

Inorganic Chemistry Questions with Solutions

Q1. What is the formula of blue vitriol?

- (a) $\text{CuSO}_4 \cdot 4\text{H}_2\text{O}$
- (b) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- (c) $\text{CuSO}_4 \cdot 6\text{H}_2\text{O}$
- (d) $\text{CuSO}_4 \cdot 7\text{H}_2\text{O}$

Answer: (b)

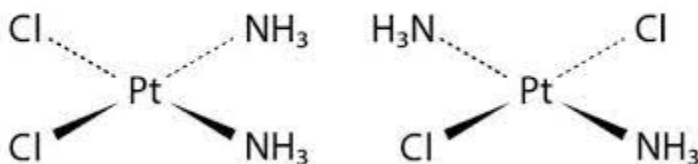
Copper (II) Sulphate is also known as blue vitriol. It is used as an insecticide in agriculture.

Q2. Name a few essential inorganic elements for our human body.

Answer: The essential inorganic elements for our human body are Magnesium (Mg), Sodium (Na), Potassium (K), Calcium (Ca).

Q3. Explain Isomerism.

Answer: Compounds which have the same molecular formula but differ in their arrangement of atoms in space are called isomers and the property is called isomerism. For example, cisplatin. It has two isomeric forms, the cis form and the trans form. The figure below shows cis and trans platin (left- cis platin, right- trans platin). The cis form is used in cancer therapy.



Q4. According to Werner's theory, how many types of valencies do metal complexes have?

Answer: Metal complexes have two types of valencies, a primary valency and a secondary valency. Primary valency corresponds to the oxidation state of the metal ion and secondary valency corresponds to the coordination number of the metal ion.

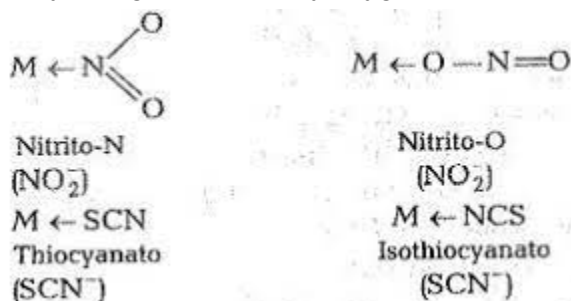
Q5. List the different types of isomerism in coordination complexes.

Answer: The different types of isomerism in coordination complexes are:

- 1) Ionisation Isomerism
- 2) Coordination Isomerism
- 3) Linkage isomerism
- 4) Geometrical isomerism
- 5) Optical isomerism

Q6. Give two examples of ambidentate ligands.

Answer: Thiocyanate (-SCN) is an ambidentate ligand that can bind to the metal centre (M) either by sulphur atom or by nitrogen atom. Nitrito (NO_2) is another example of ambidentate ligand as it can bind to the metal centre (M) either by nitrogen atom or by oxygen atom.



Q7. Match the following items of column 1 with column 2 and choose the correct answer:

Column 1 (Elements)	Column 2 (Uses)
1) Chlorine	a) Batteries
2) Neon	b) Required for strong bones
3) Calcium	c) Water disinfection
4) Lithium	d) Bulbs

Answer:

Column 1	Column 2
1) Chlorine	c) Water disinfection
2) Neon	d) Bulbs
3) Calcium	b) Required for strong bones
4) Lithium	a) Batteries

Q8. Match the following items of column 1 with column 2 and choose the correct answer:

Column 1	Column 2
1) HCl	a) Base
2) NaCl	b) Acid
3) Ca(OH) ₂	c) Salt

Answer:

Column 1	Column 2
1) HCl	b) Acid
2) NaCl	c) Salt
3) Ca(OH) ₂	a) Base

Q9. Calculate the pH of HCl acid when the concentration of [H]⁺ ions is 0.1 M.

Answer: pH is calculated by the formula:

$$\text{pH} = -\log [\text{H}^+]$$

$$\text{pH} = -\log (0.1)$$

$$\text{pH} = 1$$

Therefore the pH of HCl acid is 1.

Q10. Alkali and Alkaline earth metals belong to which group of periodic table?

