinc over iron metal is called Galvanization. Iron having layer of zinc over it known as Galvanized iron and thus iron is prevented from rusting.

**26. Which metal is used to Galvanize iron?**

- (A) Copper (B) Zinc  
(C) Tin (D) Nickel

**Ans. (B)** [SSC CGL Exam, 2014]

**Exp:** Galvanization (galvanizing) is the process of applying a protective zinc coating to steel or iron, to prevent rusting. The most common method is hot-dip galvanizing, in which metal is submerged in a bath of molten zinc.

**27. To protect the iron from getting rusted, the coat of zinc is applied on it. This process is known as–**

- (A) Galvanization (B) Reduction  
(C) Corrosion (D) Calcination

**Ans. (A)** [SSC CGL Exam, 2014]

**Exp:** Galvanization (galvanizing) is the process of applying a protective zinc coating to steel or iron, to prevent rusting. The most common method is hot-dip galvanizing, in which metal is submerged in a bath of molten zinc.

**28. Which of the following is not favourable to prevent iron from rusting?**

- (A) Annealing (B) Applying grease  
(C) Galvanization (D) Painting

**Ans. (A)** [SSC CGL Exam, 2011]

**Exp:** To prevent iron from rusting Galvanization, painting and applying Grease are beneficial but annealing is done in glass. Annealing of glass is the process of slowly cooling hot glass object after they have been formed to remove internal stresses.

**29. Potassium Permanganate is used for purifying drinking water, because \_\_\_\_\_**

- (A) It is a reducing agent (B) It is an oxidising agent  
(C) It is a sterilising agent  
(D) It dissolves the impurities of water

**Ans. (B)** (SSC CGL 2016)

**Exp:** Potassium permanganate ( $\text{KMnO}_4$ ) is a powerful oxidising agent because it liberates nascent oxygen. An oxidizing agent or oxidant, gains electrons & is reduced in a chemical reaction. Oxidant is also known as the electron Acceptor.

eg:-  $\text{KMnO}_4$ ,  $\text{K}_2\text{Cr}_2\text{O}_7$  are some examples of strong oxidizing agent.

**30. Carbon dioxide is**

- (A) A Reducing agent (B) An Oxidising agent  
(C) A Dehydrating agent (D) A Bleaching agent

**Ans. (B)** [SSC Matric Level 2008]

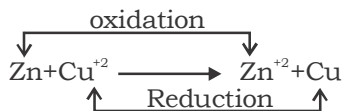
**Exp:** Carbondioxide is an oxidising agent because in Carbondioxide, Carbon has highest oxidation no. (+4). Oxidizing Agent is normally in one of its higher possible oxidation states because it will gain electrons & is reduced it self.

**31. The reactions in which oxidation and reduction occur simultaneously are called \_\_\_\_.**

- (A) Feral reactions (B) Redox reactions  
(C) Demug reactions (D) Kerol reactions

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Redox reactions are those chemical reactions in which oxidation and reduction takes place simult aneausly.

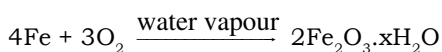


**32. Rusting is \_\_\_\_.**

- (A) Electrolysis (B) Oxidation  
(C) Redox reaction (Oxidation and Reduction)  
(D) Reduction

**Ans. (B)** (SSC CGL 2017)

**Exp:** Rusting is an oxidation process. The deposition of reddish brown layer of  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$  on iron is called Rusting. Iron in presence of water vapour (Moisture) & oxygen form rust.



**33. Which among the following metal is used for galvanization?**

- (A) Zinc (B) Copper  
(C) Iron (D) Silver

**Ans. (A)** (SSC CGL 2017)

**Exp:** Galvanisation is a process in which coating of zinc on iron metal is done to prevent iron from rusting.

**34. Process of gaining electrons is known as \_\_\_\_.**

- (A) Oxidation (B) Reduction  
(C) Radiation  
(D) Both oxidation and reduction

**Ans. (B)** (SSC CGL 2017)

**Exp:** Process of gaining electrons is reduction. Reduction is defined as :-

- (1) Addition of Hydrogen  
(2) Removal of oxygen or electronegative element  
(3) Addition of electrons.  
(4) Decrease in oxidation number.

eg :-  $\text{Cl}_2 + e^- \rightarrow 2\text{Cl}^-$

(0) \_\_\_\_\_ (-1) \_\_\_\_\_ oxidation no.

**35. Process of loosing electrons is known as \_\_\_\_.**

- (A) Oxidation (B) Reduction  
(C) Radiation  
(D) Both oxidation and reduction

**Ans. (A)** (SSC CGL 2017)

**Exp:** Process of loosing electrons or increase in oxidation state is called **Oxidation**.

eg:-  $\text{Mg} \rightarrow \text{Mg}^{2+} + 2e^-$

(0) \_\_\_\_\_ (+2) \_\_\_\_\_ (oxidation state)

**36. What is the process of rust forming on iron called?**

- (A) Rusting (B) Crystallisation  
(C) Shovel (D) Spade

**Ans. (A)** (SSC CGL 2017)

**Exp:** Rusting is the process of rust forming on iron. Rust is a reddish brown layer of  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ . Rust is formed when iron comes in contact with oxygen & moisture (water vapours).

**37. The process of deposition of a layer of zinc on iron is called \_\_\_\_.**

- (A) Galvanisation (B) Crystallisation  
(C) Rusting (D) Baking

**Ans. (A)** (SSC CGL 2017)

**Exp:** The process of deposition of a layer of zinc on Iron to prevent it from rusting is called Galvanization. It is one of the best method to prevent iron from corrosion or rusting.

**38. The process of deposition of a layer of any desired metal on another material by means of electricity is called \_\_\_\_.**

- (A) Electroplating (B) Galvanisation  
(C) Rusting (D) Crystallisation

**Ans. (A)** (SSC CGL 2017)

**Exp:** The process of deposition of a layer of any desired metal on another material by means of electricity is called as Electroplating . It is done for decorative purpose or to prevent corrosion of metals.

Eg:- copper plating , silver plating etc.

**39. Brownish film formed on iron when left in open is called?**

- (A) Dust (B) Shovel (C) Spade (D) Rust

**Ans. (D)** (SSC CGL 2017)

**Exp:** Process of deposition of reddish brown layer on iron in the presence of oxygen & moisture is called **Rusting**. The brown layer i.e.  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$  is called rust.





# Acid, Base & Salt

1. Which of the following is the strongest acid?

- (A)  $\text{CF}_3\text{COOH}$  (B)  $\text{CBr}_3\text{COOH}$   
(C)  $\text{CH}_3\text{COOH}$  (D)  $\text{CCl}_3\text{COOH}$

Ans. (A)

**Exp:**  $\text{CF}_3\text{COOH}$  is the strongest acid. Electronegative atom attracts the electron density towards itself so it decreases on O atom. To compensate electron density, O atom takes the electron from H atom by releasing  $\text{H}^+$  (Proton), i.e. called acidic nature. Strong acid is an acid which completely dissociates or ionised in aqueous solution. They have high capacity to loose proton.

2. Which of the following is the weakest acid?

- (A)  $\text{C}_6\text{H}_5\text{OH}$  (B)  $\text{CH}_3\text{COOH}$   
(C)  $\text{HCOOH}$  (D)  $\text{C}_6\text{H}_5\text{COOH}$

Ans. (A)

**Exp:** Monocarboxylic acids are stronger than phenol. In carboxylate ion, the negative charge is dispersed on two electronegative oxygen atoms while in case of phenate ion, there is only one oxygen atom to disperse the negative charge. This means that there is more dispersal of negative charge in case of carboxylate ion than phenate ion. This shows that a carboxylic acid is stronger acid than phenol. Weak acid dissociates incompletely or release some  $\text{H}^+$  in solution. Weak acid has low capacity to loose proton.

3. The element common to all acid is?

- (A) Hydrogen (B) Nitrogen  
(C) Oxygen (D) Sulphur

Ans. (A)

**Exp:** Hydrogen is most common to all acids.

4. Which acid is known as 'King of chemicals'?

- (A)  $\text{HCl}$  (B)  $\text{H}_2\text{SO}_4$   
(C)  $\text{HNO}_3$  (D)  $\text{H}_3\text{PO}_4$

Ans. (B)

**Exp:**  $\text{H}_2\text{SO}_4$  (Sulphuric acid) is known as king of chemicals.

5. The  $-\text{OH}$  group of  $-\text{COOH}$  can be replaced by Cl using

- (A)  $\text{PCl}_5$  (B)  $\text{HOCl}$  (C)  $\text{Cl}_2$  (D)  $\text{HCl}$

Ans. (A)

**Exp:** The  $-\text{OH}$  group of  $-\text{COOH}$  can be replaced by Cl using  $\text{PCl}_5$ ,  $\text{PCl}_3$  or  $\text{SOCl}_2$ . In the given options  $\text{PCl}_5$  is correct answer.

6. Which is known as Carbolic acid?

- (A) Phenol (B) Ethanol  
(C) Acetic acid (D) Oxalic acid

Ans. (A) (SSC CGL 2016)

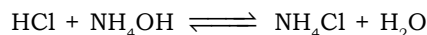
**Exp:** Phenol ( $\text{C}_6\text{H}_5\text{OH}$ ) is also known as hydroxyl benzene.

7. Ammonium chloride is acidic salt, because it is a salt of:-

- (A) Weak acid and Weak base  
(B) Weak acid and Strong base  
(C) Strong acid and Weak base  
(D) Strong acid and Strong base

Ans. (C)

**Exp:** Ammonium chloride is acidic salt because it is a salt of strong acid and weak base.



8. Choose the acid salt from the following?

- (A)  $\text{NaNO}_3$  (B)  $\text{Na}_2\text{SO}_4$   
(C)  $\text{Na}_2\text{CO}_3$  (D)  $\text{NaHSO}_4$

Ans. (D)

**Exp:** In the given options, option (D) is correct.  $\text{NaHSO}_4$  is an acidic salt because replaceable hydrogen is present in it.

9. Acids turn \_\_\_\_\_ litmus to \_\_\_\_\_

- (A) Red, Blue (B) Green, Yellow  
(C) Yellow, Green (D) Blue, Red

Ans. (D)

(SSC CHSL 2016)

**Exp:** Acid turns blue litmus to Red.

**Note:** Methylorange becomes red in acid medium phenolphthalein remains colourless in acidic medium.

10. Which among the following is false about acids?

- (A) They give  $\text{H}^+$  ions in aqueous solution  
(B) Most acids contain hydrogen  
(C) They turn blue litmus to red  
(D) They are bad conductor of electricity in aqueous solution

Ans. (D)

**Exp:** In the given options, option (D) is false. Acids are good conductor of electricity in aqueous solution because acids ionise and produce free ions.

11. Which of the following metals behaves as a non-metal towards concentrated  $\text{HNO}_3$ ?

- (A) Cu (B) Fe (C) Sn (D) Pb

Ans. (C)

**Exp:**  $\text{Sn} + 4\text{HNO}_3 (\text{Conc.}) \rightarrow \text{H}_2\text{SnO}_3 + 4\text{NO}_2 + \text{H}_2\text{O}$  (Stannic acid)

or  $\text{Sn} + 4\text{NO}_3^- + 2\text{H}^+ \rightarrow \text{SnO}_3^{2-} + \text{H}_2\text{O} + 4\text{NO}_2$

In the above reaction, Sn behaves as a non-metal.

**12. Concentrated  $\text{HNO}_3$  is stored in containers made of:**

- (A) Cu (B) Zn (C) Al (D) Si

**Ans. (C)**

**Exp:** Since Al is rendered passive when put into conc.  $\text{HNO}_3$ , the acid can be stored in containers made of Al. Passive nature of Al is due to the formation of a thin layer of  $\text{Al}_2\text{O}_3$  on its surface.

**13. Skin becomes yellow in concentrated  $\text{HNO}_3$  because:**

- (A) The proteins are converted into Xantho proteins  
(B)  $\text{HNO}_3$  acts as a dehydrating agent.  
(C) Nitrocellulose is formed  
(D)  $\text{HNO}_3$  acts as an oxidising agent

**Ans. (A)**

**Exp:** Concentrated  $\text{HNO}_3$  attacks proteins of the skin, forming a yellow nitro compound with skin which is called **Xantho protein**.

**14. Which one of the following is strongest acid?**

- (A) Acetic acid  
(B) Monochloro acetic acid  
(C) Dichloro acetic acid  
(D) Trichloro acetic acid

**Ans. (D)** [SSC MTS 2006]

**Exp:** In the given options Trichloro acetic acid is strongest acid due to maximum -I effect. As no. of electronegative atom increases, Acidic nature increases.

**15. Organic acid containing Hydroxyl group is -**

- (A) Benzoic acid (B) Carboic acid  
(C) Acetic acid (D) Cinnamic acid

**Ans. (B)** [SSC MTS 2006]

**Exp:** In the given options only carboic acid has -OH (Hydroxyl) group. It is commonly known as phenol.

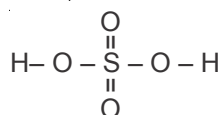
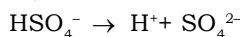
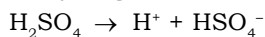
Compound	Molecular Formula
(A) Benzoic acid	$\text{C}_6\text{H}_5\text{COOH}$
(B) Carboic acid	$\text{C}_6\text{H}_5\text{OH}$
(C) Acetic acid	$\text{CH}_3\text{COOH}$
(D) Cinnamic acid	$\text{C}_6\text{H}_5\text{CH}=\text{CHCOOH}$

**16. Sulphuric acid is -**

- (A) Monobasic (B) Dibasic  
(C) Tribasic (D) Tetra basic

**Ans. (B)** [SSC CHSL 2013]

**Exp:** Sulphuric acid is a dibasic acid because two replaceable hydrogen atoms are present.



**Note:** Basicity of an Acid is defined as no. of replaceable hydrogen atoms present in one molecule of acid.

**17. The Chemical formula of Acetic acid is \_\_\_\_.**

- (A)  $\text{CH}_3\text{COH}$  (B)  $\text{CH}_3\text{COOH}$   
(C)  $\text{CH}_3\text{COCH}_3$  (D)  $\text{CH}_2\text{COOH}$

**Ans. (B)**

[SSC CHSL 2016]

**Exp:** The Chemical formula of Acetic acid is  $\text{CH}_3\text{COOH}$

**18. Chemical name of vinegar is**

- (A) Acetone (B) Acetic acid  
(C) Formaldehyde (D) Ethanol

**Ans. (B)**

[SSC CGL 2016]

**Exp:** Chemical name of vinegar is Acetic Acid or Ethanoic acid ( $\text{CH}_3\text{COOH}$ ). Vinegar is 5-10% dilute solution of Acetic Acid. It is used as a preservative.

**19. The acid used in the Lead storage cell is -**

- (A) Phosphoric acid (B) Hydrochloric acid  
(C) Nitric Acid (D) Sulphuric acid

**Ans. (D)**

[SSC Tax Asst. 2006]

or

**Which one of the following acid is used in the battery?**

- (A) Hydrochloric acid (B) Hydrofluoric acid  
(C) Sulphuric acid (D) None of these

**Ans. (C)**

[SSC Tax Asst. 2007]

or

**Which acid is used in Lead storage battery?**

- (A) Sulphuric acid (B) Nitric acid  
(C) Hydrochloric acid (D) Acetic acid

**Ans. (A)**

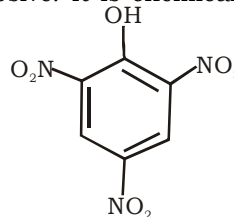
**Exp:** 38% of  $\text{H}_2\text{SO}_4$  solution is used in lead storage battery. It works as an electrolyte.

**20. Which of the following does not contain a carboxylic group?**

- (A) Picric Acid (B) Aspirin Acid  
(C) Benzoic Acid (D) Ethanoic Acid

**Ans. (A)**

**Exp:** In the given options, Picric acid is only acid that does not contain carboxylic acid. Picric acid is used as an explosive. It is chemically 2,4,6-Trinitro phenol.



**Structure of Picric Acid**

**21. Chemical name of 'Oil of Vitriol is-**

- (A) Sulphuric acid (B) Hydrochloric acid  
(C) Phosphoric acid (D) Nitric acid

**Ans. (A)**

[SSC Steno 2012]

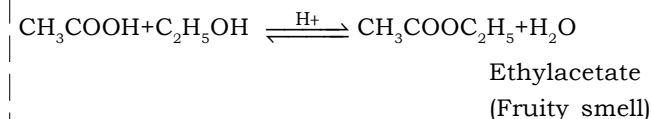
**Exp:** Sulphuric acid ( $\text{H}_2\text{SO}_4$ ) is also known as 'Oil of Vitriol' because this acid is oily and viscous in concentrated form.

**22. A fruity smell is produced by the reaction of  $C_2H_5OH$  with–**

- (A)  $PCl_5$  (B)  $CH_3COCH_3$   
(C)  $CH_3COOH$  (D) None of these

**Ans. (C)**

**Exp:** A fruity smell is produced by the reaction of  $C_2H_5OH$  with  $CH_3COOH$ . This reaction is known as Esterification.



**23. The compound used in prickly-heat powder to prevent excessive sweating is**

- (A) Boric acid (B) Phosphoric acid  
(C) Carbonic acid (D) Sulphonic acid

**Ans. (A)** (SSC CGL 2016)

**Exp:** Boric Acid ( $H_3BO_3$ ) is used in prickly heat powder to prevent excessive sweat. It is a mild Antiseptic. It is not a protonic Acid but a Lewis acid.

**24. Name the source from which Aspirin is produced?**

- (A) Willow bark (B) Oak Tree  
(C) Acacia (D) Eucalyptus

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Aspirin is produced from bark of willow tree. Aspirin was discovered by Felix Hoffmann.

**25. The acid used to dissolve gold is**

- (A) Hydrochloric Acid (B) Aquaregia  
(C) Nitric Acid (D) Phosphoric acid

**Ans. (B)**

**Exp:** Aqua regia is a mixture of conc. Nitric acid ( $HNO_3$ ) & conc. Hydrochloric acid ( $HCl$ ) in a molar ratio of 1 : 3. Aquaregia is a yellow orange fuming liquid which can dissolve the noble metals such as gold & platinum. It is also known as Royal acid.

**26. Baking soda is one of the constituents of baking powder. The other constituent is**

- (A) Acetic Acid (B)  $HCl$   
(C) Citric Acid (D) Tartaric Acid

**Ans. (D)** (SSC CHSL 2016)

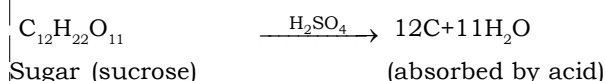
**Exp:** Baking powder is a mixture of baking soda ( $NaHCO_3$ ) and tartaric acid. Tartaric acid is found in grapes.

