Gold Chemistry Questions with Solutions

Q1: Gold is a good conductor of
(a) heat
(b) electricity
(c) heat and electricity
(d) None of them

Answer: (c) heat and electricity

Q2: In electrorefining of copper some gold is produced as:
(a) cathode mud
(b) anode mud
(c) cathode deposit
(d) anode deposit

Answer: (b) anode mud

Q3: In the equation, $4X + 8CN^- + H_2O + O_2 \rightarrow 4[X(CN)_2]^- + 4OH^-$, the metal X is
(a) copper
(b) iron
(c) gold
(d) Zinc

Answer: (c) gold

Q4: Give the chemical properties of Gold.

Answer:

- Chloro-auric acid and auric chloride are the most prevalent gold compounds.
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- Most acids are insoluble in gold, but it can be dissolved in Aqua Regia (Royal Water). Gold forms a tetrachlorocuprate anion in Aqua Regia, which is a combination of hydrochloric acid and nitric acid. It also dissolves cyanide in alkaline solutions.
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- According to the reactivity series of metals, gold is one of the least reactive metals. It's immediately after platinum, the least reactive metal.

Q5: Mention the applications of Gold in the electronics industry.

Answer:

Gold is a highly efficient electrical conductor. Small voltages can be adequately carried by the precious metal while remaining corrosion-free. As a result, gold-based electrical components and gadgets are extremely trustworthy.

For these reasons, gold is commonly utilised in electronic devices, including connections, connecting lines, and connection strips. Gold traces can be found in almost all electronic gadgets, including microwaves.

Q6: Give reasons for the following:
(i) Gold is found in nature as an element in the free state.
(ii) An alloy of gold is used in dentistry.

Answer:
(i) Gold is a non-reactive metal, meaning it doesn't react with air or water. As a result, gold can be found in nature as a free element.

(ii) Gold is a non-poisonous and non-hazardous metal. Acids have no effect on it. In nature, it is extremely malleable and ductile. As a result, it is appropriate for use in dentistry.

Q7: What are the isotopes of Gold?

Answer:

Isotopes are various versions of the same element with different atomic numbers but different mass numbers, or varying amounts of neutrons. Gold (Au79) has one stable isotope, Au-197, and 36 radioisotopes, the most stable of which is Au-195, which has a half-life of 186 days. The heaviest mono-isotopic metal element is currently known to be gold.

Q8: Arrange the metals gold, copper, iron and magnesium in order of their increase in reactivity.

Answer:

Au < *Cu* < *Fe* < *Mg* is increasing order of reactivity.

Q9: What elements does gold react with?

Answer:

On the Periodic Table, gold is one of the least reactive elements. It never rusts or corrodes since it doesn't react with oxygen. Air, water, alkalis, and all acids have no effect on gold, with the exception of aqua regia (a mixture of hydrochloric and nitric acids), which can dissolve gold.

Q10: How many electrons does the element gold have?

Answer:

The 79th element in the periodic table is gold. It has 79 protons in its nucleus and 79 electrons on the outside.

Q11: Give the general properties of element Gold.

Answer:

Element Properties	
atomic number	79
atomic weight	196.96657
melting point	1,063 °C (1,945 °F)
boiling point	2,966 °C (5,371 °F)
specific gravity	19.3 at 20 °C (68 °F)
oxidation states	+1, +3
electron configuration	[Xe]$4f^{14}5d^{10}6s^{1}$

Q12: Why is gold a transition metal?

Answer:

Gold is a transition metal in terms of chemistry. Transition metals are remarkable in that they can connect with other elements not only with their outermost electron shell (the negatively charged particles that spiral around the nucleus of an atom), but also with their outermost two shells.

Q13: How does gold occur with other elements in nature?

Answer:

While the amount of gold present in copper and lead deposits is often insignificant, it is easily collected as a byproduct of the refining of those base metals. Large quantities of gold-bearing rock rich enough to be called ores are uncommon. Hydrothermal veins, where gold is coupled with quartz and pyrite, and placer deposits, both consolidated and unconsolidated, which are generated by the weathering of gold-bearing rocks, are the two forms of gold deposits known.

Q14: Where is Gold found on Earth?

Answer:

In low concentrations, gold can be found in the crust and mantle. Gold is discovered as ore in rocks, rather than being created.

Gold can be found all over the earth and in the sea, but there are several natural sites where we may get a much larger concentration of this golden metal. Gold is most commonly associated with quartz veins found in granite and rock on our planet Earth.

