3 Minerals and Power Resources

Lesson at a Glance

- A naturally occurring substance having a definite chemical composition is called a **mineral.** Minerals are found in certain areas only and not everywhere.
- Minerals are formed in different conditions and human activities do not play any role in their formation. Instead only natural processes are involved.
- Minerals can be identified on the basis of their physical properties like colour, density, hardness and chemical properties like solubility.
- On the basis of composition, we classify minerals as **metallic** and **non-metallic**.
- **Metallic minerals** contain metal. The metal is present in raw form, that is, it contains impurities and it needs to be processed in order to yield the pure metal.
- **Ferrous minerals** and **non-ferrous minerals** are a classification of metallic minerals. Ferrous minerals contain iron. Examples are iron ore, manganese ore and chromites. Non-ferrous minerals do not contain iron as a constituent. Examples include gold, silver, copper, lead.
- **Non-metallic minerals** do not contain metals. Instead they contain impure compounds or mineral fuels. Examples: limestone, mica, coal and petroleum.
- **Extraction** is the process of taking out minerals from under the earth's surface so that useful materials can be derived from them.
- **Mining** is a process of extraction or taking out minerals from rocks under the earth's surface.
- In **open-cast mining,** minerals lying at shallow depths are taken out by removing the surface layer. In **shaft mining,** deep bores (called shafts) are made to reach mineral deposits lying at large depths.
- **Drilling** is another method of extraction in which deep wells are bored to take out minerals.
- **Quarrying** refers to the process of extraction in which minerals lying very close to the surface are extracted just by digging them out.

- Metallic minerals are generally found in **igneous rocks** and **metamorphic rocks** in plateaus. Non-metallic minerals are usually found in **sedimentary rock** formation in plains and young-fold mountains.
- **Major regions** having large iron deposits are China and India in Asia; Russia, Ukraine, Sweden and France in Europe; the Canadian Shield region in North America; and Brazil in South America. Brazil is the largest producer of high grade iron ore.
- Asia produces over half the total tin production in the world. China leads in the production of lead, antimony, tin and tungsten.
- North America is divided into three zones to describe the presence of mineral deposits. These are Canadian region north of the Great Lakes, the Appalachian region and the mountain ranges in the western part of the continent.
- Chile and Peru in South America are leading producers of copper. Brazil and Bolivia are important producers of tin.
- Africa is the continent richest in mineral resources. South America, Zimbabwe and Zaire are the world's most important producers of gold.
- Australia produces the largest quantity of bauxite. It also produces gold, diamond, iron, tin and nickel. The areas called Kalgoorlie and Coolgardie have large deposits of gold.
- In India, high grade iron ore is produced in Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Goa, Maharashtra and Karnataka. Bauxite is produced in Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Gujarat, Maharashtra and Tamil Nadu. Mica deposits are found in Jharkhand, Bihar, Andhra Pradesh and Rajasthan. India is the largest producer and exporter of mica in the world.
- Kolar in Karnataka has large deposits of gold. India is a leading producer and exporter of salt.
- Minerals are used for a lot of purposes. Copper is a metal used in nearly everything. Silicon is obtained from quartz. It is a basic tool of the computer industry.
- Minerals are non-renewable since their formation is a long process. Recycling of metals and reducing wastage are ways to conserve them.
- **Power** means energy. We require power for everything.

- Power resources are of two types: **conventional** and **non-conventional.**
- **Conventional power sources** are those that have been in use for a long time. Fossil fuels and firewood are examples.
- **Non-conventional power sources** are those power sources that have come into use recently due to the depleting conventional resources and growing awareness.
- **Firewood** is widely used in India for cooking and heating. **Fossil fuels** are what the remains of plants and animals converted into after they remained buried under the earth for millions of years.
- **Coal, petroleum** and **natural gas** are important fossil fuels. Electricity from coal is called **thermal power.** Petroleum and its derivatives are called **black gold** because of their importance. **Natural gas** is found with petroleum deposits.
- **Hydel power** is the energy possessed by river water (stored in dams) or rain water falling from great heights. One-fourth of the world's electricity is produced from hydel power.
- **Solar energy, wind energy, geothermal energy, nuclear power** and **tidal energy** are examples of non-conventional power sources.
- **Solar energy** is the heat and light energy captured from the sun. Solar cells help to convert this energy to electricity. Solar energy is used in solar heaters, solar cookers, solar dryers, etc.
- **Wind energy** is the energy possessed by moving air (wind). Windmills are used to convert wind energy to electricity. Wind farms having clusters of windmills are located in coastal regions and mountain passes.
- **Nuclear power** is energy possessed by the nuclei of atoms of naturally occurring radioactive elements like uranium, thorium, etc.
- **Geothermal energy** is the heat energy obtained from the inside of the earth. The temperature inside the earth increases as we go deeper. This heat is used to produce electricity. It is accessed in the form of hot springs.
- **Tidal energy** is the energy generated from tides. It is harnessed by building dams at narrow openings of the sea.
- **Biogas** is a gaseous fuel obtained from the decomposition of organic waste like dead plant and animal material or animal dung and kitchen waste. It is an excellent fuel for cooking and lighting, and is environment-friendly.