**27. Among these which acid is a strong dehydrating agent?**

- (A)  $CH_3COOH$  (B)  $H_2SO_4$   
(C)  $HCl$  (D)  $HNO_3$

**Ans. (B)**

**Exp:** In the given options,  $H_2SO_4$  is a strong dehydrating agent this is due to strong affinity for water.



**28. Which one of the following is battery acid?**

- (A)  $HCl$  (B)  $H_2SO_4$   
(C)  $HNO_3$  (D)  $H_3PO_4$

**Ans. (B)**

**Exp:**  $H_2SO_4$  is used in lead storage battery so it is known as battery acid.

**29. Hydrochloric acid is also known as–**

- (A) Galic acid (B) Picric acid  
(C) Muriatic acid (D) Chloric acid

**Ans. (C)** (SSC CHSL 2014)

**Exp:** Hydrochloric acid was historically called as acidum salis, muriatic acid & spirits of salt.

**30. Among these which one is a mild acid**

- (A) Hydrochloric Acid (B) Nitric Acid  
(C) Sulphuric Acid (D) Boric Acid

**Ans. (D)**

**Exp:** Boric acid [ $H_3BO_3$  or  $B(OH)_3$ ] is a mild acid. It is used to make eye lotion. It is used as an antiseptic.  $HCl$ ,  $HNO_3$  &  $H_2SO_4$  are strong acids.

**31. Which acid is present in apple?**

- (A) Citric Acid (B) Acetic Acid  
(C) Malic Acid (D) None of these

**Ans. (C)**

**Exp:** Malic acid is found in apples and hence its name is (L. malus = apple). It is used as acidulant in soft drinks and food stuffs. It is also used as a remedy for sore throat.

**32. Which acid is used for making Aspirin?**

- (A) Acetic Acid (B) Salicyclic Acid  
(C) Succinic Acid (D) Oxalic Acid

**Ans. (B)**

**Exp:** Aspirin (Acetylsalicylic acid) is prepared by heating salicyclic acid with acetyl chloride or acetic anhydride in the presence of phosphoric acid. It reduces fever. It is also used as a pain killer.

**33. Which acid is present in tomatoes?**

- (A) Oxalic acid (B) Citric acid  
(C) Acetic acid (D) Malic acid

**Ans. (A)**

**Exp:** Oxalic acid is present as potassium hydrogen oxalate in the tomatoes and spinach. Oxalic acid is used to remove iron rust stains from clothes.

**34. Which acid is used to remove Iron and rust stains from clothes?**

- (A) Citric Acid (B) Dilute Hydrochloric Acid  
(C) Oxalic Acid (D) Acetic Acid

**Ans. (C)**

**Exp:** Oxalic acid is used to remove iron rust stains from clothes.

**35. \_\_\_\_\_ is used for making Vinegar.**

- (A) Tartaric acid (B) Malic acid  
(C) Oxalic acid (D) Acetic acid

**Ans. (D)** (SSC CHSL 2016)

**Exp:** Acetic acid is used for making vinegar. 5–10% dilute solution of acetic acid is known as vinegar.

**Note:** 100% pure acetic acid is known as Glacial acetic acid.

**36. Which of the following induces souring of milk?**

- (A) Acetic Acid (B) Citric Acid  
(C) Ascorbic Acid (D) Lactic Acid

**Ans. (D)**

**Exp:** Lactic acid is the main constituent of milk that has gone sour so, lactic acid induces souring of milk.

**37. Name the acid present in lemon.**

- (A) Phosphoric acid (B) Carbonic acid  
(C) Citric acid (D) Malic acid

**Ans. (C)**

**Exp:** Citric acid is present in juices of citrus fruits such as lemons, galgals and oranges. Lemon juice contains 7–10% Citric acid.

**38. Acetic acid is known as \_\_\_\_\_**

- (A) Caustic soda (B) Spirit  
(C) Baking soda (D) Vinegar

**Ans. (D)**

**Exp:** Acetic acid is known as Vinegar. Acetic acid occurs in fruit juices which have become sour as result of fermentation.

**39. An Ester used as medicine is:-**

- (A) Ethyl Acetate (B) Methyl Acetate  
(C) Methyl Salicylate (D) Ethyl Benzoate

**Ans. (C)**

**Exp:** Methyl Salicylate is used in aid Sprays and ointments. It is also used in rheumatic pains. (For eg. Omnigel, Iodex, Volini gel). It is the principle constituent of Oil of wintergreen.

**40. Bee sting contains \_\_\_\_\_.**

- (A) An acidic liquid (B) A salt solution  
(C) An-alkaline liquid (D) A corrosive liquid

**Ans. (A)** (SSC CGL 2016)

**Exp:** Bee sting contains an acidic liquid known as formic acid. Formic acid is used in the preservation of fruits, as an antiseptic, in the treatment of gout.

**41. Vinegar is the common name of –**

- (A) Acetic acid (B) Hydrochloric acid  
(C) Acid of Lemon (D) Oxalic acid

**Ans. (A)** [SSC MTS 2002, 1992, SSC CGL 2010]

or

**Vinegar is**

- (A) Diluted acetic acid (B) Glacial acetic acid  
(C) Glacial formic acid (D) Diluted formic acid

**Ans. (A)** [SSC CGL 2016]

**Exp:** Vinegar is dilute solution of 5–10% of acetic acid ( $\text{CH}_3\text{COOH}$ ).

**42. Which one of the following is found in Vinegar?**

- (A) Lactic acid (B) Formic acid  
(C) Butyric acid (D) Acetic acid

**Ans. (D)** [SSC CPO 2015]

**Exp:** Acetic acid is used for making vinegar. 5–10% dilute solution of acetic acid is known as Vinegar.

**Note:** 100% pure acetic acid is known as Glacial acetic acid.

**43. Vinegar formed by the fermentation of cane sugar contains–**

- (A) Palmitic acid (B) Lactic acid  
(C) Citric acid (D) Acetic acid

**Ans. (D)** [Tax Asst. 2008]

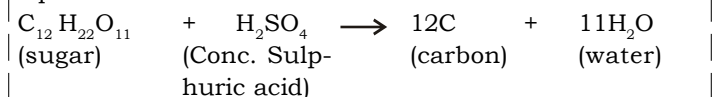
**Exp:** Vinegar is formed by the fermentation of cane sugar. It contains acetic acid.

**44. If some drops of conc sulphuric acid is added to that substance then turns to black, which of the following is that substance?**

- (A) Vinegar (B) Sugar  
(C) Food salt (D) Alcohol

**Ans. (B)** [SSC Steno 2014]

**Exp:** If some drops of conc.  $\text{H}_2\text{SO}_4$  is dropped on sugar then initially it gets converted into light brown colour and then converted into black by the following chemical equation.



This is also the method of obtaining carbon from carbohydrate.

**45. Match the source of column B with the product of column A–**

Column A (Product)			Column B (Source)
A. Formic acid			1. Lemon
B. Citric Acid			2. Tamarind
C. Tartaric Acid			3. Ants
A	B	C	
(A) 3	2	1	
(B) 3	1	2	
(C) 2	3	1	
(D) 2	1	3	

**Ans. (B)** [SSC Tax Asst 2007]

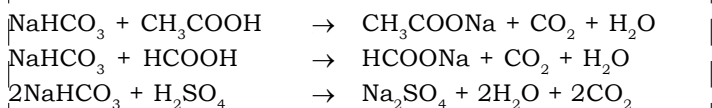
**Exp:** Formic acid–Ants, Citric acid–lemon, Tartaric acid–Tamarind

**46. The acid which fails to liberate carbon dioxide from Sodium bicarbonate is –**

- (A) Sulphuric acid (B) Formic acid  
(C) Carbonic acid (D) Acetic acid

**Ans. (C)** [SSC GD 2015]

**Exp:** Carbonic acid cannot liberate the carbon dioxide from sodium bicarbonate.





**47. Sour taste of coca cola is due to-**

- (A) Acetic acid (B) Phosphoric acid  
(C) Hydrochloric acid (D) Formic acid

**Ans. (B)** [SSC CPO Exam, 2006]

**Exp:** Sour taste of coca cola is due to the existence of phosphoric acid it is used as flavoring agent in manufacturing of soft drinks.

**48. Which one of the following is used to dissolve noble metals?**

- (A) Nitric acid (B) Hydrochloric acid  
(C) Sulphuric acid (D) Aqua regia

**Ans. (D)**

**Exp:** Aquaregia is used to dissolve noble metals like platinum, gold etc.

**49. Aqua regia is a Mixture of the following in the ratio 1:3 by volume-**

- (A) Conc  $\text{HNO}_3$  and conc  $\text{HCl}$   
(B) Conc  $\text{HNO}_3$  and Conc  $\text{H}_2\text{SO}_4$   
(C) Dil  $\text{HCl}$  and Conc  $\text{HNO}_3$   
(D) Conc  $\text{HCl}$  and Conc  $\text{HNO}_3$

**Ans. (A)**

**Exp:** Aquaregia is a mixture of conc.  $\text{HNO}_3$  and conc.  $\text{HCl}$  in ratio 1 : 3.

**50. Sour taste of lemon is due to the presence of which of the following?**

- (A) Citric acid (B) Acetic acid  
(C) Oxalic acid (D) Formic acid

**Ans. (A)** (SSC CGL 2016)

**Exp:** Citric acid is found in the juice of citrus fruits such as lemons, limes, galgals and oranges. Lemon juice contains 7-10% citric acid.

**51. Which chemical is injected into a person's body when an ant bites?**

- (A) Formic Acid (B) Acetic Acid  
(C) Tartaric Acid (D) Citric Acid

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Formic acid ( $\text{HCOOH}$ ) is injected into a person's body when red ant bites.

**52. Formic acid is produced by\_\_\_\_\_.**

- (A) White ants (B) Cockroaches  
(C) Red ants (D) Mosquitoes

**Ans. (C)** (SSC CGL 2016)

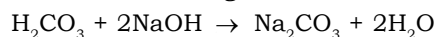
**Exp:** Formic Acid is produced by red ants. It is used in treatment of gout.

**53. Sodium carbonate is basic salt, because it is a salt of:**

- (A) Weak acid and Weak base  
(B) Strong acid and strong base  
(C) Weak acid and strong base  
(D) Strong acid and weak base

**Ans. (C)**

**Exp:** Sodium carbonate is basic salt, because it is a salt of weak acid and strong base.

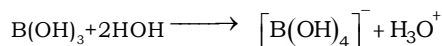


**54. Among these which one is not a Base?**

- (A)  $\text{Ba}(\text{OH})_2$  (B)  $\text{Sr}(\text{OH})_2$   
(C)  $\text{B}(\text{OH})_3$  (D)  $\text{Ca}(\text{OH})_2$

**Ans. (C)**

**Exp:** In the given options  $\text{B}(\text{OH})_3$  is not a base.  $\text{B}(\text{OH})_3$  is not a protonic acid but acts as a lewis acid by accepting electrons from a hydroxyl ion.



**55. The Base used as an antacid is -**

- (A) Calcium Hydroxide  
(B) Barium Hydroxide  
(C) Magnesium Hydroxide  
(D) Silver Hydroxide

**Ans. (C)**

[SSC CGL 2012]

**Exp:** Magnesium Hydroxide is used as an antacid, it neutralize the acidity of stomach. It is called as **Milk of Magnesia**.

**56. The natural indicator is-**

- (A) Phenolphthalein (B) Litmus  
(C) Methyl Orange (D) All of these

**Ans. (B)**

**Exp:** In the given options litmus is natural indicator. Litmus is obtained from Lichens.

**57. Litmus is obtained from-**

- (A) A bacterium (B) A fungus  
(C) An alga (D) Lichen

**Ans. (D)**

[SSC Tax Asst. 2008]

**Exp:** Litmus is obtained from Rochella lichen. Litmus solution is a natural indicator. The substances that undergo a definite colour or odour change in presence of acids and bases are called **Indicators**.

**58. pH value of Human blood is**

- (A) 8.25 - 8.35 (B) 7.35 - 7.45  
(C) 6.45 - 6.55 (D) 4.0 - 4.5

**Ans. (B)**

**Exp:** pH value of human blood is 7.35 - 7.45. Blood is alkaline in nature. Human blood contains a buffer of carbonic acid ( $\text{H}_2\text{CO}_3$ ) and bicarbonate ion ( $\text{HCO}_3^-$ ) in order to maintain blood pH. pH value of higher than 7.8 or lower than 6.8 can lead to death.

**59. What is the pH of water?**

- (A) 7 (B) 5  
(C) 3 (D) 1

**Ans. (A)**

**Exp:** Pure water is neutral in nature so its pH value will be 7.

**60. pH-scale ranges from –**

- (A) 0–7 (B) 8–14  
(C) 0–14 (D) None of these

**Ans. (C)** [SSC CGL Exam, 2014]

**Exp:** pH scale ranges from 0–14. pH scale was discovered by H. Sorenson. This scale is used to identify the nature of solution, whether it is acidic, basic or neutral.

for Acidic solution,  $\text{pH} < 7$

for Basic solution,  $\text{pH} > 7$

for Neutral solution,  $\text{pH} = 7$

**61. The pH of Lemon Juice is expected to be–**

- (A) Nothing can be predicted  
(B) Less than seven  
(C) More than seven (D) Equal to seven

**Ans. (B)** [SSC CHSL 2013]

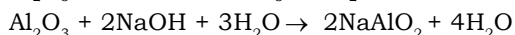
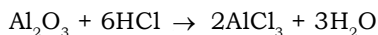
**Exp:** Lemon contains citric acid so the pH of lemon Juice is expected to be less than seven. The pH level of lemon juice is 2.

**62. Aluminium oxide is a/an?**

- (A) Basic oxide (B) Neutral oxide  
(C) Amphoteric (D) Acid Oxide

**Ans. (C)**

**Exp:** Aluminium oxide is an amphoteric oxide because it behaves as an acid in the presence of base and behaves as base in the presence of an acid.



Sodium meta

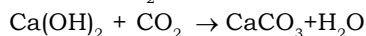
Aluminate

**63. The drying of milk of lime (white washing) is due to the action of \_\_\_\_\_**

- (A)  $\text{CO}_2$  in air (B) Oxygen in air  
(C) CO in air (D) Hydrogen in air

**Ans. (A)**

**Exp:** The drying of milk of lime (white washing) is due to the action of  $\text{CO}_2$  in air.



**64. Soda water was invented by**

- (A) Tivadar Puskas (B) Joseph Priestley  
(C) Petrarhe Poenaru  
(D) James Leonard Plimpton

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Soda water was invented by Joseph Priestly. It is also known as carbonated water.  $\text{CO}_2$  gas is also used in soda water.

**65. Kidney stones are composed of \_\_\_\_\_.**

- (A) Calcium Oxalate (B) Sodium Chloride  
(C) Magnesium Nitrate (D) Calcium Bicarbonate

**Ans. (A)** (SSC CHSL 2016)

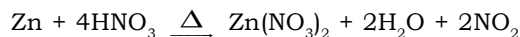
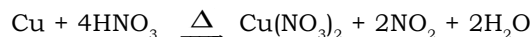
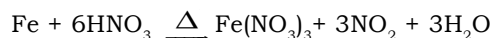
**Exp:** Kidney stones are composed of calcium oxalate. It is a salt of oxalic acid.

**66. Nitric acid does not react with**

- (A) Gold (B) Copper  
(C) Zinc (D) Iron

**Ans. (A)** (SSC CGL 2016)

**Exp:** Nitric Acid does not react with gold and platinum (noble metals)



**67. Iodex, a pain relief balm, has the smell of \_\_\_\_\_.**

- (A) Methyl salicylate (B) Ethyl salicylate  
(C) Propyl salicylate (D) Butyl salicylate

**Ans. (A)** (SSC CGL 2016)

**Exp:** Iodex has the smell of methyl salicylate (oil of wintergreen). It is used in ointments (eq- omnigel volini gel) for treating aches, sprains and bruises.

**68. What is Brine solution?**

- (A) Excess salt + water (B) Silver  
(C) Excess Ethanol + water  
(D) Excess starch + water

**Ans. (A)** (SSC CPO 2017)

**Exp:** Brine is a solution of excess salt & water ( $\text{NaCl} + \text{H}_2\text{O}$ ). Brine is also called as salt water.

**69. pH scale ranges from \_\_\_\_\_.**

- (A) 1 to 14 (B) 1 to 7  
(C) 0 to 14 (D) 0 to 7

**Ans. (C)** (SSC CPO 2017)

**Exp:** pH scale ranges from 0–14. The degree of the acidity or the alkalinity of a solution is measured on a scale which is called as pH scale.

For Acidic solution, pH value is less than 7.

For Basic solution, pH value is above 7.

For neutral solution, pH value is 7.

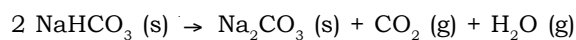
**Eg:-** Distill water.

**70. Sodium bicarbonate is chemical name of which of the following?**

- (A) Baking Soda (B) Washing Powder  
(C) Plaster (D) Fly-Ash

**Ans. (A)** (SSC CPO 2017)

**Exp:** Sodium bicarbonate is the chemical name of Baking Soda ( $\text{NaHCO}_3$ ). It is used in cooking. When it is heated, it gives out  $\text{CO}_2$  which is responsible for fluffy & light texture of bread.



**71. Which among the following is a pure element?**

- (A) Glass (B) Cement  
(C) Sodium (D) Steel

**Ans. (C)** (SSC CPO 2017)

**Exp:** Sodium is a pure element.

Glass is a mixture of sand, lime & soda.

Cement is a mixture of limestone, clay, silica & alumina.

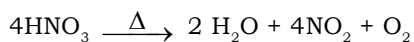
Steel is an alloy of manganese, nickel, iron chromium & carbon etc.

**72. Which among the following is responsible for colour of nitric acid?**

- (A) Carbon dioxide (B) Sulphur dioxide  
(C) Coloured impurities (D) Nitrogen dioxide

**Ans. (D)** (SSC CPO 2017)

**Exp:** Yellowish brown colour of  $\text{HNO}_3$  is due to Nitrogen dioxide which is formed by partial decomposition of  $\text{HNO}_3$  acid.