Gold is frequently discovered in rock formations. It's also found in waterways that have passed through these rock and mineral formations as a secondary source.

The world's largest gold reserves are found in two continents: Africa and India. South Africa is the continent with the highest concentrations of gold among these two continents.

Q15: Where is Gold mainly used?

Answer:

The world's consumption of newly generated gold is roughly 50% in jewellery, 40% in investment, and 10% in industrial.

Commercial Chemistry
The salt cyanide is formed when gold dissolves in alkaline potassium solutions. It's a procedure that's been utilised to extract metallic gold. Gold cyanide is an electrolyte used in the electroplating and electroforming of gold on base metals.

Colloidal gold is made from gold chloride solutions. Red-coloured glasses with regularly sized sphere-shaped gold nanoparticles are made with gold chloride and gold oxide.

Electronics
The most common modern use of gold is in the production of electronic devices.

Gold is a highly efficient conductor that can transmit these tiny currents while being corrosion-free. Gold-plated electronic components are extremely durable. Connectors, switches, connection strips, soldered joints, and connecting wires all contain gold.

Almost every complex electronic equipment contains a little quantity of gold. Calculators, cell phones, global positioning system (GPS) units, and other small electronic devices fall under this category. Gold is found in most major electronic appliances, such as televisions.

Gold may be found in a variety of areas on a typical desktop or laptop.

Medicine
A few medical disorders are treated with gold as a medicine.

Gold had a reputation in the nineteenth century for being a "nervine," or a therapy for nerve illnesses. Gold was used to treat depression, epilepsy, headaches, and glandular disorders like impotence and amenorrhea.

A small amount of gold is used to treat lagophthalmos, which is the inability of a man to totally close his eyes.

A diagnosis may include the use of radioactive gold.

Bridges, fillings, crowns, and orthodontic items are all made of gold alloys. Gold is utilised in dentistry because it is chemically inert, non-allergenic, and easy to work with for dental specialists.

Practise Questions on Gold

Q1: What is Gold?

Answer:

- When available in mass, gold is a soft, bright, dense, soft, malleable, and ductile metal with a reddish yellow tint. When finely divided, however, it turns black, purple, or ruby.
- 28 grams of gold can be hammered into 300 square feet, making it one of the most malleable and ductile metals.
- A significant portion of this soft metal is mined and delivered to us in the form of gravels, quartz veins, or pyrites deposits.

Q2: Why is Gold symbolized as Au?

Answer:

The term "gold" comes from the Anglo-Saxon word "Gohl," which is supposed to mean "yellow, green, or shiny."

The chemical symbol for gold is Au, which comes from the Latin word "Aurum," which means "Gold." The colour of gold, which can range from a pale yellow to a sparkling sandstone colour or a deep, rich brazen hue, is referred to by the Latin term gold.

Q3: Why we use Gold instead of copper in electronics?

Answer:

Copper is a far more affordable choice that also happens to be a superior conductor of energy. Copper is the most widely used metal in wiring. However, there are several reasons why gold is preferred over copper in electronics:

- It's easier to work with gold since it's more ductile and malleable.
- When compared to copper or silver, gold has a lower reactivity with other materials. Gold is sometimes referred to as a "chemically inactive" element because of this.
- Copper and silver corrode and tarnish more quickly than gold.

Q4: Arrange the following in the order of decreasing reactivity of metals:
magnesium, potassium, iron, gold

Answer:

Potassium < Magnesium < Iron < Gold

Q5: An archaeologist found a gold coin, a silver bracelet and an iron sword while digging at a site. On washing them carefully, he found that while the gold coin shone brightly, the iron sword had a reddish brown colour and was chipped from the sides and the silver bracelet had turned black. Explain these observations.

Answer:

The observations made by the archeologist can be explained as:
As a noble metal, gold is unaffected by air, water, acids, or other gases in the atmosphere. It will not rust and will keep its lustre for a very long time. Even though it was buried beneath, the gold coin had a dazzling aspect. Silver is less reactive than oxygen and does not react with oxygen in the air; nevertheless, it does react with hydrogen sulphide in the air, generating a thin layer of silver sulphide on its surface. As a result, the silver bracelet had become black. Because iron is highly reactive, it combines with moist air (water + oxygen) on its surface to generate iron oxide, a reddish brown powdery deposit known as rust. The iron sword had corroded as a result of contact with moist air.