TEXTBOOK QUESTIONS SOLVED

Q. 1. *Answer the following questions.*

(*i*) *Name any three common minerals used by you every day.*

(*ii*) *What is an ore? Where are the ores of metallic minerals generally located?*

(*iii*) *Name two regions rich in natural gas resources.*

(*iv*) *Which sources of energy would you suggest for*

(*a*) *rural areas* (*b*) *coastal areas*
(*c*) *arid regions*

(*v*) *Give five ways in which you can save energy at home.*

Ans. (*i*) Three common minerals used by us in day-to-day life are copper, iron and salt.

(*ii*) An ore is a rock from which minerals are mined. Ores of metallic minerals are found usually in igneous and metamorphic rock formations.

(*iii*) Two regions in India rich in natural gas resources are: Jaisalmer and Krishna-Godavari delta.

(*iv*) (*a*) For rural areas, solar energy and wind energy are feasible options. There aren't many high-rise buildings to act as obstacle for sunlight or to break the momentum of wind.

(*b*) For coastal areas, wind energy and tidal energy are good choices.

(*c*) For arid regions, wind energy and solar energy are feasible, for reasons similar to rural areas.

(*v*) Five ways in which one can save energy at home:

(*a*) Promoting the use of solar energy as much as possible.

(*b*) Using biogas as cooking fuel.

(*c*) Drying clothes in sunlight instead of electric dryers to prevent emissions and unnecessary use of electricity.

(*d*) Avoiding misuse of electricity; switching off fans and lights when not required.

(*e*) Using pressure cookers for cooking.

Q. 2. *Tick the correct answer.*

(*i*) *Which one of the following is not a characteristic of minerals?*

(*a*) *They are created by natural processes.*

(*b*) *They have a definite chemical composition.*

(*c*) *They are inexhaustible.*

(*d*) *Their distribution is uneven.*

(*ii*) *Which one of the following is not a producer of mica?*

(*a*) *Jharkhand* (*b*) *Karnataka*

(*c*) *Rajasthan* (*d*) *Andhra Pradesh*

(*iii*) *Which one of the following is a leading producer of copper in the world?*

(*a*) *Bolivia* (*b*) *Ghana*

(*c*) *Chile* (*d*) *Zimbabwe*

(*iv*) *Which one of the following practices will not conserve LPG in your kitchen?*

(*a*) *Soaking the dal for some time before cooking it.*

(*b*) *Cooking food in a pressure cooker.*

(*c*) *Keeping the vegetables chopped before lighting the gas for cooking.*

(*d*) *Cooking food in an open pan kept on low flame.*

Ans. (*i*) (*c*), (*ii*) (*b*), (*iii*) (*c*), (*iv*) (*d*).

Q. 3. *Give reasons.*

(*i*) *Environmental aspects must be carefully looked into before building huge dams.*

(*ii*) *Most industries are concentrated around coal mines.*

(*iii*) *Petroleum is referred to as "black gold".*

(*iv*) *Quarrying can become a major environmental concern.*

Ans. (*i*) Building huge dams causes destabilisation of the natural habitats of plants and animals living in the area. These environmental aspects should be looked into before building dams.

(*ii*) Presence of coal mines around industries reduces the costs of transportation and also ensures easy availability of fuel.

(*iii*) Petroleum is a very valuable fossil fuel. It is used for running all machineries, transport vehicles, from a bicycle to an aeroplane.

(*iv*) After quarrying, pits are not covered so they may cause environmental hazards.

Q. 4. *Distinguish between the followings.*

(*i*) *Conventional and non-conventional sources of energy.*

(*ii*) *Biogas and natural gas.*

(*iii*) *Ferrous and nonferrous minerals*

(*iv*) *Metallic and non-metallic minerals.*

Ans. (*i*)

Conventional Sources of Energy	Non-conventional Sources of Energy
1. Conventional power sources are those that have been in use for a long time.	1. Non-conventional power sources are those power sources that have come into use recently due to the depleting conventional resources and growing awareness.
2. Examples: Fossil fuels and firewood.	2. Examples: Solar energy, tidal energy.

(*ii*)

Biogas	Natural Gas
1. Biogas is obtained from the decomposition of organic waste.	1. Natural gas is obtained as a by-product from the extraction of petroleum.
2. It is a renewable source.	2. It is a non-renewable source.
3. It is a non-conventional source.	3. It is a conventional source.

(*iii*)

Ferrous Minerals	Nonferrous Minerals
1. Ferrous minerals are those containing iron. 2. They are magnetic. 3. Example: iron ore.	1. Nonferrous minerals are those not containing iron. 2. They are non-magnetic. 3. Example: limestone.

(*iv*)

Metallic Minerals	Non-metallic Minerals
1. Metallic minerals contain metals in raw form. 2. Examples: Iron ore, bauxite.	1. Non-metallic minerals do not contain metals. 2. Examples: limestone, gypsum.

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