**73. Match the following pair:-**

- | Nature                  | Substance            |
|-------------------------|----------------------|
| 1. Acidic               | (a) Distill water    |
| 2. Basic                | (b) Carbonated drink |
| 3. Neutral              | (c) Soap             |
| (A) 1 - a, 2 - c, 3 - b |                      |
| (B) 1 - b, 2 - c, 3 - a |                      |
| (C) 1 - a, 2 - b, 3 - c |                      |
| (D) 1 - c, 2 - a, 3 - b |                      |

**Ans. (B)** (SSC CPO 2017)

<b>Exp:</b>	<b>Nature</b>	<b>Substance</b>
1.	Acidic	(a) Carbonated drink
2.	Basic	(b) Soap
3.	Neutral	(c) Distill water

Carbonated drink is Acidic in nature due to presence of  $\text{H}_2\text{CO}_3$  acid. Soaps are Sodium or Potassium salts of fatty acids, which provide basic nature. Distill water has no salts or impurity so it is neither acidic nor basic i.e. neutral.

**74. 'Oil of vitriol' is the common name of which of the following?**

- (A) Nitric Acid (B) Carbonic Acid  
(C) Acetic Acid (D) Sulphuric Acid

**Ans. (D)** (SSC CPO 2017)

**Exp:** Sulphuric acid is also known as 'Oil of vitriol' because this acid is oily & viscous in concentrated form.

**75. Which among the following acid is also known as 'Muriatic Acid'?**

- (A) Hydrochloric Acid (B) Sulphuric Acid  
(C) Carbonic Acid (D) Nitric Acid

**Ans. (A)** (SSC CPO 2017)

**Exp:** Hydrochloric acid is also known as Muriatic acid, acidum & spirit of salt.

**76. What is the chemical name of vinegar?**

- (A) Acetic Acid (B) Citric Acid  
(C) Lactic Acid (D) Formic Acid

**Ans. (A)** (SSC CPO 2017)

**Exp:** Chemical name of Vinegar is Acetic Acid or Ethanoic acid ( $\text{CH}_3\text{COOH}$ ). Vinegar is 5-10% dilute solution of Acetic acid. It is used as preservative.

**77. What is the common name of Calcium Hypochlorite?**

- (A) Water (B) Bleaching powder  
(C) Baking soda (D) Baking powder

**Ans. (B)** (SSC CPO 2017)

**Exp:** Calcium Hypochlorite is bleaching powder. Its chemical formula is  $\text{CaOCl}_2$ . It is used in disinfection of water & as a bleaching agent.

**78. Spinach contains \_\_\_\_.**

- (A) Lactic Acid (B) Oxalic Acid  
(C) Carbonic Acid (D) Formic Acid

**Ans. (B)** (SSC CPO 2017)

**Exp:** Leafy vegetables contain Oxalic acid & Spinach has the highest level of Oxalic acid 750 mg per 100 g. Spinach is very good source of Vitamin A.

**79. What is the common name of sodium carbonate?**

- (A) Limestone (B) Lime  
(C) Marble (D) Washing soda

**Ans. (D)** (SSC CPO 2017)

**Exp:** Washing Soda is sodium carbonate decahydrate ( $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ ). It is disodium salt of Carbonic acid with alkaline nature.

**80. Washing soda is chemically called as \_\_\_\_.**

- (A) Sodium carbonate (B) Sodium chloride  
(C) Sodium hydroxide (D) Potassium nitrate

**Ans. (A)** (SSC CPO 2017)

**Exp:** Washing Soda is sodium carbonate decahydrate ( $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ ). It is disodium salt of Carbonic acid with alkaline nature.

**81. Tartaric Acid is not found in \_\_\_\_.**

- (A) Tamarind (B) Grapes  
(C) Unripened mangoes (D) Spinach

**Ans. (D)** (SSC CPO 2017)

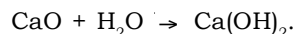
**Exp:** Tartaric acid is found in tamarind, Grapes & unripened mangoes. While oxalic acid is present in Spinach.

**82. What is the chemical name of quick lime?**

- (A) Calcium carbonate (B) Sodium hydroxide  
(C) Calcium oxide (D) Calcium sulphate

**Ans. (C)** (SSC CPO 2017)

**Exp:** Chemical name of quick lime is Calcium Oxide ( $\text{CaO}$ ). It reacts with water to form slaked lime.



**83. What is the common name of  $\text{CaOCl}_2$ ?**

- (A) Washing soda (B) Bleaching powder  
(C) Baking powder (D) Baking soda

**Ans. (B)** (SSC CPO 2017)

**Exp:** Calcium Hypochlorite is bleaching powder. Its chemical formula is  $\text{CaOCl}_2$ . It is used for disinfection of water & bleaching purpose.

**84. What is the nature of antacid?**

- (A) Acidic (B) Basic  
(C) Neutral (D) Highly Acidic

**Ans. (B)** (SSC CPO 2017)

**Exp:** The antacids are basic substances which on ingestion, decrease the stomach acidity by reacting with gastric acid.

**eg:-** Milk of Magnesia  $[Mg(OH)_2]$ ,  $Al_2O_3$  &  $NaHCO_3$  etc.

**85. Oxide of which of the following will turn red litmus blue?**

- (A) Magnesium (B) Phosphorous  
(C) Sulphur (D) Carbon

**Ans. (A)** (SSC CGL 2017)

**Exp:** Generally, Metallic oxides are basic in nature while non metallic oxides are acidic in nature because on reacting with water they form base and acid respectively. Magnesium is only metal in given options so it will form oxide i.e. basic in nature & convert red litmus to blue. While phosphorous, Sulphur & carbon are non-metals. They will form acidic oxides.

**86. In the following reaction, fill in the blank.**

**Acid + Base  $\rightarrow$  \_\_\_\_\_ + Water**

- (A) Carbon dioxide (B) Metal Oxide  
(C) Hydrogen gas (D) Salt

**Ans. (D)** (SSC CGL 2017)

**Exp:** Acid + Base  $\rightarrow$  Salt + water

When an acid reacts with base, then water & salt are formed as product. This reaction is called as **Neutralisation Reaction**.

**eg:-**  $NaOH + HCl \rightarrow NaCl + H_2O$   
(Base) (Acid) (Salt) (Water)

**87. pH of the human blood is \_\_\_\_\_.**

- (A) Slightly acidic (B) Highly acidic  
(C) Slightly basic (D) Highly basic

**Ans. (C)** (SSC CGL 2017)

**Exp:** pH of human blood is 7.35 to 7.5. So, pH is slightly alkaline or slightly basic.

**88. What is the chemical formula for Sodium Chloride (Salt)?**

- (A)  $NaCl_2$  (B)  $NaCl$   
(C)  $Na_2Cl$  (D)  $Na_2C$

**Ans. (B)** (SSC CGL 2017)

**Exp:** The chemical formula of sodium chloride is  $NaCl$ . It is main constituent of salt. It is also known as **table salt** or **rock salt**.

**89. What is nature of pH of Milk?**

- (A) Slightly acidic (B) Slightly basic  
(C) Highly acidic (D) Highly basic

**Ans. (A)** (SSC CGL 2017)

**Exp:** Due to presence of lactic acid in milk. Lactic acid is weak acid so, its pH value is less than 7 or slightly acidic.

**90. What is the common name of  $CaOCl_2$ ?**

- (A) Baking powder (B) Baking soda  
(C) Bleaching powder (D) Washing soda

**Ans. (C)** (SSC CGL 2017)

**Exp:** Common name of  $CaOCl_2$  is bleaching powder. In presence of dilute acids, it gives nascent oxygen, so it acts as oxidising or bleaching agent.

$\rightarrow$

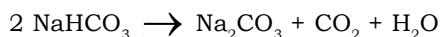
$\rightarrow$

**91. What is the common name of Sodium bicarbonate?**

- (A) Baking soda (B) Washing powder  
(C) Plaster of paris (D) Fly ash

**Ans. (A)** (SSC CGL 2017)

**Exp:** Baking soda is Sodium bicarbonate ( $NaHCO_3$ ). It is used in baking industry because on heating it releases  $CO_2$  which makes bread spongy & fluffy.

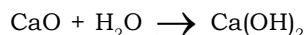


**92. Which of the following is a chemical formula of quicklime?**

- (A)  $Ca_2O$  (B)  $Ca_2CO_3$   
(C)  $CaO_2$  (D)  $CaO$

**Ans. (D)** (SSC CGL 2017)

**Exp:** Chemical formula of quicklime is  $CaO$  (calcium oxide). When it reacts with water, it forms slaked lime.



**93. Most liquids that conduct electricity are solutions of acids, bases and \_\_\_\_\_.**

- (A) Copper (B) Aluminium  
(C) Salts (D) Iron

**Ans. (C)** (SSC CGL 2017)

**Exp:** Most liquids that conduct electricity are solutions of acids, bases & salts, because they contain ions

**94. Which base is present in milk of magnesia?**

- (A) Magnesium hydroxide  
(B) Ammonium hydroxide  
(C) Sodium hydroxide  
(D) Calcium hydroxide

**Ans. (A)** (SSC CGL 2017)

**Exp:** Magnesium hydroxide  $[Mg(OH)_2]$  is called as Milk of Magnesia. It is used as an antacid which on ingestion, decreases the stomach acidity.

**95. What is the name of the acid in an ant's sting?**

- (A) Acetic acid (B) Citric acid  
(C) Formic acid (D) Lactic acid

**Ans. (C)** (SSC CGL 2017)

**Exp:** Formic acid ( $HCOOH$ ) or methanoic acid is present in red ant's sting

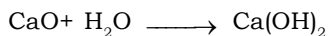


**96. Which base is present in lime water?**

- (A) Sodium hydroxide (B) Magnesium hydroxide  
(C) Calcium hydroxide (D) Ammonium hydroxide

**Ans. (C)** (SSC CGL 2017)

**Exp:** Calcium hydroxide  $[\text{Ca}(\text{OH})_2]$  is present in lime water. It is also called as slaked lime. It is formed by reaction of quick lime (CaO) & water.



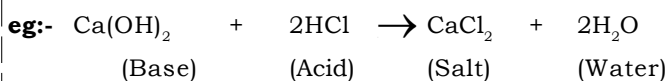
**97. What is the reaction between an acid and a base called?**

- (A) Desalination (B) Crystallisation  
(C) Neutralisation (D) Sublimation

**Ans. (C)** (SSC CGL 2017)

**Exp:** Acid + Base  $\rightarrow$  Salt + Water

When an acid reacts with base, salt & water are formed as product. This process is called as Neutralisation reaction.



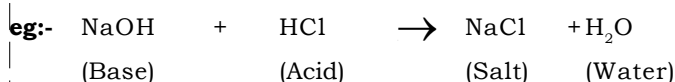
**98. In an acid base reaction which product is produced along with a salt?**

- (A) Hydrogen gas (B) Oxygen gas  
(C) Carbon dioxide (D) Water

**Ans. (D)** (SSC CGL 2017)

**Exp:** Acid + Base  $\rightarrow$  Salt + water

When an acid reacts with base, then water & salt are formed as product. This reaction is called as **Neutralisation Reaction**.



**99. What is the name of the acid in grapes?**

- (A) Lactic acid (B) Formic acid  
(C) Acetic acid (D) Tartaric acid

**Ans. (D)** (SSC CGL 2017)

**Exp:** Tartaric acid is found in bananas, grapes & tamarind. It is added to food when a sour taste is desired.

**100. Blue Vitriol is another name for which of the following?**

- (A) Copper Sulphate (B) Oxygen  
(C) Copper (D) Magnesium oxide

**Ans. (A)** (SSC CGL 2017)

**Exp:** Blue vitriol is another name of  $\text{CuSO}_4 \cdot 7\text{H}_2\text{O}$ . It is water soluble. It is blue in colour. It is used as an insecticide & fungicide.

**101. Acetic acid is another name for which of the following?**

- (A) Vinegar (B) Baking soda  
(C) Copper sulphate (D) Magnesium oxide

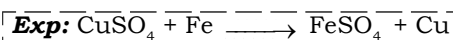
**Ans. (A)** (SSC CGL 2017)

**Exp:** Acetic acid is another name of vinegar. Vinegar is 5-10% dilute solution of Acetic acid. It is used as preservative.

**102. The reaction of Copper Sulphate and Iron produces Iron Sulphate and \_\_\_\_\_.**

- (A) Vinegar (B) Ash  
(C) Baking Soda (D) Copper

**Ans. (D)** (SSC CGL 2017)



When  $\text{CuSO}_4$  reacts with iron, ferrous sulphate & copper are formed as product. This is a displacement reaction because high reactive metal (iron) displaces the copper from its salt.

**103. Crystallisation is an example of?**

- (A) Physical change (B) Chemical change  
(C) Chemical reaction (D) Galvanisation

**Ans. (A)** (SSC CGL 2017)

**Exp:** The formation of crystals (solid form) from homogeneous solution is called as Crystallisation. This process is a physical change as only liquid state is converted into solid state. There is no chemical reaction.

**104. Vinegar and Baking Soda together produce \_\_\_\_\_.**

- (A) Copper (B) Carbon dioxide  
(C) Copper sulphate (D) Magnesium oxide

**Ans. (B)** (SSC CGL 2017)

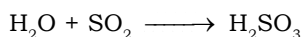
**Exp:**  $\text{CH}_3\text{COOH} + \text{NaHCO}_3 \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2$   
Vinegar & Baking soda react together to form Carbon dioxide, water & sodium acetate.

**105. Chemical formula for sulphurous acid is:**

- (A)  $\text{H}_2\text{SO}_4$  (B)  $\text{H}_2\text{SO}_3$   
(C)  $\text{H}_3\text{SO}_3$  (D)  $\text{H}_3\text{SO}_4$

**Ans. (B)** (SSC CGL 2017)

**Exp:** Chemical formula for sulphurous acid is  $\text{H}_2\text{SO}_3$ . It is an aqueous solution of sulphur dioxide. It is weak & unstable acid.





# Chemical Bonding

## 1. Formation of cation occurs by–

- (A) Gain of electron (B) Loss of electron  
(C) Gain of proton (D) Loss of proton

Ans. (B)

**Exp:** Formation of cation occurs by loss of electron.

eg.  $\text{Mg} \rightarrow \text{Mg}^{+2} + 2\text{e}^-$

Element/Ion	No. of electrons
Magnesium (Mg)	12
Magnesium ion ( $\text{Mg}^{2+}$ )	10

## 2. Formation of anions occurs by–

- (A) Loss of neutrons (B) Gain of protons  
(C) Gain of electrons (D) None

Ans. (C)

**Exp:** Formation of anion occurs by gain of electrons.

eg.  $\text{Cl} + \text{e}^- \rightarrow \text{Cl}^-$

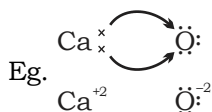
Element/Ion	No. of electrons
Chlorine atom (Cl)	17
Chloride ion ( $\text{Cl}^-$ )	18

## 3. A bond formed by the transfer of electrons between atoms of the elements is called

- (A) Ionic-bond (B) Covalent bond  
(C) Co-ordinate bond (D) Hydrogen bond

Ans. (A)

**Exp:** Ionic or electrovalent bond is formed by the complete transfer of electrons from one atom to another atom



## 4. Ionic solids are characterised by

- (A) Good conductivity in solid state  
(B) Low melting point  
(C) Solubility in polar solvent  
(D) High vapour pressure

Ans. (C)

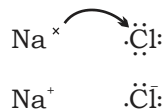
**Exp:** Ionic Solids (compounds) are generally soluble in water and other polar solvents having high dielectric constants. This is due to larger electrostatic interactions between polar solvents and ions.

## 5. The compound which contains ionic bond is

- (A)  $\text{CH}_4$  (B)  $\text{CHCl}_3$   
(C)  $\text{NaCl}$  (D)  $\text{O}_2$

Ans. (C)

**Exp:** NaCl compound has ionic bond. In NaCl compound transfer of electron takes place from Na to Cl atom.—



## 6. With reference to ionic compounds, consider the following statement:

1. Ionic compounds are soluble in alcohol
2. Ionic compounds in the solid state are good conductor of electricity

Which of these statements is/are correct?

- (A) Only 1 (B) Only 2  
(C) Both 1 and 2 (D) Neither 1 nor 2

Ans. (A)

**Exp:** Ionic Compounds are soluble in alcohol because alcohols are polar in nature and ionic compounds are soluble in polar solvents. Ionic compounds don't conduct electricity in solid state due to absence of free ions. Ions are bound together by strong electro-static force of attraction.

## 7. Why do atoms form bond?

- (A) To reduce potential energy and gain stability  
(B) To make molecules  
(C) To increase potential energy and lose stability  
(D) To increase potential energy and gain stability

Ans. (A)

(SSC CHSL 2016)

**Exp:** Atoms form chemical bond to reduce potential energy of system and gain stability.

## 8. Electrons in the highest energy level of a atom are called

- (A) Valence protons (B) Orbital protons  
(C) Valence electrons (D) Orbital electrons

Ans. (C)

**Exp:** Electrons present in the highest energy level or outer most shell of an atom are called valence electrons. Only these electrons participate in chemical bonding.

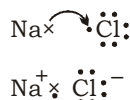
## 9. NaCl has \_\_\_\_.

- (A) Nonpolar bond (B) Polar covalent bond  
(C) Metallic bond (D) Ionic bond

Ans. (D)

(SSC CHSL 2016)

**Exp:** NaCl has ionic bond because there is a transfer of electron from Na atom to Cl atom takes place.



**10. A bond formed by sharing of electrons between atoms of the elements is called-**

- (A) Ionic bond (B) Covalent bond  
(C) Co-ordinate bond (D) None

**Ans. (B)**

**Exp:** Covalent bond is formed by mutual sharing of electrons between two or more atoms.

Eg.



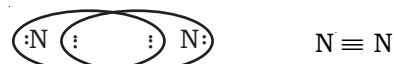
**Note-** Covalent bond is also known as Molecular bond.

**11. The compound which has covalent bond is**

- (A) CsCl (B) CaO (C) N<sub>2</sub> (D) Na<sub>2</sub>O

**Ans. (C)**

**Exp:** N<sub>2</sub> has triple Covalent bond.

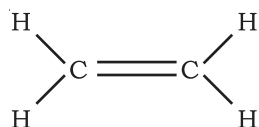


**12. Double bond occurs in-**

- (A) CH<sub>4</sub> (B) C<sub>2</sub>H<sub>6</sub>  
(C) C<sub>2</sub>H<sub>4</sub> (D) C<sub>2</sub>H<sub>2</sub>

**Ans. (C)**

**Exp:** Double bond occurs in C<sub>2</sub>H<sub>4</sub>

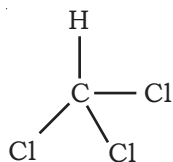


**13. Example of covalent bond is-**

- (A) KCl (B) BaO (C) CHCl<sub>3</sub> (D) CaO

**Ans. (C)**

**Exp:** Covalent bond is present in CHCl<sub>3</sub>



**14. Ethylene is a \_\_\_\_\_ molecule.**

- (A) Polar (B) Ionic  
(C) Covalent (D) Non-polar

**Ans. (D)** [SSC CGL 2016]

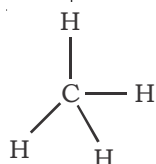
**Exp:** Ethylene is non-polar molecule as it has Zero dipole moment ( $\mu = 0$ ).