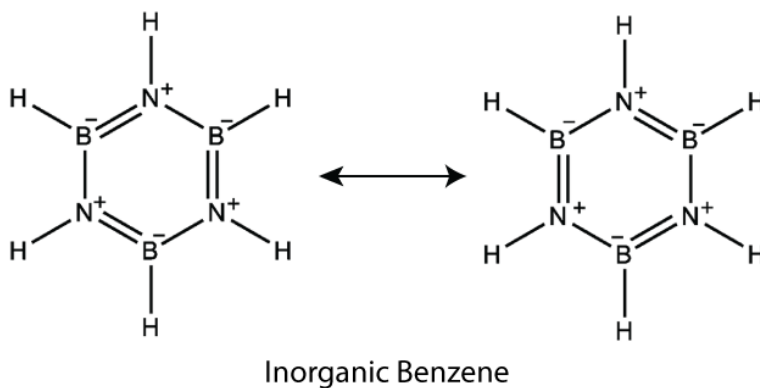
Answer: Alkali and Alkaline Earth metals belong to group 1 and group 2 of the periodic table respectively. They are collectively called s-block elements.

Q11. Which compound is called inorganic benzene?

- (a) B₃H₆N₃
- (b) B₃H₃N₃
- (c) BH₃N₃
- (d) B₆H₃N₃

Answer: (a)

$B_3H_6N_3$ is called inorganic benzene or Borazine.



Q12. Calculate the pOH of base NaOH having a concentration of $1 \times 10^{-10}M$.

Answer:

$$pOH = -\log [OH]^-$$

$$pOH = -\log (1 \times 10^{-10})$$

$$pOH = -(-10 \log 10)$$

$$pOH = 10 \log 10$$

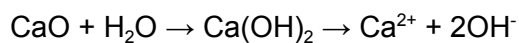
$$pOH = 10 \times 1$$

$$pOH = 10$$

The pOH of NaOH is 10.

Q13. What are Arrhenius acids and Bases? Give examples.

Answer: The acids which give H^+ ions in water are called Arrhenius acids. The bases which give OH^- ions in water are called Arrhenius bases. For example, CO_2 is an Arrhenius acid and CaO is an Arrhenius base.



Q14. What are Bronsted Lowry acids and bases?

Answer: Proton (H^+) donors are called Bronsted Lowry acids and proton acceptors are called Bronsted Lowry bases.

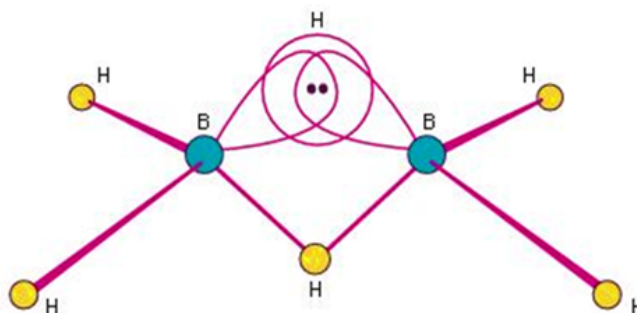
Q15. Give an example of Lewis acid.

Answer: BF_3 is an example of lewis acid. It is an electron pair acceptor.

Practice Questions on Electronic Configuration

Q1. What is the chemical formula of diborane? What is its structure?

Answer: The chemical formula of diborane is B_2H_6 . Its structure is as shown below:



Q2. How many banana bonds are there in diborane?

Answer: There are two 3 centred 2 electron bonds in diborane. They are also called banana bonds.

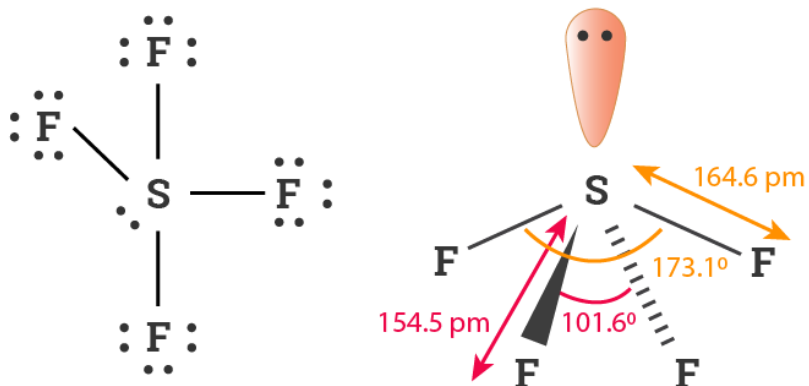
Q3. What is the HSAB principle?

Answer: Hard-Soft-Acid-Base principle, also called HSAB principle states that the interaction between hard acid - hard base and soft acid - soft base is stable.

Q4. What is the geometry and shape of the SF_4 molecule?

Answer: The geometry of the SF_4 molecule is Trigonal Bipyramidal and its shape is see-saw.

Hybridization of SF₄



Q5. What is the hybridization of methane?

Answer: The hybridization of methane is sp³.