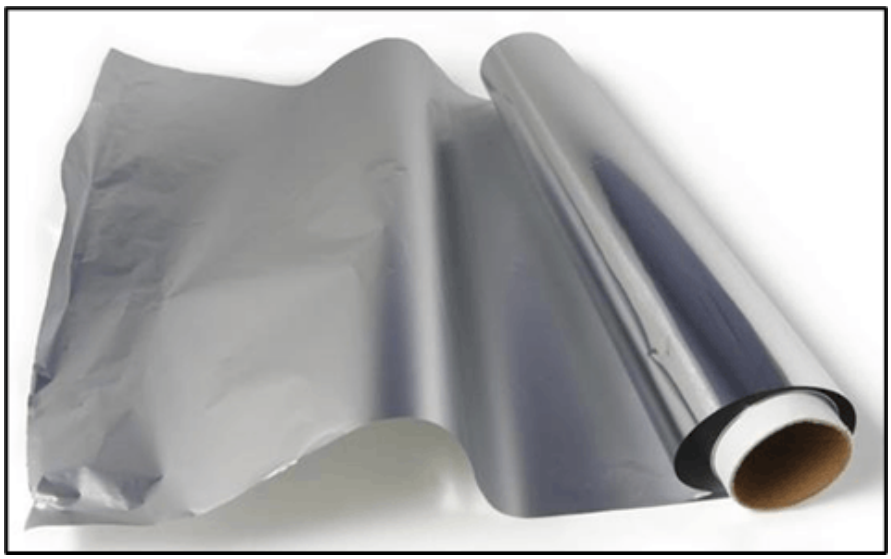
Uses of Aluminium, Iron, Copper and Zinc, P-Block Element, Questions

Copper, zinc, and iron are d-block elements with atomic numbers 29,30 and 26 respectively. **Aluminium is a p-block element with atomic number 13**. They are all metals and are fair to good conductors of electricity.

Uses of Aluminium



Uses of Aluminium

- Aluminium is widely used in the packaging industry for the production of coils, cans, foils, and other wrapping materials.
- It is also a component of many commonly used items such as utensils and watches.

- In construction industries, aluminium is employed in the manufacture of doors, windows, wires, and roofing.
- It is used in the transport industry for the production of cycles, spacecraft, car bodies, aircraft and marine parts.
- Many coins are made up of alloys that contain aluminium.
- Aluminium also finds applications in the production of paints, reflective surfaces, and wires.
- Aluminium has some distinct physical properties. It is a soft metal and is very malleable. In fact, it is the second most malleable metal. It is also a non-toxic metal. This results in a large variety of household uses of aluminium. In our everyday use, we will see aluminium use in cans, foils and kitchen utensils.
- Aluminium is also non-corrosive and non-magnetic. And although by itself it isn't very strong; it makes very strong alloys with copper and magnesium. These are lightweight alloys and yet have great strength. And so, they are an important part in the building of aero planes and aircraft.
- Aluminium is also a great conductor of electricity. And it is much cheaper than its counterpart Copper. So, we often use aluminium in electric wires and other such power transmission lines.

Uses of Copper

Uses of Copper

- Being an excellent conductor of electricity, copper is extensively used in electric wires and cables.

- It is a vital component of many industrial tools and machines.
- Copper also finds applications in plumbing and roofing materials.
- Several commercially important alloys (such as brass and bronze) are derived from copper.
- Copper is used in the manufacture of circuits and PCBs.
- It is also used in the manufacturing of pipes, gutters, vaults, and doors.
- Copper is an integral component of several musical instruments.
- These above characteristics make copper a very useful metal to humankind. Copper has been in regular use since almost 8000 BC, where coins and ornaments were made from copper. In the modern day, the most important use of copper is in wiring for electronic devices such as computers and mobile phones. Also, conductors, transformers and other systems of distribution of power depend on copper due to its excellent conductivity.
- It is also an essential metal in plumbing systems. Copper is also a major component in the manufacturing of cars. They are found in the radiators, oil coolers and even in the braking systems. And in the newer cars, it is also an important element of the navigation systems.
- However, copper is invaluable when we combine it with other metals to make excellent alloys. Bronze is one such alloy we get when we mix copper with tin. The uses of bronze are limitless. Another alloy of great importance is Brass made by combing copper and zinc.