**15. Compound having tetrahedral structure is-**

- (A) C<sub>2</sub>H<sub>4</sub> (B) C<sub>2</sub>H<sub>2</sub> (C) CH<sub>4</sub> (D) None

**Ans. (C)**

**Exp:** CH<sub>4</sub> (Methane) has tetrahedral structure.



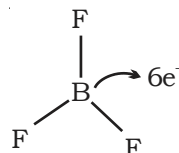
**16. The octet rule is not valid for which one of the following molecule-**

- (A) CO<sub>2</sub> (B) H<sub>2</sub>S  
(C) NH<sub>3</sub> (D) BF<sub>3</sub>

**Ans. (D)**

[SSC CPO 2014]

**Exp:** The Octet rule is not valid for BF<sub>3</sub> molecule. In BF<sub>3</sub> molecule B atom has 6 electrons.

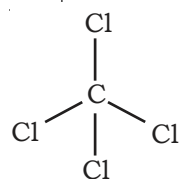


**17. The geometry of CCl<sub>4</sub> is-**

- (A) Tetrahedral (B) Triangular  
(C) Linear (D) Octahedral

**Ans. (A)**

**Exp:** CCl<sub>4</sub> molecule has tetrahedral geometry.

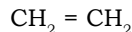


**18. The structure of Ethylene is-**

- (A) Linear (B) Tetrahedral  
(C) Octahedral (D) Triangular

**Ans. (A)**

**Exp:** The Structure of Ethylene (Ethene) is linear.



**19. The (O-H) bond in CH<sub>3</sub>OH is \_\_\_\_.**

- (A) Polar covalent (B) Ionic  
(C) Non polar covalent (D) Cationic

**Ans. (A)**

[SSC CHSL 2016]

**Exp:** The (O-H) bond in CH<sub>3</sub>OH is Polar Covalent due to electronegativity difference between Oxygen and Hydrogen atoms.

**20. Which has covalent bond?**

- (A) Na<sub>2</sub>S (B) AlCl<sub>3</sub>  
(C) NaH (D) MgCl<sub>2</sub>

**Ans. (B)**

**Exp:** Alkali metals and Alkaline earth metals form ionic bond while Aluminium forms covalent bond with Cl. So AlCl<sub>3</sub> molecule has covalent bond.

**21. Which of the following contains both ionic and covalent bond?**

- (A) H<sub>2</sub>O (B) NaOH  
(C) C<sub>6</sub>H<sub>6</sub> (D) CO<sub>2</sub>

**Ans. (B)**

**Exp:** NaOH molecule contains both ionic and covalent bond. In NaOH molecule Na has positive charge while OH has negative charge. Ionic bond is present between Na<sup>+</sup> & OH<sup>-</sup>. Covalent bond is present between O & H atoms in OH<sup>-</sup>.

**22. Which of the following compound is non-polar?**

- (A) HCl (B)  $\text{CH}_2\text{Cl}_2$   
(C)  $\text{CHCl}_3$  (D)  $\text{CCl}_4$

**Ans. (D)** [SSC CGL 2014]

**Exp:**  $\text{CCl}_4$  molecule is non polar this is due to regular tetrahedral structure and dipole moment is zero.

**23. Mark the compound which possesses ionic, covalent and co-ordinate bonds**

- (A)  $\text{SO}_2$  (B)  $\text{H}_2\text{O}$  (C)  $\text{NH}_4\text{Cl}$  (D)  $\text{CCl}_4$

**Ans.(C)**

**Exp:**  $\text{NH}_4\text{Cl}$  molecule has ionic, covalent and Co-ordinate bond. Ionic bond is present between  $\text{NH}_4^+$  ion and  $\text{Cl}^-$  ion while covalent and co-ordinate bond is present in  $\text{NH}_4^+$  ion.

**24. Strongest bond is-**

- (A)  $\text{C} = \text{C}$  (B)  $\text{C} \equiv \text{C}$   
(C)  $\text{C} - \text{C}$  (D) all are equally strong

**Ans. (B)**

**Exp:** Bond energy values for  $\text{C}-\text{C}$ ,  $\text{C} = \text{C}$  &  $\text{C} \equiv \text{C}$  are 346, 598, 813 KJ respectively. So,  $\text{C} \equiv \text{C}$  is strongest.

**25. An example of a covalent molecule is-**

- (A) Potassium chloride (B) Sodium chloride  
(C) Lead chloride (D) Carbon tetrachloride

**Ans. (D)** [SSC 2013]

**Exp:** Carbon tetra chloride ( $\text{CCl}_4$ ) is an example of a covalent molecule. Covalent bond is formed by mutual sharing of electrons between C and Cl Atoms.

**26. Which of the following bonds will be the most polar?**

- (A)  $\text{N}-\text{Cl}$  (B)  $\text{O}-\text{F}$  (C)  $\text{C}-\text{F}$  (D)  $\text{N}-\text{N}$

**Ans. (C)**

**Exp:** Since F-atom which is the most electronegative atom is present in (B) and (C), the correct answer will be out of these two alternatives. Since electronegativity of O atom is greater than that of C-atom, ( $x_F - x_C$ ) is greater than ( $x_F - x_O$ ) and hence  $\text{F}-\text{C}$  bond will be the most polar.

**27. Which of the following will be the least soluble in water ?**

- (A)  $\text{NaCl}$  (B)  $\text{Na}_2\text{S}$  (C)  $\text{MgCl}_2$  (D)  $\text{MgS}$

**Ans. (D)**

**Exp:** We know that the  $\text{Na}^+$  ion is larger in size than  $\text{Mg}^{2+}$  ( $\text{Na}^+ > \text{Mg}^{2+}$ ). Similarly,  $\text{S}^{2-}$  ion is also larger in size than  $\text{Cl}^-$  ion ( $\text{S}^{2-} > \text{Cl}^-$ ). Now  $\text{MgS}$  has smaller cation and larger anion, it would be the most covalent (Fajan's rules) and hence would be the least soluble in water.

**28. Ethyne is an Example of compound-**

- (A) Triple bond (B) Single bond  
(C) Double bond (D) Co-ordinate bond

**Ans. (A)** [SSC MTS 2014]

**Exp:** Ethyne or Acetylene is an unsaturated hydrocarbon. It has triple bond between carbon-carbon atoms.

**Structure of Ethyne:-**  $\text{CH} \equiv \text{CH}$

**29. Which one of the following has a covalent bond?**

- (A) Calcium Chloride (B) Magnesium Fluoride  
(C) Sodium chloride (D) Carbon Tetrachloride

**Ans. (D)** [SSC MTS 2014]

**Exp:** In Covalent compounds, bond is formed between two or more nonmetals by mutual sharing of electrons.

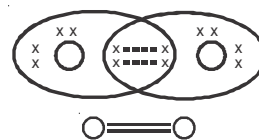
For Example :  $\text{CCl}_4$ ,  $\text{H}_2\text{O}$ ,  $\text{CO}_2$  etc. Alkali & Alkaline Earth Metals form ionic bond.

**30. Which of the following molecules, is joined by a double covalent bond?**

- (A)  $\text{Cl}_2$  (B)  $\text{O}_2$   
(C)  $\text{N}_2$  (D)  $\text{He}_2$

**Ans. (B)** (SSC CHSL 2016)

**Exp:**  $\text{O}_2$  molecule is joined by a double covalent bond. This double bond is formed due to mutual sharing of two electron pair.



**31. Why does carbon tetrachloride have no dipole moment?**

- (A) Because of same size of carbon and chlorine atoms  
(B) Because of regular tetrahedral structure  
(C) Because of planar structure  
(D) Because of similar electron affinities of carbon and chlorine

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Because of regular tetrahedron structure, bond polarity is cancelled so, carbon tetrachloride ( $\text{CCl}_4$ ) has no dipole moment. Dipole moment can be defined as the product of the magnitude of the charge and the distance between the centres of positive and negative charge.

Dipole moment ( $\mu$ ) = charge ( $q$ )  $\times$  distance of separation ( $r$ )  
It is expressed in debye units (D).

**32. \_\_\_\_\_ is a polar covalent bond.**

- (A)  $\text{P}-\text{Cl}$  (B)  $\text{Ne}-\text{Cl}$   
(C)  $\text{Cl}-\text{Cl}$  (D)  $\text{Ca}-\text{Cl}$

**Ans. (A)** (SSC CHSL 2016)

**Exp:**  $\text{P}-\text{Cl}$  is a polar covalent bond due to higher electronegativity of chlorine than that of phosphorous.

**33. Covalent Bond is also called \_\_\_\_\_.**

- (A) Molecular Bond (B) Proton Bond  
(C) Nucleus Bond (D) Electron Bond

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Covalent bond is also called Molecular bond. Covalent bond is defined as a chemical bond that involves the sharing of electron pairs between atoms. Shared electron pairs are known as bond pairs.



**34. Sulphur and Chlorine can have what type of a bond?**

- (A) Polar covalent (B) Polyionic  
(C) Nonpolar (D) Ionic

**Ans. (A)** (SSC CHSL 2016)

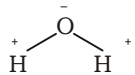
**Exp:** Bond formed between sulphur and chlorine is polar covalent bond because chlorine is more electronegative than sulphur and mutual sharing of electrons takes place between S and Cl.

**35. \_\_\_\_\_ bond holds the atoms together within a water molecule.**

- (A) Nonpolar covalent (B) Polar covalent  
(C) Ionic (D) Co-ordinate

**Ans. (B)** (SSC CHSL 2016)

**Exp:** The polar covalent bond is formed when the atoms share the electrons unequally between each other due to electronegativity difference between O & H atom. This results in partial positive and negative charges on each atom.



**36. \_\_\_\_\_ character of a bond between two atoms is greater if the difference in their electro negativities is lesser.**

- (A) Polar (B) Metallic  
(C) Ionic (D) Covalent

**Ans. (D)** (SSC CHSL 2016)

**Exp:** Ionic and covalent character describe the nature of the bond between atoms.

The lesser the difference in electronegativity between the atoms, the greater the covalent character of the bond.

The greater the difference in electronegativity between the atoms, the greater the ionic character of the bond.

**37. How many lone pair of electrons are present in  $N_2$ ?**

- (A) 1 (B) 3 (C) 4 (D) 2

**Ans. (D)** (SSC CHSL 2016)

**Exp:**  $N \equiv N$

$N_2$  molecule has 2 lone pair of electrons.

**Lone pair of electron:** A pair of electron in the valence shell that does not participate in chemical bond formation.

**38. The residual attractive or repulsive forces between molecules or atomic groups that do not arise from a covalent bond, or ionic bonds is called \_\_\_\_ .**

- (A) Neutral Bond (B) Non Polar Bond  
(C) Electrovalent bond (D) Vanderwaals bond

**Ans. (D)** (SSC CHSL 2016)

**Exp:** The residual attractive or repulsive forces between molecules or atomic groups that do not arise from a covalent bond or ionic bond is called vanderwaals bond. Vanderwaals forces (bond) term is used to define

intermolecular forces. These are weak forces. These forces arise due to the following type of interactions:-

- (i) Dispersion forces or London forces.  
(ii) Dipole-dipole forces  
(iii) Dipole – induced dipole forces.

**39. Water has high boiling point because it:-**

- (A) Is Ionic (B) Is Covalent  
(C) Has High Dielectric Constant  
(D) Is having Hydrogen Bonding

**Ans. (D)** [SSC CGL 2013]

**Exp:** Water has high boiling point due to presence of hydrogen bonding.

**40. Which one does not contain Hydrogen bonding?**

- (A)  $CH_4$  (B)  $H_2O$   
(C)  $NH_3$  (D)  $HCOOH$

**Ans. (A)**

**Exp:** In the given options,  $CH_4$  does not contain hydrogen bonding. Hydrogen bonding is possible when most electronegative atoms like N, O & F are present in molecule.

**41. Which of the following is the weakest bond?**

- (A) Covalent bond (B) Ionic bond  
(C) Metallic bond (D) Hydrogen bond

**Ans. (D)**

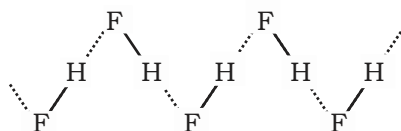
**Exp:** In the given options, Hydrogen bond is the weakest bond. The strength of hydrogen bond ranges from 10 – 40  $KJmol^{-1}$

**42. Which among the following compounds has the strongest Hydrogen bond?**

- (A) HI (B) HCl (C) HF (D) HBr

**Ans. (C)** [SSC CPO 2016]

**Exp:** HF has strongest hydrogen bond because hydrogen bonding takes place between hydrogen and electronegative elements (F, O, N) and F is the highest electronegative atom.



**43. The maximum number of hydrogen bonds in a  $H_2O$  molecule is-**

- (A) 1 (B) 2 (C) 3 (D) 4

**Ans. (D)**

**Exp:** The maximum number of Hydrogen bonds in a  $H_2O$  molecule is 4. Oxygen atom of  $H_2O$  molecule form two hydrogen bonds while two hydrogen atoms form two other hydrogen bonds.

**44. What are the types of bonds present in  $CuSO_4 \cdot 5H_2O$ ?**

- (A) Electrovalent and Covalent  
(B) Electrovalent and Co-ordinate

(C) Electrovalent, Covalent, Co-ordinate and Hydrogen bond

(D) Covalent, Co-ordinate and Covalent

**Ans. (C)**

[SSC CHSL 2015]

**Exp:** The  $\text{Cu}^{2+}$  ions are attracted towards  $\text{SO}_4^{2-}$  ions not only by ionic interactions (electrovalent) but also by co-ordinate covalent bonds. The  $\text{Cu}^{2+}$  ions form co-ordinate covalent bonds with water as well as sulphate ions. Also hydrogen bond is present in water and sulphate ion.

**45.  $\text{H}_2\text{O}$  is liquid and  $\text{H}_2\text{S}$  is a gas because—**

(A) Oxygen forms stronger hydrogen bond than sulphur

(B) Oxygen is less electronegative than sulphur

(C) Atomic radius of oxygen is less than that of sulphur

(D) Atomic radius of oxygen is greater than that of sulphur

**Ans. (A)**

**Exp:** In water, Oxygen is highly electronegative than sulphur. As a result, hydrogen bonding is present in  $\text{H}_2\text{O}$  molecule while hydrogen bonding is almost negligible in  $\text{H}_2\text{S}$ . As a result,  $\text{H}_2\text{O}$  exists in liquid state and  $\text{H}_2\text{S}$  exists in gaseous state.

**46. The High Boiling Point of water compared to Hydrogen Sulphide or Hydrogen Chloride is due to—**

(A) Dipole Insulation (B) Hydrogen bonding

(C) Polar covalent bonding

(D) Vander wall's attraction

**Ans. (B)**

[SSC CGL 2012]

**Exp:** Boiling Point of water is high due to Hydrogen bonding.

**47. Strenght of hydrogen bonding in O, F, S, Cl, N is in the order :**

(A)  $\text{Cl} < \text{S} < \text{N} < \text{O} < \text{F}$  (B)  $\text{Cl} < \text{F} < \text{S} < \text{N} < \text{O}$

(C)  $\text{Cl} < \text{N} < \text{S} < \text{O} < \text{F}$  (D)  $\text{Cl} < \text{O} < \text{S} < \text{N} < \text{F}$

**Ans. (A)**

**Exp:** Strength of a Hydrogen bonding,  $\text{H} \cdots \text{M}$  increases with the increase in the electronegativity of M-atom. Out of the given atoms, Cl-does not form H-bond while the strength of H-bonding of other atoms is in the order  $\text{S} < \text{N} < \text{O} < \text{F}$ , since the electronegativity of these atoms also increases in the same order

$$\begin{pmatrix} \text{S} & \text{N} & \text{O} & \text{F} \\ 2.5 & 3.0 & 3.5 & 4.0 \end{pmatrix}$$

**48. Which among the following compounds has the strongest hydrogen bond?**

(A) HI (B) HCl

(A) HF (D) HBr

**Ans. (C)**

(SSC CHSL 2016)

**Exp:** Hydrogen bond is formed when hydrogen atom is bonded to highly electron negative atoms such as as Fluorine, Oxygen or Nitrogen.

**Order of strength of H-bond:-**  $\text{H-F} > \text{H-O} > \text{H-N}$

**49. The hybridisation of C in  $\text{CO}_2$  is—**

(A) sp

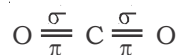
(B)  $\text{sp}^2$

(C)  $\text{sp}^3$

(D) None

**Ans. (A)**

**Exp:** In  $\text{CO}_2$  molecule 2 sigma bonds are present so sp hybridisation is present in  $\text{CO}_2$  molecule.



**50. Hybridisation involves:**

(A) Separation of atomic orbitals

(B) Overlapping of atomic orbitals

(C) Mixing of atomic orbitals

(D) All of them

**Ans. (C)**

**Exp:** Linear mixing of atomic orbitals to form equal no. of Molecular orbitals having equal energy, is called

**Hybridisation** & the newly formed orbitals are called as Hybrid Orbitals.

**51. What happens when one s and one p orbital is hybridized?**

(A) We get three orbitals in a plane

(B) We get two orbitals at 180 degrees

(C) We get two mutually perpendicular orbitals

(D) We get four orbitals directed tetrahedrally

**Ans. (B)**

(SSC CHSL 2016)

**Exp:** Molecular orbital (MO) Theory was developed by F. Hund R.S. Mulliken in 1932. According to this theory –

The number of molecular orbitals formed is equal to the number of combining orbitals. When two atomic orbitals combine, two molecular orbitals are formed.

**52. Benzene is \_\_\_\_\_ in ethyl alcohol.**

(A) Soluble

(B) Solute

(C) Insoluble

(D) Insolate

**Ans. (C)**

(SSC CHSL 2016)

**Exp:** Polar molecules are soluble in polar solvents while nonpolar molecules are soluble in nonpolar solvents.

Benzene is a nonpolar molecule while ethyl alcohol is polar solvent so it is insoluble in ethyl alcohol.

