Silver Chemistry Questions with Solutions

Q-1: The chemical formula of a chlorargyrite?

a) AgCl
b) $AgNO_3$
c) Ag_2SO_4
d) Ag_2S

Answer: a) AgCl

Explanation: Horn silver, also known as chlorargyrite, is a silver chloride mineral that is mostly polished by desert wind and dust. The mineral's appearance resembles that of a cow horn, hence the name "horn silver." Chlorargyrite is classified as an isothermic-hexoctahedral crystal. It is naturally water insoluble.

Q-2: The symbol for silver is ”Ag,” which stands for the word “Argentum” . What does argentum mean?

a) Shiny
b) Fireworks
c) Light
d) Shimmer

Answer: a) Shiny

Explanation: Silver's Latin name, argentum, is most likely referring to the metal's lustre(shininess).

Q-3: Name the metal:
a) Placed just below mercury in the reactive series
b) Present in pyrargyrite
c) Present in German silver

Answer:

a) Silver is placed just below mercury in the reactive series.
b) Pyrargyrite is also another name for ruby silver. It's an ore of silver with chemical formula $Ag_2S.Sb_2S_3$.
c) German silver is a copper, zinc, and nickel alloy with trace amounts of lead and tin.

Q-4: How would you demonstrate that silver is less reactive chemically than copper?

Answer: There will be no reaction when silver is immersed in a copper sulphate solution. This is because silver cannot displace copper from copper sulphate as it has lower reactivity than copper.

Q-5: A method used to remove lead present in silver is

a) Froth Flotation process
b) Cupellation
c) Distillation
d) Leaching

Answer: b) Cupellation

Explanation: Cupellation is used to eliminate lead impurities from silver. Cupellation is a refining process that involves heating ores or alloyed metals to high temperatures in order to extract noble metals present in the ore.

Q-6: What are the properties of silver?

Answer: The properties of lead are:

1. Silver is a white, glossy,and gentle metal.
2. It is a good conductor of heat and electricity.
3. It is very ductile, malleable and not a very chemically active metal.
4. It does not oxidise in air, but rather interacts with hydrogen sulphide to generate silver sulphide (tarnish).
5. It is very stable in water.

6.Silver is usually generally monovalent in its compounds, however divalent silver oxides, fluorides, and sulphides have been discovered.

Q-7: What role does silver play in soldering and brazing?

Answer: Silver's great tensile strength and flexibility are used in brazing and soldering to produce joints between two metal components. Temperatures above 600°C are used for brazing, whereas temperatures below 600°C are used for soldering. Because these techniques do not require particularly pure silver, silver scrap can be utilised in brazing and soldering. From heating and air conditioning vents to plumbing, brazing and soldering make tight junctions.

Q-8: Silver of _____ purity is used in electronics.

a) 95%

b) 99.99%
c) 25%
d) 75%

Answer: b) 99.99%

Q-9: Write the chemical symbols of metal(s) which are used for

a) Engine bearings
b) For decorating sweet dishes.

Answer:
a) Ag
b) Au and Ag

Q-10: Fill in the blanks

a) _____ property has given silver a place in film photography.
b) Silver's reflectivity gave it another role in _____ and _____ energy.
c) Silver acts as a chemical to produce _____ and _____ two important chemicals in chemistry.
d) Sterling silver contains _____ % of silver.
e) A small silver coin of ancient Rome is called_____

Answers:

a) Photosensitivity
b) Solar, nuclear
c) Formaldehyde, ethylene oxide
d) 92,5%
e) Denarius

Q-11: Calculate the mass of an atom of Ag.

Answer:

Weight of 6.022×10^{23} atoms in Ag= 108 g
Weight of 1 atom = $(108/6.022\times 10^{23})$ g
$= 1.8 \times 10^{-22}$ g

Q-12: The correct electronic configuration of silver is

a) [Kr] $4d^9\,5s^2$
b) [Kr] $4d^{10}\,5s^1$
c) [Ar] $3d^9\,4s^1$
d) [Xe] $4f^{14}\,5d^{10}\,6s^1$

Answer: b) [Kr] $4d^{10}\,5s^1$

Q-13: What are the two key isotopes of Ag?

Answer: Silver (Ag) has two stable isotopes: ^{107}Ag and ^{109}Ag, with ^{107}Ag being the more abundant (51.839 percent natural abundance)

Q-14: The chemical formula of potassium argentocyanide is

a) $KAg(CN)_3$
b) $K_2Ag(CN)_2$
c) $KAg(CN)_2$
d) $KAg_2(CN)$

Answer: c) $KAg(CN)_2$

Q-15: The electrolyte used to electroplate silver onto an object is:
A) Solution of silver nitrate
B) Sodium sulphate solution
C) Silver cyanide solution
D) Sodium argentocyanide solution

Answer: D) Sodium argentocyanide solution

Explanation: Electroplating is a process in which there is a deposition of a metal on the other surface.

There is a very quick flow of degraded silver ions in the silver nitrate solution and the silver cyanide solution, both of which have an oxidation state of silver of +1. The unequal composition of the plates formed on an article is the outcome of this fast-slow process.
The passage of silver ions via an electrolytic solution of sodium argentocyanide solution is very sluggish, allowing for even electroplating of silver on an article.

Practise Questions on Silver

Q-1: What is the significance of leaching in extraction of silver?

Answer: The respective metal is leached with a dilute solution of NaCN or KCN in the presence of air, which furnishes O_2 in silver metallurgy. Later on, the metal is obtained through a replacement reaction with zinc.

$4Ag(s) + 8CN^{-}(aq) + 2H_2O(aq) + O_2(g) \rightarrow 4[Ag(CN)_2]^{-}(aq) + 4OH^{-}(aq)$

$2[Ag(CN)_2]^{-}(aq) + Zn(s) \rightarrow [Zn(CN)_4]^{2-}(aq) + 2Ag(s)$

Q-2: Which property of AgNPs(silver nanoparticles) make it suitable for food packaging?

a) High tensile strength
b) Antibiotic
c) Antimicrobial
d) High melting point

Answer: c) Antimicrobial

Q-3: How do silver nanoparticles make their way to the environment?

Answer:

1. When personal grooming products, cosmetics, and household cleaning products are poured down the drain, silver nanoparticles are released into the wastewater.

2. According to a new study, when socks treated with silver nanoparticles to keep them germ and odour free are washed, the particles are liberated. Some people lost the majority of their nanosilver after two to four washings.
3 .Nanosilver particles have been identified in sewage sludge, indicating that these particles have made it into the water system. Microbial communities in wastewater treatment plants are particularly vulnerable to silver nanoparticle pollution.

4. When nanoparticle-imbedded textiles and clothes are washed, the particles are released into the wash cycle and eventually end up in waste and surface waterways.

Q-4: Calculate the relative atomic mass of silver, which is 52 percent silver-107 and 48 percent silver -109 in nature.

Answer: The relative atomic mass is calculated using the formula below, which is illustrated for two isotopes with % abundances.

$$A_r = \frac{Mass\ of\ ^{107}Ag \times abundance\ of\ ^{107}Ag + Mass\ of\ ^{109}Ag \times abundance\ of^{109}Ag}{100}$$

$$A_r = \frac{52 \times 107 + 48 \times 109}{100} = 108$$

Q-5: Is silver harmful to humans?

Answer: Silver, unlike other metals like lead and mercury, is not hazardous to humans and has not been linked to cancer, reproductive or neurological impairment, or other long-term side effects.