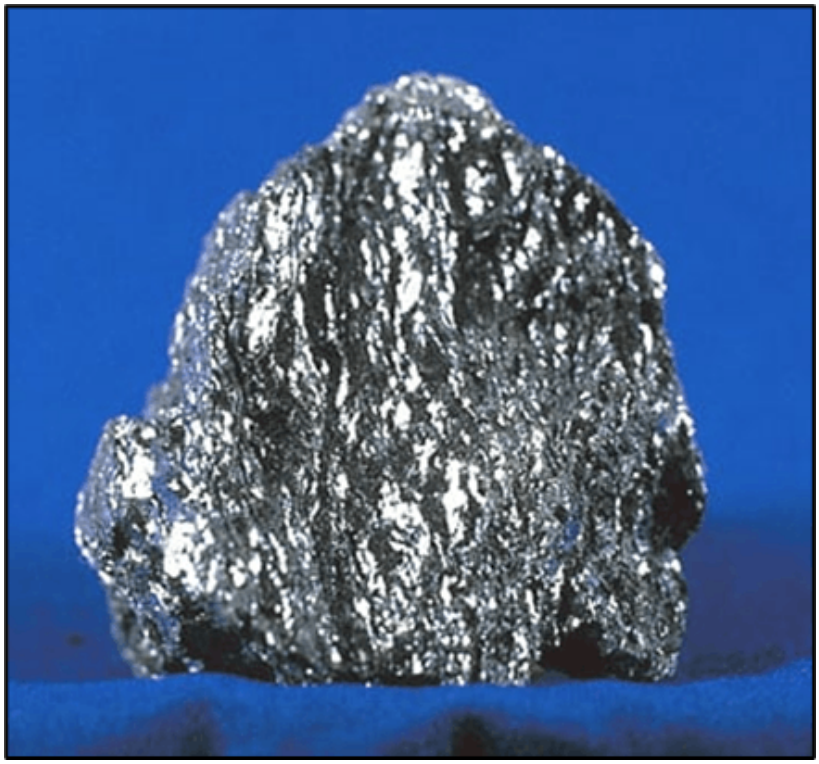
Uses of Zinc

Uses of Zinc

- The most important application of zinc is in hot-dip galvanization, which is the process of immersing iron or steel in molten zinc in order to coat the metal surface with a layer of zinc. This zinc layer protects the metal from corrosion. Galvanized steel is an excellent and cheap substitute for stainless steel.
- Zinc is also a component of many electrochemical cells and is used extensively in the production of electrical cells and batteries.
- Several important alloys of zinc are commercially important. Examples include brass and German silver.
- Compounds of zinc have a wide range of applications. They are used in the production of dyes, paints, anti-dandruff shampoos, and diet supplements.
- Zinc is a bluish metal. It is actually a hard and brittle metal. It can be malleable between 100° to $150^{\circ}C$ but is hard at other temperatures. In comparison to other metals, it has a relatively low melting as well as the boiling point. Zinc is also fairly non-corrosive

- One of the most important uses of zinc is its suitability to be used in Galvanization. A thin layer of zinc coats other metals such as iron. It protects the iron from corrosion. Also since Zinc is a more reactive metal it acts as a sacrificial metal. The oxygen in the air reacts with Zinc to form Zinc Oxide, thereby protecting the iron.
- Zinc also makes alloys with vast uses such as Brass and nickel silver. It also is used in the manufacturing of die-casting. An important compound of zinc, Zinc Sulphide (ZnS) is the main element in the production of luminous paints. Its applications are in X-ray machines and television screens.

Uses of Iron



Uses of Iron

- Iron is a readily available metal with high abundance in the Earth's crust. It has a broad spectrum of applications owing to its cheap cost, high tensile strength (especially when alloyed) , conductivity (thermal and electrical) .
- It is the major component of the alloy steel, which is used for the manufacture of building equipment, industrial tools, machinery, furniture, weapons, etc.
- Due to its low cost, it is widely used in households as a component of appliances, kitchenware, and other structures (such as fences and railings) .
- Iron is used as a catalyst for commercial production of ammonia via the Haber process.
- Wrought iron is resistant to rust and can be moulded easily. This form of iron is used in the manufacture of armour, chains, bolts and agricultural tools.
- Cast iron has a property of getting heated in a uniform manner, which is why it is used in the production of long-lasting cookware, toys, pipes, stoves, etc.
- Metallic iron is used in the production of magnets.
- Iron is the single most important metal on this planet. It is a fact that nearly 90% of the total metal refined by us is Iron. An actually it is a great contradiction that the metal most widely used is also highly corrosive. But its importance arises from the fact that it makes the most important alloy which is Steel.
- Iron like all metals is a great conductor of thermal and electric energy. It is also malleable and ductile both. In its pure form iron is actually a soft material, which means it can be shaped easily. Pure iron is also highly reactive to be of much use.