**53. Which of the following gases has the highest solubility in water at room temperature?**

(A) Nitrogen

(B) Nitrous Oxide

(C) Ammonia

(D) Carbon dioxide

**Ans. (C)**

(SSC CHSL 2016)

**Exp:** Ammonia has the highest solubility in water at room temperature due to hydrogen bonding.

54. Which of the following is not soluble in water?

- (A) Lead sulphate (B) Zinc sulphate  
(C) Potassium sulphate (D) Sodium sulphate

Ans. (A)

(SSC CGL 2016)

**Exp:** In the given options, Lead Sulphate is not soluble in water. In lead sulphate, lattice energy is greater than hydration energy.

55. Molten NaCl is good conductor of electricity because it has:-

- (A) Free electron (B) Free ions  
(C) Free molecules (D) None

Ans. (B)

**Exp:** Molten NaCl is good Conductor of electricity is due to presence of free ions. However it does not conduct in solid state because of strong electrostatic forces between the ions. So, ions are not free.

56. Which of the following bonds is the weakest in nature?

- (A) Single bond (B) Double bond  
(C) Triple bond (D) Hydrogen bond

Ans. (D)

(SSC CGL 2017)

**Exp:** Hydrogen bond is the weakest in nature. Hydrogen bond is formed when H atom is covalently bonded to electronegative atoms such as F, O & N.



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# Periodic table

## 1. Who proposed the Modern Periodic Table?

- (A) Faraday (B) Mendeleev  
(C) Newton (D) Bohr

**Ans. (B)** (SSC CHSL 2016)

**Exp:** Periodic table was proposed by Dimitri Mendeleev (Russian Scientist)

## 2. Total number of Inner Transition Elements are-

- (A) 16 (B) 28 (C) 32 (D) 33

**Ans. (B)** [SSC MTS 2008]

**Exp:** Total number of inner transition elements is 28 in which 14 elements are lanthanoids or lanthanides ( $_{58}\text{Ce}$  -  $_{71}\text{Lu}$ ) and other 14 are Actinoids or Actinides ( $_{90}\text{Th}$  -  $_{103}\text{Lr}$ ).

**Note:** Lanthanoids are also called rare earth elements.

## 3. In the periodic table, the element with atomic number 38 belongs to:

- (A) Period IV and group II  
(B) Period IV and group IV  
(C) Period III and group IV  
(D) Period V and group II

**Ans. (D)**

**Exp:** Noble gases are  $_{2}\text{He}$  (1<sup>st</sup> period),  $_{10}\text{Ne}$  (2<sup>nd</sup> period),  $_{18}\text{Ar}$  (3<sup>rd</sup> period),  $_{36}\text{Kr}$  (4<sup>th</sup> period),  $_{54}\text{Xe}$  (5<sup>th</sup> period) etc. Since the atomic number of the given element is 38, this element is present in 5<sup>th</sup> period and 2<sup>nd</sup> group in the periodic table.

## 4. Which of the following is not a representative element?

- (A) Fe (B) K (C) Ba (D) N

**Ans. (A)**

**Exp:** Representative elements are s- and p-block elements. Since K and Ba are s-block elements and N is a p-block element, these are representative elements. Fe is a d-block element (transition metal).

## 5. The Modern Periodic Table consists of 18 groups and 7 periods. What is the atomic number of the element placed in the 4<sup>th</sup> group and the 4<sup>th</sup> period?

- (A) 24 (B) 20 (C) 22 (D) 12

**Ans. (C)** (SSC CHSL 2016)

**Exp:** 4<sup>th</sup> group of Modern Periodic Table has Titanium in 4<sup>th</sup> period (Ti = 22), Zirconium in 5<sup>th</sup> period (Zr = 40), Hafnium in 6<sup>th</sup> period (Hf = 72) and Rutherfordium in 7<sup>th</sup> period (Rf = 104).

## 6. The modern periodic table consists of 18 groups and 7 periods. What is the atomic number of the element placed in the 3<sup>rd</sup> group and the 4<sup>th</sup> period?

- (A) 23 (B) 21 (C) 19 (D) 11

**Ans. (B)** (SSC CHSL 2016)

**Exp:** 3<sup>rd</sup> group has 4 elements - Scandium (Sc = 21) belongs to 4<sup>th</sup> period.

⇒ Yttrium (Y = 39) belongs to 5<sup>th</sup> period

⇒ Lanthanum (La = 57) belongs to 6<sup>th</sup> period

⇒ Actinium (Ac = 89) belongs to 7<sup>th</sup> period.

## 7. The Modern Periodic table consists of 18 groups and 7 periods. What is the atomic number of the element placed in the 2<sup>nd</sup> group and the 4<sup>th</sup> period?

- (A) 20 (B) 22 (C) 18 (D) 10

**Ans. (A)** (SSC CHSL 2016)

**Exp:** Calcium (Z = 20) is placed in 2<sup>nd</sup> group and 4<sup>th</sup> period. II<sup>nd</sup> group of periodic table is known as alkaline earth metals. It has 6 elements. These are-

Beryllium (Be=4)	- 2 <sup>nd</sup> period
Magnesium (Mg=12)	- 3 <sup>rd</sup> period
Calcium (Ca=20)	- 4 <sup>th</sup> period
Strontium (Sr=38)	- 5 <sup>th</sup> period
Barium (Ba=56)	- 6 <sup>th</sup> period
Radium (Ra=88)	- 7 <sup>th</sup> period

## 8. In the Modern Periodic table one of the following does not have appropriate position:

- (A) Inert gases  
(B) Inner-transition elements  
(C) Transition elements (D) Fluorine

**Ans. (B)**

**Exp:** If we look at the modern periodic table, we find that inner-transition elements have not been placed in the main body of the periodic table. These elements have been put at a separate place at the bottom of the periodic table.

## 9. The Modern Periodic Table consists of 18 groups and 7 periods. What is the atomic number of the element placed in the 1<sup>st</sup> group and the 4<sup>th</sup> period?

- (A) 21 (B) 17 (C) 19 (D) 9

**Ans. (C)** (SSC CHSL 2016)

**Exp:** Potassium (Z = 19) is placed in 1<sup>st</sup> group and 4<sup>th</sup> period. 1<sup>st</sup> group has 7 elements these are -



Hydrogen (H=1) belongs to 1<sup>st</sup> period. Lithium (Li=3) belongs to 2<sup>nd</sup> period. Sodium (Na=11) belongs to 3<sup>rd</sup> period. Potassium (K=19) belongs to 4<sup>th</sup> period. Rubidium (Rb=37) belongs to 5<sup>th</sup> period. Cesium (Cs=55) belongs to 6<sup>th</sup> period. Francium (Fr=87) belongs to 7<sup>th</sup> period.

**10. The electronegativity of the following elements increases in the order:**

- (A) C, N, Si, P (B) N, Si, C, P  
(C) Si, P, C, N (D) P, Si, N, C

**Ans. (C)**

**Exp:** We know that in a period, Electronegativity increases and in a group electronegativity decreases. On this basis we write the following order of electronegativity values of the given elements (i) C < N (same period) (ii) Si < P (same period) (iii) C > Si (same group) (iv) N > P (same group).

**11. The correct order of electronegativity of F, N, O and P is:**

- (A) F > N > P > O (B) F > O > P > N  
(C) F > O > N > P (D) N > O > F > P

**Ans. (C)**

**Exp:** We know that in a period, Electronegativity increases and in a group electronegativity decreases. Thus on the basis we can write the relations : (i) N < O < F (same period) (ii) P < N (same group). On combining these relations we can write P < N < O < F or F > O > N > P.

**12. Electronegativity values of Fe, Fe<sup>2+</sup> and Fe<sup>3+</sup> are in the order:**

- (A) Fe > Fe<sup>2+</sup> > Fe<sup>3+</sup> (B) Fe<sup>2+</sup> > Fe > Fe<sup>3+</sup>  
(C) Fe<sup>3+</sup> > Fe > Fe<sup>2+</sup> (D) Fe<sup>3+</sup> > Fe<sup>2+</sup> > Fe

**Ans. (D)**

**Exp:** Since the size of the given species increases in the order : Fe<sup>3+</sup> < Fe<sup>2+</sup> < Fe, electronegativity values of these species decrease as Fe<sup>3+</sup> > Fe<sup>2+</sup> > Fe.

**13. Which among the following elements has highest electronegativity?**

- (A) Gallium (B) Sodium  
(C) Arsenic (D) Cesium

**Ans.(C) (SSC CHSL 2016)**

**Exp:** In the given options, Arsenic has highest electronegativity. Electronegativity generally increases on moving across a period from left to right. This is due to decrease in atomic size and increases in effective nuclear charge. Electronegativity generally decreases from top to bottom in a group as atomic size increases and the bonding electrons become away from the nucleus.

**14. Element with Highest Ionization energy is-**

- (A) Hydrogen (B) Helium  
(C) Lithium (D) Sodium

**Ans. (B) (SSC MTS 2008)**

**Exp:** In the given options helium has highest ionization energy. This is attributed to completely filled stable configuration of Helium.

$He - 1s^2$



**Completely filled 1s orbital**

**15. Nitrogen has higher ionization energy than oxygen because in Nitrogen there is-**

- (A) Small Atomic Radii  
(B) High Nuclear Charge  
(C) Half Filled Stable configuration in 2p orbital  
(D) High Bond Dissociation energy

**Ans. (C) (SSC CHSL 2013)**

**Exp:** Nitrogen has higher ionization energy than oxygen because in Nitrogen there is half filled stable configuration in 2p orbital.

${}_7N - 1s^2, 2s^2 2p^3$

${}_8O - 1s^2, 2s^2 2p^4$

**Note:** The completely filled and completely half filled subshells are stable due to symmetrical distribution of electrons and exchange energy.

**16. Ionization Potential for inert gas is**

- (A) Zero (B) Low  
(C) High (D) Negative

**Ans. (C) (SSC CHSL 2016)**

**Exp:** The Ionization Potential for inert gas is very high. This is attributed to the completely filled stable configurations. However, the ionisation potential decreases with increase in Atomic Number from He to Rn due to increase in size.

**17. Which of the following atoms has the lowest ionisation potential?**

- (A) N (B) Cs (C) As (D) O

**Ans. (B) (SSC CHSL 2016)**

**Exp:** In Cesium (Cs), the outermost electron is farthest from the nucleus and so minimum energy is required to remove outermost electron from the atom. Hence Cs has lowest Ionisation Potential.

**18. Who amongst the following gave the 'Periodic Law'?**

- (A) Carlton McGee (B) Emil Fischer  
(C) Charles Darwin (D) Dmitri Mendeleev

**Ans. (D) (SSC CPO 2017)**

**Exp:** Dmitri Mendeleev gave the 'Periodic Law'. According to him, the physical & chemical properties of the elements are periodic function of their Atomic Mass.

After Mendeleev, Mosley gave 'Modern Periodic Law' which states that Physical & Chemical properties of the elements are periodic function of their atomic number or no. of protons.

**19. 'Rn' is chemical symbol of which element?**

- (A) Radium (B) Radon  
(C) Rhenium (D) Ruthenium

**Ans. (B) (SSC CPO 2017)**

Exp: Element	Symbol
Radium	Ra
Radon	Rn
Rhenium	Rh
Ruthenium	Ru

20. What is the chemical symbol of 'Iron'?

- (A) Ir (B) Fe  
(C) F (D) In

Ans. (B) (SSC CPO 2017)

Exp: Chemical symbol of Iron is Fe. Atomic number is 26.

21. In a periodic table, while moving from left to right in a period, number of \_\_\_\_\_ remains same.

- (A) Electrons (B) Protons  
(C) Shells (D) Neutrons

Ans. (C) (SSC CPO 2017)

Exp: On moving in period from left to right, no. of shells remains same while no. of electrons, protons & neutrons changes.

22. What is the common characteristic of the elements of the same group in the periodic table?

- (A) Electrons in outer most shell  
(B) Total number of electrons  
(C) Total number of protons  
(D) Atomic weight

Ans. (A) (SSC CGL 2017)

Exp: The common characteristic of the elements of the same group in the periodic table is no. of electrons in outermost shell or valence shell.

eg:- H  $1s^1$   
Li  $1s^2, 2s^1$   
Na  $1s^2, 2s^2 2p^6, 3s^1$   
K  $1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^1$   
Rb  $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^6, 5s^1$

H, Li, Na, K & Rb are elements of same group ( $1^{st}$  group) having one valence electron.



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# Metallurgy

1. Major portion of the earth's crust is mainly constituted by

- (A) Oxygen and Iron (B) Oxygen and Silicon  
(C) Silicon and Iron (D) Silicon and Aluminium

Ans. (B) (SSC CHSL 2016)

Exp: Oxygen constitutes nearly half (46.6%) and silicon about one quarter (25.7%) of the total mass of the elements in the earth's crust.

2. The most abundant metal in the Earth's crust is

- (A) Zinc (B) Copper  
(C) Aluminium (D) Iron

Ans. (C) (SSC CGL 2016)

Exp: The most abundant metal in earth crust is Aluminium (8.3% by weight) while iron (4.7% by weight) is second most abundant metal.

3. The most abundant element on the earth is-

- (A) Calcium (B) Silicon  
(C) Oxygen (D) Nitrogen

Ans. (C) [SSC CPO 2015]

Exp: Oxygen is the most abundant element on the earth crust with 46.6%.

4. Bridgmanite is

- (A) A bridge on the river Thames  
(B) Name of a game  
(C) Earth's most abundant mineral  
(D) Name of a music

Ans. (C) (SSC CGL 2016)

Exp: Bridgmanite is the most abundant mineral on Earth. It makes up about 70% of the earth's lower mantle and 38% of total volume of earth. It is made up of high density magnesium iron silicate. This name is in honour of Percy Bridgman.

5. Which of the following metal is found in Free State?

- (A) Copper (B) Iron  
(C) Tin (D) Lead

Ans. (A)

Exp: Copper is found in both states free and combined. It is a transition element. Early Man first of all used copper Metal.

6. Which of the following metal is found in free state in nature?

- (A) Aluminium (B) Gold  
(C) Iron (D) Lead

Ans. (B) [SSC MTS 2011]

Exp: Gold is found in free state in nature. Gold, Platinum are noble metals.

7. Haematite is an ore/mineral of

- (A) Zinc (B) Iron  
(C) Lead (D) Manganese

Ans. (B) (SSC CHSL 2016)

Exp: Haematite ( $\text{Fe}_2\text{O}_3$ ) is main ore of iron. It is also called red oxide of iron. It contains 69.9% iron.

8. Chromite is an ore/mineral of

- (A) Zinc (B) Uranium  
(C) Titanium (D) Chromium

Ans. (D) (SSC CHSL 2016)

Exp: Chromite is an iron chromium oxide ( $\text{FeCr}_2\text{O}_4$ ).

9. Turquoise is an ore/mineral of

- (A) Copper (B) Manganese  
(C) Mercury (D) Tin

Ans. (A) (SSC CHSL 2016)

Exp: Turquoise is a hydrated phosphate of copper and aluminium. So in the given options it is an ore/mineral of copper.

10. Malachite is an ore/mineral of

- (A) Lead (B) Manganese  
(C) Mercury (D) Copper

Ans. (D) (SSC CHSL 2016)

Exp: Malachite is an ore of copper. Malachite is a green copper carbonate hydroxide mineral [ $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ ]

11. Sphalerite is an ore/mineral of

- (A) Mercury (B) Molybdenum  
(C) Zinc (D) Silver

Ans. (C) (SSC CHSL 2016)

Exp: Sphalerite is the major ore of Zinc. It is also known as blende or Zinc blende.

12. Carnotite is an ore/mineral of

- (A) Beryllium (B) Chromium  
(C) Uranium (D) Copper

Ans. (C) (SSC CHSL 2016)

Exp: Carnotite is a potassium uranium vanadate with chemical formula  $\text{K}_2(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$ . It is an ore of Uranium.

13. Manganite is an ore/mineral of

- (A) Beryllium (B) Chromium  
(C) Manganese (D) Copper

Ans. (C) (SSC CHSL 2016)

Exp: Manganite is a mineral of manganese. It is composed of manganese oxide hydroxide,  $\text{MnO}(\text{OH})$ . However, main ore of manganese is pyrolusite ( $\text{MnO}_2$ ).

14. Cinnabar is an ore/mineral of

- (A) Lead (B) Manganese

- (C) Molybdenum (D) Mercury
- Ans. (D)** (SSC CHSL 2016)
- Exp:** Cinnabar (HgS) is an ore of Mercury.
- 15. Molybdenite is an ore/mineral of**
- (A) Molybdenum (B) Nickel  
(C) Silver (D) Tin
- Ans. (A)** (SSC CHSL 2016)
- Exp:** Molybdenite ( $\text{MoS}_2$ ) is a principle source of molybdenum. It is a sulphide mineral.
- 16. Magnetite is an ore/mineral of**
- (A) Beryllium (B) Chromium  
(C) Iron (D) Lead
- Ans. (C)** (SSC CHSL 2016)
- Exp:** Magnetite ( $\text{Fe}_3\text{O}_4$ ) is an ore of Iron. It is magnetic ore of iron. It contains 72.3% iron.
- 17. Beryl is an ore/mineral of**
- (A) Nickel (B) Beryllium  
(C) Lead (D) Tin
- Ans. (B)** (SSC CHSL 2016)
- Exp:** Beryl ( $\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$ ) is an ore of Beryllium.
- Note:** Phenacite is also an ore of Beryllium.
- 18. The common name of Lead (II) Sulphide is**
- (A) Borax (B) Epsom salt  
(C) Galena (D) Brimstone
- Ans. (C)** (SSC CHSL 2016)
- Exp:** Borax or sodium tetraborate [ $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ ] Galena or Leadsulphide [ $\text{PbS}$ ]  
Epsom salt or Magnesium Sulphate Heptahydrate [ $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ]  
Brimstone – It is common name of Sulphur. Galena is main ore of Lead.
- 19. Pyrolusite is an ore/mineral of \_\_\_\_\_.**
- (A) Mercury (B) Manganese  
(C) Molybdenum (D) Lead
- Ans. (B)** (SSC CHSL 2016)
- Exp:** Pyrolusite ( $\text{MnO}_2$ ) is an ore of Manganese.
- 20. Ilmenite is an ore/mineral of \_\_\_\_\_.**
- (A) Titanium (B) Copper  
(C) Lead (D) Manganese
- Ans. (A)** (SSC CHSL 2016)
- Exp:** Ilmenite is the titanium iron oxide ( $\text{FeTiO}_3$ ) mineral. It is the most important ore of Titanium.
- 21. Uraninite is an ore/mineral of \_\_\_\_\_.**
- (A) Zinc (B) Uranium  
(C) Titanium (D) Aluminium
- Ans. (B)** (SSC CHSL 2016)
- Exp:** Uraninite, formerly pitchblende is an ore of uranium.
- 22. Aluminium is extracted from –**
- (A) Mica (B) Copper  
(C) Bauxite (D) Gold
- Ans. (C)** [SSC MTS 2014]

- Exp:** Aluminium is not found in native (free) state. It is found in combining state with different minerals. Aluminium has three principle ores Bauxite, Diaspora, cryolite.
- Bauxite  $\rightarrow \text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$ ,  
Diaspore  $\rightarrow \text{AlO}(\text{OH})$ ,  
Cryolite  $\rightarrow \text{Na}_3\text{AlF}_6$
- 23. The ore of Aluminium is –**
- (A) Fluorspar (B) Bauxite  
(C) Haematite (D) Chalco Pyrites
- Ans. (B)** [SSC CGL 2015]
- Exp:** Bauxite is  $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$
- 24. Most important ore of Lead is–**
- (A) Galena (B) Magnetite  
(C) Pyrolusite (D) Siderite
- Ans. (A)** [SSC CHSL 2010]
- Exp:** Galena ( $\text{PbS}$ ) and Anglesite ( $\text{PbCl}_2$ ) are the ores of Lead.
- 25. Magnetite is –**
- (A)  $\text{Fe}_2\text{O}_3$  (B)  $\text{Fe}_3\text{O}_4$   
(C)  $\text{Fe}_2\text{CO}_3$  (D)  $2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$
- Ans. (B)** [SSC CGL Exam, 2014]
- Exp:** Magnetite is a mineral and one of the main iron ores. With the chemical formula  $\text{Fe}_3\text{O}_4$ , it is one of the oxides of iron.
- 26. Which one of the following is an iron ore?**
- (A) Bauxite (B) Magnetite  
(C) Lignite (D) Nitrite
- Ans. (B)** [SSC Steno 2011]
- Exp:** Bauxite – Aluminium ore  
Lignite – A type of Coal  
Magnetite – Iron ore  
Nitrite – Ion
- 27. Which one of the following Mineral does not contain Oxygen?**
- (A) Haematite (B) Bauxite  
(C) Cryolite (D) Calcite
- Ans. (C)** [SSC CHSL Exam, 2014]
- Exp:** Cryolite ( $\text{Na}_3\text{AlF}_6$ ) mineral does not contain Oxygen. Calcite ( $\text{CaCO}_3$ ) contains Carbon, Oxygen and Calcium. Bauxite contains Aluminium, Oxygen.  $\text{Na}_3\text{AlF}_6$  is sodium Hexa fluoro aluminates.
- 28. Ruby and Sapphire are the oxides of –**
- (A) Copper (B) Tin  
(C) Iron (D) Aluminium
- Ans. (D)** [SSC CGL 2008]
- Exp:** Ruby and Sapphire are the oxides of Aluminium.
- 29. Of the following commonly used materials, the one that is not an alloy is**
- (A) Steel (B) Brass  
(C) Bronze (D) Copper
- Ans. (D)** (SSC CGL 2016)
- Exp:** In the given option, Copper is metal while Steel, Brass and Bronze are alloy.  
Stainless steel - Fe = 73%, Cr = 18%, Ni = 8%, carbon = low amount



Brass - Cu = 60%,	Zn = 40%
Bronze - Cu = 88%,	Sn = 12%

**30. Bronze is an alloy of-**

- (A) Copper and zinc (B) Tin and Zinc  
(C) Copper and Tin (D) Iron and Zinc

**Ans. (C)** [SSC CGL 2016]

**Exp:** Bronze is an alloy of copper and tin. It consists of 88% of copper and 12% of tin. It is used in the manufacturing of doors, windows, sculptures and utensils.

**31. Which of the following does not contain silver?**

- (A) German Silver (B) Horn Silver  
(C) Ruby Silver (D) Lunar Silver

**Ans. (A)** [SSC CGL 2013]

**Exp:** German Silver contains Copper (60%), Zinc (20%) and Nickel (20%).

**32. Brass contains -**

- (A) Copper and Zinc (B) Copper and Tin  
(C) Copper and silver (D) Copper and Nickel

**Ans. (A)** [SSC CGL 2014]

or

**Brass is made of -**

- (A) Copper and tin (B) Tin and lead  
(C) Copper and Zinc (D) Copper, tin and Zinc

**Ans. (C)** [SSC CHSL 2011]

**Exp:** Brass is a metal alloy, made up of Copper and Zinc. The proportions of zinc and copper can be varied to create a range of brass with varying properties.

**33. Which of the following metal forms Amalgam with other metals?**

- (A) Lead (B) Zinc  
(C) Mercury (D) Copper

**Ans. (C)** [SSC CGL 2005]

**Exp:** Mercury on reacting with other metals form Amalgam. For Example- Dental Amalgam (Silver-Mercury), Potassium Amalgam, Sodium Amalgam, gold Amalgam, Aluminium Amalgam etc. Mercury is used in Thermometer.

**34. Amalgam is an alloy in which the base metal is-**

- (A) Aluminium (B) Mercury  
(C) Copper (D) Zinc

**Ans. (B)** [SSC Stenographer 2012]

**Exp:** Mercury on reacting with other metals form Amalgam. For Example- Dental Amalgam (Silver-Mercury), Potassium Amalgam, Sodium Amalgam, gold Amalgam, Aluminium Amalgam etc. Mercury is used in Thermometer.

**35. German Silver contains following Metals -**

- (A) Copper, Zinc, Nickel  
(B) Copper, Zinc, Silver  
(C) Copper, Zinc, Aluminium  
(D) Zinc, Silver Nickel

**Ans. (A)** [SSC LDC 2005]

Or

**German Silver, used for making utensils is an alloy of-**

- (A) Copper, Silver, Nickel

(B) Copper, Zinc, Nickel

(C) Copper, Zinc, Aluminium

(D) Copper, Nickel, Aluminium

**Ans. (B)**

[SSC CPO 2007]

or

**Which of the following is not contained by the German Silver?**

- (A) Copper (B) Nickel  
(C) Silver (D) Zinc

**Ans. (C)**

[SSC Section off. - 2007]

**Exp:** German silver varies in composition, the percentage of the three elements ranging approximately as follows:- Copper (50% to 61.6%), Zinc (19% to 17.2%), Nickel (30% to 21.1%). The proportions are always specified in commercial alloys.

**36. Percentage of carbon in steel ranges from-**

- (A) 0.1 to 1.5 (B) 1.5 to 3.0  
(C) 3.0 to 4.0 (D) 4.0 to 6.0

**Ans. (A)**

[SSC Sec off. Exam, 2007]

**Exp:** Steel contains around 98.9% of Iron and 0.1 to 1.5% of carbon. It is used for making blade, knife, utensils etc.

**37. The material used in electric heater is**

- (A) Tungsten (B) Nichrome  
(C) Brass (D) Steel

**Ans. (B)**

[SSC CGL 2016]

**Exp:** The material used in electric heater is Nichrome. Nichrome is a mixture of Nickel, Chromium and Iron.

**38. Fuse wire is made of an alloy of**

- (A) Tin and Lead (B) Tin and Copper  
(C) Lead and Copper (D) Copper and Silver

**Ans. (A)**

[SSC CGL 2016]

**Exp:** Fuse wire is made of alloy of Tin (Sn) and Lead (Pb). It is a piece of wire with a low melting point.

**39. Type of metals used in Printing, is an alloy of-**

- (A) Lead and Copper (B) Lead and Antimony  
(C) Lead and Bismuth (D) Lead and Zinc

**Ans. (B)**

[SSC CPO 2006]

**Exp:** Type of Metal Used in Printing is an alloy of Lead, tin and Antimony and their quantity in % given as follows.

Lead = 60-86%, Antimony = 11-30%,  
Tin = 3-20%

**40. An alloy used in making heating elements for electric heating devices is -**

- (A) Solder (B) Alloy steel  
(C) Nichrome (D) German Silver

**Ans. (C)**

[SSC CHSL 2013]

**Exp:** Heating effect of electric current is used in the appliances such as Electric Heater, Electric Iron, Room Heater etc. These Heating devices are operated by coils of very high resistance, which are made up of alloy Nichrome. Nichrome is an alloy of Nickel, Chromium and Iron.

**41. Shock absorbers are usually made up of steel as it?**

- (A) Is not brittle (B) Has lower elasticity  
(C) Has Higher elasticity (D) Has no Higher elasticity

**Ans. (C)**

[SSC CGL Exam, 2011]

**Exp:** Shock absorbers are usually made of steel because steel has higher elasticity. Elasticity is the ability of an object to resume its normal shape after being stretched or compressed.

**42. Which one of the following Metals is used to Heat up the electric iron?**

- (A) Copper (B) Tungsten  
(C) Nichrome (D) Tin

**Ans. (C)** [SSC MTS 2011]

**Exp:** Electric iron contains high resistance metal Nichrome as a heating element, stripped insulated by Mica. It does not melt even at very high temperature.

**43. Which of the following is the purest commercial form of Iron?**

- (A) Pig Iron (B) Steel  
(C) Stainless Steel (D) Wrought Iron

**Ans. (D)** [SSC CGL Exam, 2014]

**Exp:** Wrought Iron is the purest commercial form of Iron. It is the purest ore of iron containing carbon around 0.04 to 0.08%, which is less than even in the steel.

**44. Which of the following is purest form of Iron?**

- (A) Steel (B) Cast Iron  
(C) Wrought Iron (D) Pig iron

**Ans. (C)** [SSC CGL 2005, SSC FCI 2012]

**Exp:** Wrought Iron is the purest commercial form of Iron. It is the purest ore of iron containing carbon around 0.04 to 0.08%, which is less than even in the steel.

**45. The Percentage of carbon in cast iron is -**

- (A) 3 to 5 (B) 0.1 to 0.25  
(C) 0.5 to 1.5 (D) 6 to 8

**Ans. (A)** [SSC CGL Exam, 2014]

**Exp:** Depending upon the % of carbon Iron is of three types. Cast iron, pig iron and Steel. Amount of (%) carbon present in Cast iron, Pig Iron and Steel is 2 to 4%, 0.1 to 0.25% and 0.5 to 1.5 respectively.

**46. The Iron ore which contains 72% of Iron is -**

- (A) Magnetite (B) Limonite  
(C) Haematite (D) Siderite

**Ans. (A)** [SSC FCI 2012]

**Exp:** Percentage of Iron in different iron ores are given as:-

1. Magnetite ( $\text{Fe}_3\text{O}_4$ ) - 72%
2. Haematite ( $\text{Fe}_2\text{O}_3$ ) - 70%
3. Limonite ( $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$ ) - 55 - 66%
4. Siderite ( $\text{FeCO}_3$ ) - 48%

**47. Stainless Steel is an alloy of -**

- (A) Chromium and Carbon  
(B) Chromium and iron  
(C) Chromium, carbon and iron  
(D) Chromium and iron

**Ans. (C)** [SSC FCI 2012]

**Exp:** Stainless steel is an alloy of Chromium, Iron and Carbon.

**48. Hard Steel contains -**

- (A) 2 to 5% of carbon (B) 0.5 to 1.5% of carbon  
(C) 0.1 to 0.4% of carbon (D) 0.01 to 0.04% of carbon

**Ans. (B)** [SSC CGL 2011]

**Exp:** Steel containing carbon 0.1 to 0.4% is known as Mild steel while steel having carbon 0.5 to 1.5% is called Hard steel.

**49. The manufacturing of iron from iron-ore involves the process of**

- (A) Oxidation (B) Reduction  
(C) Electrolysis (D) Fractional distillation

**Ans. (B)** [SSC CGL 2016]

**Exp:** Haematite ( $\text{Fe}_2\text{O}_3$ ) is main ore of iron metal. It is an Oxide Ore. Reduction process is used in manufacturing of iron because oxides are reduced.

**50. The use of Heat treatment of ore that includes smelting and roasting is termed as-**

- (A) Cry metallurgy (B) Pyrometallurgy  
(C) Electrometallurgy (D) Hydrometallurgy

**Ans. (B)** [SSC CHSL 2015]

**Exp:** Pyrometallurgy is the branch of science and technology concerned with the use of the High temperature to extract and purify metals. It consists of the thermal treatment of minerals and metallurgical ore (calcinations, Roasting, Refining and Smelting). Fe, Cu, Zn, Cr, Tin etc. are extracted by this process.

**51. Heating of ore in the absence of air below its melting point is called-**

- (A) Leaching (B) Roasting  
(C) Smelting (D) Calcination

**Ans. (D)** [SSC CHSL 2013]

**Exp:** In Calcination process Carbonate, Hydroxide or Oxide ores are heated frequently in the absence of air.

**52. Froth Floatation process is used for the metallurgy of -**

- (A) Sulphide ore (B) Oxide ore  
(C) Sulphate ore (D) Chloride ore

**Ans. (A)**

**Exp:** Froth floatation method has been used for the concentration of sulphide ores such as Galena ( $\text{PbS}$ ), Copper pyrites are preferentially wetted by palm oil and gangue particle by water.

**53. Aluminium can be purified by-**

- (A) Oxidation (B) Electrolysis  
(C) Ozonolysis (D) Distillation

**Ans. (B)** [SSC CPO 2006]

**Exp:** The aluminium metal obtained by the electrolysis of alumina is 99% pure.

**54. Ultra purification of a metal is done by-**

- (A) Slugging (B) Leaching  
(C) Zone Melting (D) Smelting

**Ans. (C)** [SSC CGL 2015]

**Exp:** Ultra purification of metal is done by Zone Melting Method.

**55. Which material is used in the manufacturing of electric heater coil?**

- (A) Copper (B) Iron  
(C) Nickel (D) Nichrome

**Ans. (D)** (SSC CPO 2017)

**Exp:** Nichrome is an alloy of Nickel (Ni), Chromium (Cr) & Iron (Fe). It is used in the manufacturing of electric heater coil because of its high resistance.

**56. Which of the following cloth will readily catch fire?**

- (A) Cotton cloth (B) Polyester cloth  
(C) Acrylic cloth (D) Nylon cloth

**Ans. (A)** (SSC CPO 2017)

**Exp:** Cotton cloth catches fire easily because of its light texture.

**57. Which of the following are the main components of stainless steel?**

- (A) Iron and carbon (B) Silver  
(C) Iron, chromium and nickel  
(D) Iron and nickel

**Ans. (C)** (SSC CPO 2017)

**Exp:** Stainless steel is an alloy of Iron, chromium & nickel. It is corrosion resistant.

**58. Which of the following pairs is Incorrect?**

- I. Haematite : Iron  
II. Pitchblende : Copper  
III. Monazite : Thorium  
(A) Only I (B) Only II  
(C) Only I and II (D) Only I and III

**Ans. (B)** (SSC CGL 2017)

Exp:	Ore	Metal
	Haematite	Iron
	Pitchblende	Uranium
	Monazite	Thorium

**59. Which of the following is an ore of Aluminium?**

- (A) Galena (B) Cryolite

- (C) Cinnabar (D) Epsom salt

**Ans. (B)** (SSC CGL 2017)

**Exp:** Galena (PbS) = lead ore  
Cryolite ( $\text{Na}_3\text{AlF}_6$ ) = Aluminium ore  
Cinnabar (HgS) = Mercury ore  
Epsom salt ( $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ) = Salt of Magnesium

**60. What are the main components of Brass alloy?**

- (A) Copper and Zinc  
(B) Copper and Strontium  
(C) Copper, Zinc and Nickel  
(D) Copper and Nickel

**Ans. (A)** (SSC CGL 2017)

**Exp:** Brass is an alloy of Copper & Zinc. Cu = 60% & Zn = 40%. It is used for making plumbing & electric appliances.

**61. Which of the following is an ore of iron?**

- (A) Dolomite (B) Epsom salt  
(C) Siderite (D) Galena

**Ans. (C)** (SSC CGL 2017)

**Exp:** Siderite ( $\text{FeCO}_3$ ) = Ore of Iron  
Galena (PbS) = Ore of lead  
Dolomite ( $\text{CaCO}_3 \cdot \text{MgCO}_3$ ) = Ore of Magnesium & Calcium  
Epsom salt ( $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ) = Salt of Magnesium

**62. What are the main components of Bronze alloy?**

- (A) Copper and Zinc (B) Copper and Tin  
(C) Zinc and Nickel (D) Aluminium and Nickel

**Ans. (B)** (SSC CGL 2017)

**Exp:** Bronze is an alloy of copper & tin. It consists 88% of copper & 12% of tin. It is used for manufacturing the doors, windows, sculptures & utensils.

**63. \_\_\_\_\_ is made by mixing iron with carbon and metals like chromium, nickel and manganese.**

- (A) Ship (B) Stainless steel  
(C) Rust (D) Ozone

**Ans. (B)** (SSC CGL 2017)

**Exp:** Stainless steel is made by mixing iron with carbon & metals like chromium, nickel & manganese. It is a corrosion resistant alloy which is used for making utensils.





# Metals, Non-metals & Semimetals

1. Identify the metal which is Non-toxic in nature—

- (A) Gold (B) Cadmium  
(C) Cobalt (D) Chromium

Ans. (A) [SSC CHSL 2010]

**Exp:** In the given metals, Gold is nontoxic in nature while cadmium, cobalt and chromium are toxic.

2. Main constituent of liquid bleach is —

- (A) Hydrochloric acid (B) Sodium chloride  
(C) Sodium hypochlorate (D) Sodium hypochlorite

Ans. (D) [SSC CHSL Exam, 2015]

**Exp:** Sodium hypochlorite (NaOCl) when dissolved in water is commonly known as bleach or liquid bleach. It is used as disinfectant or a bleaching agent.

3. Caustic Soda is —

- (A) Deliquescent (B) Oxidant  
(C) Reductant (D) Efflorescent

Ans. (A) [SSC CHSL 2012]

**Exp:** Caustic soda is chemically known as sodium hydroxide (NaOH). It is deliquescent.

**Deliquescent:** The property of certain compounds of taking up the moisture present in atmosphere and becoming wet when exposed is known as deliquescent. These compounds are known as deliquescent.

eg. KOH, anhy.  $\text{CaCl}_2$ , anhy.  $\text{MgCl}_2$ , anhy.  $\text{FeCl}_3$ .

4. Which of the following is used in welding broken pieces of iron rails and parts of machine—

- (A) Aluminium sulphate (B) Solder  
(C) Aluminium powder (D) None of these

Ans. (C) [SSC FCI 2012]

**Exp:** Aluminium Powder is used in welding broken pieces of iron rail and machine parts.

5. Hydrogen sulphide is a—

- (A) Colourless, odourless gas  
(B) Yellowish gas with pungent odour  
(C) Reddish brown gas with fishy odour  
(D) Colourless gas with rotten egg smell

Ans. (D) [SSC Steno 2014]

**Exp:** Hydrogen Sulphide is a colourless gas with rotten egg smell.

6. Tip of match stick contains —

- (A) Phosphorous penta oxide  
(B) White phosphorous  
(C) Red phosphorous  
(D) Phosphorous trichloride

Ans. (C) [SSC Tax Asst. 2009, FCI 2012]

or

Head of safety Matches contains —

- (A)  $\text{P}_2\text{O}_3$  (B)  $\text{Sb}_2\text{S}_3$   
(C) Yellow Phosphorous (D) Red Phosphorous

Ans. (D) [SSC MTS 2014]

**Exp:** Tip of match stick contains red phosphorous.

7. Match Stick uses the allotrope of Phosphorous—

- (A) Any Phosphorous (B) Red phosphorous  
(C) Black Phosphorous (D) Purple Phosphorous

Ans. (B) [SSC CGL 2002]

**Exp:** Tip of match stick contains red phosphorous. Red phosphorous is an allotrope of phosphorous.

8. Most abundant inert gas in the atmosphere is

- (A) He (B) Ne (C) Kr (D) Ar

Ans. (D) [SSC CGL 2014]

**Exp:** Most abundant inert gas in the atmosphere is Argon. Total percentage of noble gases in dry air is about 1% by volume, of which Argon (0.93%) is the major component.

9. Green colour seen in firework display, is due to the chloride salt of—

- (A) Sodium (B) Calcium  
(C) Barium (D) Strontium

Ans. (C) [SSC CGL Exam, 2015]

**Exp:** In fireworks, Green colour is displayed due to chloride salts of Barium. Salts used for different colours are:-

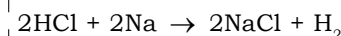
Salt	Colour
1. Strontium sulphate	Red
2. Strontium Carbonate	Bright Red Colour
3. Sodium Salt	Golden yellow
4. Copper Salt	Blue
5. Aluminium Powder	Silver Colour.

10. Which of the following will displace Hydrogen from acids to form salts?

- (A) S (B) Na (C) Ag (D) P

Ans. (B) [SSC CHSL 2014]

**Exp:** For the Formation of salts, sodium will displace Hydrogen because in electrochemical series Hydrogen is below sodium.



11. Liquid Chemical used for artificial rain or cloud seeding—

- (A) Silver iodide (AgI) (B) Sodium chloride (NaCl)  
(C) Dry ice (solid  $\text{CO}_2$ ) (D) All the these

Ans. (D) [SSC CPO 2010]



**Exp:** Silver iodide, sodium chloride and dry ice are oftenly used fluid chemical for artificial rain or cloud seeding.

**12. The inert gas used as beacon Light is -**

- (A) Krypton (B) Argon  
(C) Helium (D) Neon

**Ans. (D)** [SSC CHSL 2014]

**Exp:** Neon (noble gas) is used in beacon light as safety signal for air navigators because its light has fog penetrating power.

**13. Hydrogen was discovered by -**

- (A) Boyle (B) Charles  
(C) Cavendish (D) Priestley

**Ans. (C)** [SSC CGL 2014]

**Exp:** Hydrogen was discovered by Henry Cavendish in 1766. Hydrogen is the lightest gas. It is known as fuel of future.

**14. Gas used in the production of vegetable ghee is-**

- (A) Hydrogen (B) Helium  
(C) Oxygen (D) Nitrogen

**Ans. (A)** [SSC FCI 2012]

**Exp:** Hydrogen Gas is used in the production of vegetable ghee. This process is known as Hydrogenation.

**15. Ozone Contains-**

- (A) Only oxygen (B) Oxygen and nitrogen  
(C) Hydrogen and carbon (D) Oxygen and carbon

**Ans. (A)** [SSC CPO 2009]

**Exp:** Chemical formula of ozone is  $O_3$ , so ozone contains only oxygen. Ozone is a pale blue gas.

**16. Ozone is represented as \_\_\_\_.**

- (A)  $O_3$  (B)  $H_2O_2$   
(C)  $Cl_2O$  (D)  $N_2O$

**Ans. (A)** (SSC CHSL 2016)

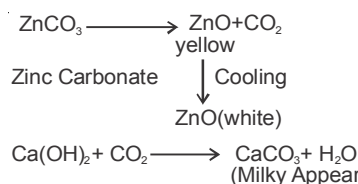
**Exp:** Chemical formula of ozone is  $O_3$ , so ozone contains only oxygen. Ozone is a pale blue gas.

**17. A white solid 'A' gives off a gas which turns lime water milky. The residue is yellow but turns white on cooling. Now the solid is-**

- (A) Zinc sulphate (B) Zinc carbonate  
(C) Lead sulphate (D) Lead carbonate

**Ans. (B)** (SSC CHSL 2012)

**Exp:** Carbon dioxide turns lime water into calcium carbonate.



**18. Which of the following can not be formed**

- (A)  $He^{+2}$  (B)  $He^+$   
(C)  $He$  (D)  $He_2$

**Ans. (D)**

**Exp:** Noble gases are monoatomic so formation of  $He_2$  is not possible.

**19. Chemical name of bleaching powder is-**

- (A) Calcium chlorate  
(B) Calcium hypochlorite  
(C) Calcium chloro hypochlorite  
(D) Calcium dichloride

**Ans. (B)** [SSC CGL 2006, SSC CHSL 2010]

**Exp:** Chemically Bleaching powder is known as calcium hypochlorite and its chemical formula is  $CaOCl_2$ . It is used in disinfection of water and as a bleaching agent. It is also used for the manufacturing of chlorine gases and chloroform ( $CHCl_3$ ).

**20. Which one among the following is used commonly in the dehydration of water?**

- (A) Bleaching powder (B) Alum  
(C) Borax (D) Soda powder

**Ans. (A)**

**Exp:** Calcium hypochlorite (bleaching powder) is an inorganic compound with formula  $CaOCl_2$ . It is used as dehydrating agent along with  $CaCl_2$ .

**21. Which one of the following is odd-**

- (A) Chalk (B) Slaked lime  
(C) Limestone (D) Marble

**Ans. (B)** [SSC CHSL 2011]

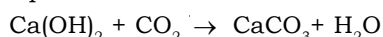
**Exp:** Marble is a metamorphic rock, which is the result of metamorphosis of Lime stone. Chalk is also a type of Lime Stone. Slaked Lime is a colourless crystal with chemical formula  $Ca(OH)_2$ .

**22. Lime water becomes milky when exposed to air due to the presence of -**

- (A) Carbon dioxide (B) Nitrogen  
(C) Oxygen (D) Sulphur dioxide

**Ans. (A)** [SSC CHSL 2011]

**Exp:** Lime water becomes milky when exposed to air due to the presence of carbondioxide.



**23. Which of the following gas is coloured?**

- (A) Oxygen (B) Nitrogen  
(C) Chlorine (D) Hydrogen

**Ans. (C)** (SSC CHSL 2015)

**Exp:** Oxygen, Nitrogen and Hydrogen are colourless gases while chlorine is a greenish yellow coloured gas.

**24. Chemically Lime water is -**

- (A) Calcium Hydroxide (B) Sodium Carbonate  
(C) Sodium Hydroxide (D) Calcium carbonate

**Ans. (A)** (SSC CGL 2006)

**Exp:** Chemically Lime water is known as calcium Hydroxide and its chemical formula is  $Ca(OH)_2$ .

**25. Which gas is used as a fire extinguisher?**

- (A) Carbon dioxide (B) Carbon monoxide

(C) Carbon suboxide (D) Sulphur dioxide  
**Ans. (A)** (SSC Tax Asst. 2007)

or

**Gas is used as a fire extinguisher is-**

- (A) Neon (B) Nitrogen  
 (C) Carbon dioxide (D) Carbon monoxide

**Ans. (C)** (SSC CHSL 2013)

**Exp:** Carbon dioxide Gas is used as a fire extinguisher. It stops the supply of oxygen which is necessary for the burning of object because  $\text{CO}_2$  is heavier than oxygen.

**26. Mercury is a -**

- (A) Solid metal (B) Liquid metal  
 (C) Solid nonmetal (D) Liquid nonmetal

**Ans. (B)** (SSC Steno 2010)

**Exp:** Mercury is liquid Metal, it is an essential constituent of **Amalgams**. It is found in liquid state at room temperature.

**27. What is dry ice?**

- (A) Dry ice without water (B) Benzoic acid  
 (C) Glacial acetic acid (D) Solid carbon dioxide

**Ans. (D)** (SSC MTS 2008, SSC CGL 2012)

Or

**Dry ice is a solid type of-**

- (A) Air (B) Nitrogen  
 (C) Water (D) Carbon dioxide

**Ans. (D)** (SSC MTS 2011, SSC CGL 2015)

**Exp:** Dry ice is solid carbon dioxide ( $\text{CO}_2$ ) with a low temperature of  $-78^\circ \text{C}$  ( $-109^\circ \text{F}$ ). At atmospheric pressure, solid  $\text{CO}_2$  sublimates directly to vapour without a liquid phase.

**28. Diamond does not conduct electricity, because**

- (A) It's structure is very compact  
 (B) It is of crystalline nature  
 (C) There are only carbon atoms, present in it  
 (D) No free electrons are present in it

**Ans. (D)** (SSC CGL 2016)

**Exp:** Since all the electrons are firmly held in C-C  $\sigma$ -bonds, there are no free electrons in a diamond crystal. Therefore, diamond is a bad conductor of electricity.

**29. Charcoal is used in water treatment as a/an-**

- (A) Solvent (B) Absorbent  
 (C) Coagulant (D) Adsorbent

**Ans. (D)** (SSC CHSL 2012)

**Exp:** Charcoal or coal of wood is a black Brownish Product which is formed when wood or bone is combusted in the absence of oxygen and water. Volatile constituents from animals and vegetation are removed. Charcoal is used as an adsorbent in water treatment because charcoal adsorbs the pollutants present in water.

**30. The gas which turns into Liquid at the Lowest temperature among the following is-**

- (A) Hydrogen (B) Oxygen  
 (C) Helium (D) Nitrogen

**Ans. (A)** (SSC CGL 2008)

**Exp:** At the lowest temperature Hydrogen turns into Liquid.

**31. Heavy water means-**

- (A) Water which is used in heavy industries.  
 (B) Distilled water  
 (C) Water containing Maximum density  
 (D) Water containing salts of calcium and Magnesium

**Ans. (C)** (SSC CPO 2009)

**Exp:** Heavy water means water containing maximum density. It contains Deuterium, an isotope of Hydrogen. It contains 11% more density than simple water but physically and chemically is same as simple water. It is used as a moderator in nuclear reactors.

**32. What is the chemical composition of Heavy Water?**

- (A)  $\text{H}_2\text{O}$  (B)  $\text{HDO}$   
 (C)  $\text{D}_2\text{O}$  (D)  $\text{H}_2\text{O}_2$

**Ans. (C)** (SSC GD 2015)

**Exp:** Heavy water is chemically deuterium oxide ( $\text{D}_2\text{O}$ ). Heavy water contains heavy hydrogen or deuterium.

**33. Soda water contains -**

- (A)  $\text{SO}_2$  (B)  $\text{NO}_2$   
 (C)  $\text{H}_2$  (D)  $\text{CO}_2$

**Ans. (D)** (SSC CGL 2014)

**Exp:** Soda water contains Carbon dioxide ( $\text{CO}_2$ ) gas.

**34. Which of the following is used for making smoke bombs?**

- (A) Sulphur (B) Phosphorous  
 (C) Hydrogen (D) Carbon

**Ans. (B)** (SSC CGL 2005)

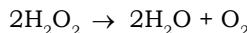
**Exp:** Phosphorous is used for making the smoke bombs. It is also used in making match box, crackers and explosive materials.

**35. Hydrogen Peroxide is an effective Sterilizing agent. Which one of the following product is formed when it readily loses active oxygen?**

- (A) Water (B) Hydrogen  
 (C) Ozone (D) Nascent hydrogen

**Ans. (A)**

**Exp:** Hydrogen peroxide is an effective sterilizing agent, when active oxygen disappears from it, then it forms water.



**36. In deep sea diving, divers use a mixture of gases consisting of oxygen and-**

- (A) Argon (Ar) (B) Helium (He)  
 (C) Helium (He) and nitrogen (N)  
 (D) Hydrogen (H)

**Ans. (C)** (SSC MTS 2014)

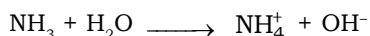
**Exp:** In deep sea water, divers used a mixture of oxygen, Nitrogen and Helium which is known as Trimix.

**37. The Gas dissolved in water that makes it basic is?**

- (A) Hydrogen (B) Carbon dioxide  
(C) Sulphur dioxide (D) Ammonia

**Ans. (D)** [SSC CHSL 2015]

**Exp:** Dissolved ammonia ( $\text{NH}_3$ ) in water makes it basic. Polar characteristics of ammonia and its tendency to form bonding shows its High Solubility in water. In aqueous solution ammonia acts as a base and forms hydroxyl and ammonium ions.



**38. Which metal is extracted from sea water?**

- (A) Potassium (B) Aluminium  
(C) Magnesium (D) Beryllium

**Ans. (C)** [SSC Sec. Officer 2007]

**Exp:** Magnesium is extracted from sea salts  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ .

**39. Silicone is a Polymer of-**

- (A) Silicon Tetra Chloride  
(B) Dialkyl dichloro silane  
(C) Silane (D) Tetra alkyl silane

**Ans. (B)** [SSC CGL 2013]

**Exp:** Silicon is a polymer of dialkyl dichloro silane ( $\text{R}_2\text{SiCl}_2$ ).

**Silicones:** These are organosilicon polymeric compounds containing Si-O-Si linkages. These have general formula of  $(\text{R}_2\text{SiO})_n$  having  $(\text{R}_2\text{SiO}-)$  as a repeating unit. (R may be alkyl or phenyl group). The starting material for the manufacturing of silicones is alkyl or aryl substituted chlorosilanes.

**40. Which one of the following gases mixed oxygen in aqualungs used by divers for the breathing?**

- (A) Methane (B) Nitrogen  
(C) Helium (D) Hydrogen

**Ans. (C)** [SSC MTS 2002, SSC CHSL 2011]

**Exp:** Helium-oxygen mixture is used by deep sea divers in preference to nitrogen oxygen mixture because of its very low solubility in blood. It is also used to assist breathing in asthma.

**41. Which of the oxide is neutral?**

- (A) CO (B)  $\text{SnO}_2$   
(C) ZnO (D)  $\text{SiO}_2$

**Ans. (A)**

**Exp:** CO is a neutral oxide. Neutral oxides show neither basic nor acidic properties and hence do not form salt when reacted with acids or bases.

**eq.**  $\text{NO}$ ,  $\text{N}_2\text{O}$  etc

**42. Which of the following oxide is amphoteric in character?**

- (A) CaO (B)  $\text{CO}_2$   
(C)  $\text{SiO}_2$  (D)  $\text{SnO}_2$

**Ans. (D)**

**Exp:** Metal oxides which show both acidic as well as basic behaviour are known as amphoteric oxides. These oxides react with acids as well as bases to produce salt and water.

**eg:**  $\text{ZnO}$ ,  $\text{SnO}_2$ ,  $\text{PbO}_2$ ,  $\text{Al}_2\text{O}_3$  etc

**43. Which one of the following is a biochemical sediment rock?**

- (A) Marble (B) Coal  
(C) Granite (D) Slate

**Ans. (B)** [SSC MTS 2006]

**Exp:** Sedimentary rocks are important sources of natural resources like coal, fossil fuels or ores.

Depending upon the quantity of carbon % coal are of four types-

- |                           |   |
|---------------------------|---|
| 1. <b>Peat coal</b>       | Carbon content is 50 – 60%.<br>It is lowest grade of coal.    |
| 2. <b>Lignite coal</b>    | Carbon content is 65 – 70%.<br>It is known as brown coal      |
| 3. <b>Bituminous coal</b> | Carbon content is 70–85%.<br>It is also known as soft coal.   |
| 4. <b>Anthracite coal</b> | Carbon content is 90% – 95%.<br>It is the best grade of coal. |

**44. Which one of the following element is an Example of noble gas?**

- (A) Nitrogen (B) Hydrogen  
(C) Chlorine (D) Helium

**Ans. (D)** [SSC CHSL Exam, 2014]

**Exp:** In the given elements, Helium is an example of noble gas. Noble gases have completely filled orbitals (stable configuration). **Helium, Neon, Argon, Krypton, Xenon and Radon are Noble gases.**

**45. Which one of the following is not a form of carbon?**

- (A) Graphite (B) Charcoal  
(C) Soot (D) Haematite

**Ans. (D)**

**Exp:** Haematite ( $\text{Fe}_2\text{O}_3$ ) is not a form of carbon. It is an ore of Iron.

**46. Percentage of Lead in Lead Pencils is -**

- (A) 0 (B) 31-66  
(C) 40 (D) 80

**Ans. (A)** [SSC Sec off. 2007]

**Exp:** In Lead pencils, Lead is 0%. In lead pencils, graphite is used.

**47. The material used in the manufacture of Lead pencil is-**

- (A) Graphite (B) Lead  
(C) Carbon (D) Mica

**Ans. (A)** [SSC CGL MST 2010, SSC Steno 2005, 2002]

**Exp:** Graphite is used in pencils because of its ability to leave grey marks on paper. It is crystalline allotrope of carbon.

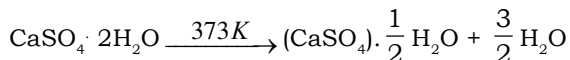
**Note:** In lead pencils lead percentage is 0.

**48. Plaster of Paris is made by the Partial dehydration of-**

- (A) Green vitriol (B) Blue vitriol  
(C) Gypsum salt (D) Epsom salt

**Ans. (C)** [SSC MTS 1966, SSC Tax Asst. 2006]

**Exp:** Plaster of Paris is formed by the partial dehydration of Gypsum Salt. It is used in the medicals for plastering the bones, in making toys and statues etc.



(Gypsum) (POP)

**49. Which among the following halogens is the most reactive?**

- (A) Fluorine (B) Bromine  
(C) Iodine (D) Chlorine

**Ans. (A)** [SSC CHSL Exam, 2010]

**Exp:** Fluorine is the most reactive among the Halogens. Fluorine has the lowest bond dissociation enthalpy. This is due to weak F-F bond because of the repulsion between the non-bonding electrons in the small molecule.

**50. Non-metal found in Liquid State-**

- (A) Bromine (B) Nitrogen  
(C) Fluorine (D) Chlorine

**Ans. (A)** [SSC CHSL Exam, 2013]

**Exp:** Bromine is the only nonmetal which is found in liquid State at room temperature. It has reddish brown colour.

**51. Which silver salt is used for making film of photography?**

- (A) Silver bromide (B) Silver chloride  
(C) Silver sulphate (D) Silver nitrate

**Ans. (A)** [SSC MTS 2002, SSC Sec off. 2006]

**Exp:** Silver Bromide is used to prepare the Light sensitive chemical (Emulsion) over photographic film, because these are soluble in Hypo solution (Sodium thiosulphate) which makes photographic film transparent.

**52. The chemical name of Hypo commonly used in Photography is-**

- (A) Sodium thiosulphate (B) Sodium nitrate  
(C) Sodium chloride (D) Silver nitrate

**Ans. (A)** [SSC CHSL 2014]

**Exp:** The chemical name of Hypo commonly used in photography is sodium thiosulphate ( $\text{Na}_2\text{S}_2\text{O}_3$ ).

**53. Silver halides are used in photographic plate because they are-**

- (A) Oxidised in air (B) Soluble in Hypo solution  
(C) Reduced by Light (D) Totally colourless

**Ans. (C)** [SSC CGL 2010]

**Exp:** Silver halides are used in photographic plates because they are Reduced by Light.

**54. Chemically 'Philosopher Wool' is a-**

- (A) Zinc oxide (B) Calcium oxide

(C) Aluminium oxide (D) Magnesium

**Ans. (A)** [SSC CHSL Exam, 2012]

**Exp:** Chemically Philosopher Wool is a zinc oxide ( $\text{ZnO}$ ). It is also known as zinc white. It is a constituent of cigarette filters. It can be used in lotions and creams to protect skin from UV light.

**55. Oxygen is a-**

- (A) Reducing agent  
(B) Combustion nourishing  
(C) Constituent of all gas  
(D) Inflammable gas

**Ans. (B)** [SSC Steno 2014]

**Exp:** Oxygen is a combustion nourishing gas. It is a supporter of combustion.

**56. Carbon monoxide is an inflammable gas which one of the following is also inflammable?**

- (A) Helium (B) Nitrogen  
(C) Oxygen (D) Hydrogen

**Ans. (D)** [SSC CPO 2009]

**Exp:** Carbon monoxide ( $\text{CO}$ ) is an inflammable gas. Hydrogen is also an inflammable from the given options and oxygen is combustion supporting gas.

**57. Select the incorrect statement regarding the carbon compounds -**

- (A) They have low melting and boiling Point  
(B) Insoluble in water  
(C) These are not easily combustible  
(D) They mainly contain carbon and Hydrogen.

**Ans. (C)** [SSC MTS 2013]

**Exp:** Carbon compounds are easily combustible in the presence of air and their melting point and boiling point are low. They are water insoluble and mainly consists of carbon & hydrogen.

**58. Chemical Name of common salt is-**

- (A) Sodium chloride (B) Sodium nitrate  
(C) Ammonium chloride (D) Calcium chloride

**Ans. (A)** [SSC Sec officer 2007]

**Exp:** Chemical name of common salt is sodium chloride and it's also known as Rock Salt. Its chemical formula is  $\text{NaCl}$ .

**59. Sodium chloride or Table salt occurs in nature as the mineral:**

- (A) Sylvite (B) Talc  
(C) Halite (D) Sphalerite

**Ans. (C)** [SSC CHSL Exam, 2015]

**Exp:** Sodium chloride or Table salt occurs in nature as the mineral Halite.

**60. Sodium carbonate commonly known as-**

- (A) Baking soda (B) Washing soda  
(C) Caustic soda (D) Caustic potash

**Ans. (B)** [SSC MTS 2009, SSC CHSL 2014]



**Exp:** Sodium carbonate is commonly known as washing soda. It is manufactured by solvay-ammonia process. It is white crystalline solid which crystallizes as decahydrate ( $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ ).

**61. Chemical formula of washing soda is-**

- (A)  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$  (B)  $\text{NaHCO}_3$   
(C)  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  (D)  $\text{Ca}(\text{OH})_2$

**Ans. (C)** [SSC CHSL Exam, 2014]

**Exp:** Chemical formula of washing soda is  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ .

**62. The common name of sodium bicarbonate is \_\_\_\_\_.**

- (A) Baking soda (B) Borax  
(C) Bleach (D) Epsom salt

**Ans. (A)** (SSC CHSL 2016)

or

**Commercial name of sodium bicarbonate is -**

- (A) Washing Soda (B) Baking Soda  
(C) Bleaching Powder (D) Soda Ash

**Ans. (B)** [SSC MTS 2010, SSC Tax Asst. 2009]

**Exp:** Commercial name of Sodium bicarbonate ( $\text{NaHCO}_3$ ) is Baking soda because on heating it decomposes to evolve bubbles of  $\text{CO}_2$  (leaving holes in cakes or pastries to make them light & fluffy).

**63. Chemical name of baking soda is-**

- (A) Sodium carbonate (B) Sodium bicarbonate  
(C) Sodium chloride (D) Sodium nitrate

**Ans. (B)** [SSC CHSL 2014]

**Exp:** Chemical name of baking soda is Sodium bicarbonate ( $\text{NaHCO}_3$ ).

**64. What is baking soda?**

- (A) Aluminium bicarbonat (B) Sodium isolate  
(C) Sodium bicarbonate (D) Aluminium sulphate

**Ans. (C)** (SSC CHSL 2016)

**Exp:** Sodium bicarbonate ( $\text{NaHCO}_3$ ) is known as baking soda. It is used in fire extinguisher for generating  $\text{CO}_2$ .

**65. Mortar is a mixture of water, sand -**

- (A) Slaked lime (B) Quick Lime  
(C) Lime Stone (D) Gypsum

**Ans. (A)** [SSC Tax Asst. 2009]

**Exp:** Slaked lime is used as building material in the form of mortar. It is prepared by mixing slaked lime with 3-4 times its weight of sand. The mixture is made into a thick paste with gradual addition of water. This paste is called mortar.

**66. Most commonly bleaching agent is -**

- (A) Carbon dioxide (B) Alcohol  
(C) Chlorine (D) Sodium Chloride

**Ans. (C)** [SSC CGL 2015]

**Exp:** Most commonly bleaching agent is chlorine ( $\text{Cl}_2$ ). It bleaches only in presence of water. Since chlorine bleaches by oxidation, the bleaching action of chlorine is permanent. Chlorine produces  $\text{HCl}$  during bleaching therefore it is used only for paper pulp, wood pulp and cloth.

**67. Helium gas is filled in the balloon instead of Hydrogen because its-**

- (A) Lighter than Hydrogen  
(B) More abundant than Hydrogen  
(C) Non-Combustible (D) More stable

**Ans. (C)** [SSC CGL Exam, 2008]

**Exp:** Because it is a noncombustible (non-flammable) gas.

**68. Why Helium gas used in balloons?**

- (A) Its atomic number is two  
(B) Its Lighter than air  
(C) It's one of the constituents of water  
(D) It's a noble gas

**Ans. (B)** [SSC MTS Exam 1999]

**Exp:** Helium gas is lighter than air and non-flammable (noncombustible) so it is used in balloons.

**69. A balloon filled with Helium rises in air because-**

- (A) Air exerts on upward force on the balloon.  
(B) The balloon is weightless  
(C) Helium is less dense than air  
(D) Helium pushes down the air below the balloon.

**Ans. (C)** [SSC CPO Exam, 2011]

**Exp:** Because helium is less dense than air.

**70. Which gas is filled in balloons?**

- (A) Hydrogen (B) Helium  
(C) Carbon dioxide (D) Oxygen

**Ans. (B)** [SSC Steno Exam, 2014]

**Exp:** Helium gas is used in balloons, because it's lighter than air. Earlier it was used in tyres but now a days Nitrogen is filled in Aeroplane tyres.

**71. Which of the following Noble gas can forms compound?**

- (A) Helium (B) Argon  
(C) Xenon (D) Krypton

**Ans. (C)** [SSC CHSL 2010, SSC Steno 2011]

**Exp:** Xenon is a noble gas (Chemical element) with symbol Xe and atomic number 54. Due to Low Ionization Potential it can react with fluorine and oxygen in special conditions and forms chemical compounds.

Such as  $\text{XeF}_2$ ,  $\text{XeF}_4$ ,  $\text{XeOF}_4$  etc.

**72. The maximum density of water is at-**

- (A)  $100^\circ\text{C}$  (B)  $0^\circ\text{C}$   
(C)  $4^\circ\text{C}$  (D)  $273^\circ\text{C}$

**Ans. (C)** [SSC CHSL Exam, 2014]

**Exp:** The maximum density of water is at  $4^\circ\text{C}$ . Above this temperature, its density decreases because its volume increases. Below this temp its density also decreases.

**73. White Phosphorous is placed under the-**

- (A) Ammonia (B) Cold water  
(C) Alcohol (D) Kerosene

**Ans. (B)** [SSC LDC Exam, 2005]

**Exp:** White Phosphorous is insoluble in water but soluble in benzene, carbon disulphide liquid  $\text{NH}_3$ . It is stored under water to protect it from air. Its ignition temperature is very low and therefore, it catches fire in the air to form white dense fume.

**74. Commonly sodium is kept under the-**

- (A) Alcohol (B) Water  
(C) Ammonia (D) Kerosene oil

**Ans. (D)** [SSC Stenographer 2005]

**Exp:** Alkali metals (Li, Na, K etc) are placed under the kerosene oil because they can be easily oxidised with air and water due to their high reactivity.

**75. Which of the following can be used as an anesthetic?**

- (A)  $\text{NH}_3$  (B) NO  
(C)  $\text{NO}_2$  (D)  $\text{N}_2\text{O}$

**Ans. (D)** [SSC MTS 2014]

**Exp:** Nitrous oxide ( $\text{N}_2\text{O}$ ) is commonly known as laughing gas or happy gas. It can be used as an anesthetic in surgery and dental treatment.

**76. Dry powder fire extinguisher contains -**

- (A) Sand  
(B) Sand and sodium carbonate  
(C) Sand and potassium carbonate  
(D) Sand and sodium bicarbonate

**Ans. (D)** [SSC CPO 2010]

**Exp:** Normally Sand and sodium bicarbonate is used in dry Powder fire extinguisher.

**77. No. of unpaired electron in inert gas is**

- (A) zero (B) 8 (C) 4 (D) 18

**Ans. (A)**

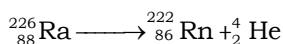
**Exp:** All electrons are paired in noble gases (inert gases) so no. of unpaired electrons in noble gases is zero.

**78. Noble gas used in the treatment of cancer is-**

- (A) Helium (B) Argon  
(C) Krypton (D) Radon

**Ans. (D)** [SSC CGL 2011]

**Exp:** Radon gas is used in treatment of cancer. It is radioactive in nature. It is the only noble gas that is not present in atmosphere. It is the heaviest gas at room temperature. It is obtained as a decay product of  ${}_{88}^{226}\text{Ra}$ .



**79. Old oil painting becomes black due to the formation of-**

- (A)  $\text{Cu}_2\text{S}$  (B)  $\text{PbS}$   
(C)  $\text{CaS}$  (D)  $\text{Na}_2\text{S}$

**Ans. (B)**

**Exp:** Old oil painting becomes black due to formation of lead sulphide ( $\text{PbS}$ ). When  $\text{H}_2\text{S}$  gas (present in air) react with lead (present in lead paint) formation of lead sulphide takes place.

**80. Which of the following is second most abundant element on the surface of sun beside Hydrogen?**

- (A) Helium (B) Neon  
(C) Argon (D) Oxygen

**Ans. (A)**

**Exp:** After Hydrogen, Helium is the Second most abundant element on the surface of sun.

Helium - 24.85%	Iron - 0.16%
Carbon - 0.29%	Neon - 0.12%

**81. What is Asbestos?**

- (A) Calcium magnesium silicate  
(B) Alumina  
(C) Calcium silicate (D) Magnesium silicate

**Ans. (A)** [SSC Steno Exam, 2005]

**Exp:** Asbestos contains silicates of metals such as calcium magnesium, nickel, iron and manganese etc.

**82. At room temperature, the metal that remains liquid is:**

- (A) Mercury (B) Platinum  
(C) Lead (D) Zinc

**Ans. (A)** [SSC CGL 2016]

**Exp:** Mercury metal has melting point of  $-37.9^\circ\text{F}$ . This is due to weak metallic bonding as mercury has fulfilled valence orbitals. Melting point is the temperature at which a substance changes from solid to liquid state.

**83. If the bullets could not be removed from gunshot injury of a man, it May cause poisoning by-**

- (A) Mercury (B) Lead  
(C) Iron (D) Arsenic

**Ans. (B)** [SSC CGL Exam, 2010]

**Exp:** If the bullets could not be removed from gunshot injury of a man, it causes poisoning in the body due to the presence of Lead.

**84. The ratio of pure gold in 18 carat gold is -**

- (A) 100% (B) 80%  
(C) 75% (D) 60%

**Ans. (C)** [SSC CPO 2005, SSC MTS 1999]

**Exp:** Purity of gold is measured in carat. 24 carat gold is pure gold % of pure gold in 18 carat gold can be found by

$$\text{following method } \frac{18}{24} \times 100 = 75\%$$

**85. Purity of gold is expressed in terms of carat. Purest form of gold is-**

- (A) 24 Carat (B) 99.6 Carat  
(C) 91.6 Carat (D) 22 Carat

**Ans. (A)** [SSC CPO 2007]

**Exp:** Purity of gold is expressed in terms of carat. Purest form of gold is 24 carat.

**86. The King of metal is -**

- (A) Gold (B) Silver  
(C) Iron (D) Aluminum

**Ans. (A)** [SSC MTS 2002, SSC CHSL 2015]

**Exp:** Gold is the most valuable metal, so it is known as king of metal.

**87. Standard 18 carat Gold sold in the Market is –**

- (A) 82 parts of gold and 18 parts of Metal
- (B) 18 parts of gold and 82 parts other metal
- (C) 18 parts gold and 6 parts other metal
- (D) 9 parts gold and 15 parts other metal

**Ans. (C)** [SSC Sec off. 2006]

**Exp:** Standard 18 carat Gold Sold in Market Contains 18 parts Gold and 6 Parts of Metal.

**88. Which one of the following is known as the brown coal?**

- (A) Anthracite (B) Bituminous
- (C) Coke (D) Lignite

**Ans. (D)** [SSC CHSL Exam, 2011]

**Exp:** Quality of coal depends upon the amount of carbon present in it. Due to the High temperature and pressure in earth cast peat coal (Less than 50% carbon) formed, then lignite coal (60–70% Carbon) formed, Bituminous coal (60–80% carbon) and then of Best quality of coal Anthracite (85–90% carbon). Lignite coal is also known as Brown coal.

**89. Which one of the following is not a coal variety?**

- (A) Bituminous (B) Lignite
- (C) Peat (D) Dolomite

**Ans. (D)**

**Exp:** Depending upon the quantity of carbon % coal are of four type-

- |                           |  |
|---------------------------|--|
| 1. <b>Peat coal</b>       | Carbon content 50 – 60%.<br>It is lowest grade of coal.    |
| 2. <b>Lignite coal</b>    | Carbon content 65 – 70%.<br>It is known as brown coal      |
| 3. <b>Bituminous coal</b> | Carbon content 70–85%.<br>It is also known as soft coal.   |
| 4. <b>Anthracite coal</b> | Carbon content 90% – 95%.<br>It is the best grade of coal. |

**90. Which of the following elements behave chemically both as Metal and a Non-metal?**

- (A) Argon (B) Carbon
- (C) Xenon (D) Boron

**Ans. (D)** [SSC CPO 2015]

**Exp:** Boron behaves chemically both as Metal and a Non-Metal. It belongs to 13th group of periodic table.

**91. Which of the following metal has maximum electrical conductivity?**

- (A) Copper (B) Aluminium
- (C) Silver (D) Lead

**Ans. (C)** [SSC DEO 2008]

**Exp:** Silver has maximum electrical conductivity and thermal conductivity order of conductivity is as follows: Silver > Copper > Aluminium > Lead.

**92. Illumination of Metal is caused by the –**

- (A) High density due to close packing of atoms
- (B) Highly Polished
- (C) Reflection of Light due to presence of free electrons
- (D) Absorption of Light due to presence of sockets.

**Ans. (C)** [SSC CPO 2007]

**Exp:** Cause of illumination of metals is the reflection of light due to the presence of free electrons.

**93. Heavy metals got their names because compared to others atoms they have**

- (A) Higher atomic mass (B) Higher atomic radii
- (C) Higher densities (D) Higher atomic number

**Ans. (C)** [SSC CGL 2015]

**Exp:** Heavy metals have higher densities as compare to lighter metals. Metals having densities greater than 5g/cm<sup>3</sup> are categorized as heavy metals. For example Cadmium, Copper, Lead etc.

**94. Which of the following is the most bad conductor?**

- (A) Iron (B) Lead
- (C) Silver (D) Gold

**Ans. (B)** [SSC MTS 2006]

**Exp:** In metals Lead is the most bad conductor, while gold, Silver and Iron are good conductors.

**95. Which metal is protected by the layer of its own oxide?**

- (A) Silver (B) Iron
- (C) Aluminium (D) Calcium

**Ans. (C)** [SSC CHSL 2012]

**Exp:** Aluminium is the metal which protects itself by the rusting with its own layer of oxide.

**96. The ore of only two metals that are Non-Silver in colour, they are–**

- (A) Nickel and zinc (B) Copper and gold
- (C) Palladium and platinum
- (D) Sodium and magnesium

**Ans. (B)** [SSC CHSL Exam, 2015]

**Exp:** From the given options, Only Gold and Copper are non-silver in colour. Gold is of Golden and Copper is of Reddish Brown Colour.

**97. The Soft Silvery Metallic element which ionizes easily when heated or exposed to Light and it present in atomic clocks is–**

- (A) Californium (B) Cesium
- (C) Calcium (D) Cerium

**Ans. (B)** [SSC CGL Exam, 2015]

**Exp:** Cesium has least melting points from the given Metals and is easily ionized when exposed to Light. It is also used in Atomic Clocks.