Chapter- 4

MINERAL AND POWER RESOURCES

STUDY NOTES

A mineral is a naturally occurring substance that has a definite chemical composition. Minerals are created by natural processes such as rock formation and are concentrated in a particular area.

Mineral	Ore
1. These are naturally occurring chemical substan-ces obtained from earth crust by mining.	1. Ores are those minerals from which metals can be extracted profitably and conveniently.
2. All minerals are not ores.	2. All ores are minerals.

Minerals are identified on the basis of their physical properties. They are extracted by the process of mining. There are two types of minerals: Metallic and Non-metallic. Metallic minerals such as iron ore, nickel, copper, etc., are found in igneous and metamorphic rocks. Non-metallic minerals such as limestone and mineral fuels are found in sedimentary rock formation of plains and young fold mountains.

Metallic minerals	Non-metallic minerals
(*a*) Minerals from which metals are extracted are called metallic minerals.	(*a*) Minerals consisting of non-metals are called non-metallic minerals.
(*b*) These minerals are malleable and ductile.	(*b*) These minerals are neither malleable nor ductile.
(*c*) These minerals are associated with igneous and metamorphic rocks.	(*c*) Non-metallic minerals are associated with sedimentary rocks.
(*d*) They are usually hard and have shine or luster of their own.	(*d*) They are not so hard and have no shine or luster of their own.
(*e*) For example, iron, copper, bauxite, tin, manganese etc.	(*e*) For example, coal, salt, clay etc. (*any three*)

Minerals are essential for the economic development of any country. Being non-renewable resources, minerals should be used moderately. They can be conserved by reducing the

wastage during mining, recycling and using substitutes. Power or energy plays a vital role in our lives. We depend on power to make our life more comfortable. Power is needed not only in a home, but also for running the activities of industry, agriculture, transport, communication and defence.

Power sources can be broadly categorized into

- Conventional Sources
- Non-Conventional Sources.

The power sources which have been in common use for a long time are known as Conventional Sources. For example, firewood, fossil fuels like coal, petroleum, natural gas, and hydropower. Some new sources of energy which have been discovered in the recent past are called non-conventional sources of energy. Important sources of non-conventional energy are—Solar energy, wind energy, biomass energy, geothermal energy, through tides and waves, etc. Non-conventional sources of energy are non-polluting, inexhaustible, safe and clean. Most of these are only in the experimentation stage and are being used as a different source of commercial energy to a very little extent.

We must conserve the conventional power sources as they are limited in nature. So, we must promote the use of alternative sources of power.

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 color, 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.

Ferrous minerals	Non-ferrous minerals
(a) Ferrous minerals have iron content.	(a) Non-ferrous minerals do not have iron content.
(b) These minerals have little resistance to corrosion.	(b) They have more resistance to corrosion.
(c) Iron ore and manganese are the examples of ferrous minerals.	(c) Copper, lead, zinc, gold and bauxite are the examples of non-ferrous minerals.

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 a 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 in 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, Odisha, Chhattisgarh, Madhya Pradesh, Goa, Maharashtra and Karnataka. Bauxite is produced in Jharkhand, Orisha, 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.

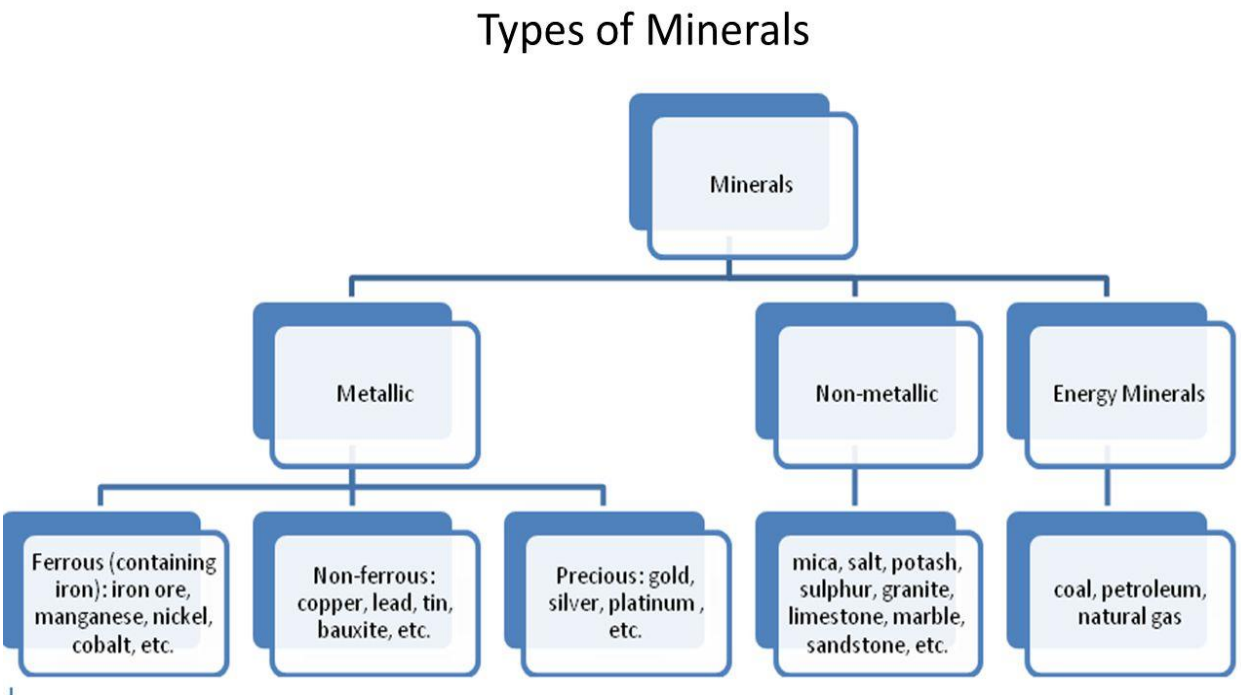
Nuclear power is energy possessed by the nuclei of atoms of naturally occurring radioactive elements like uranium, thorium, etc.

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.

Flow Learning:



Mineral: A naturally occurring substance having a definite chemical composition is called a mineral.

Rock: A rock is an aggregate of one or more minerals, without definite composition of the constituent of minerals.

Ore: An ore is a rock from which minerals are mined.

Metallic Minerals: Metallic minerals are those containing 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: Ferrous minerals are the ones containing iron as a constituent.

Non-ferrous Minerals: Non-ferrous minerals are the ones that do not contain iron as a constituent.

Non-metallic Minerals: Non-metallic minerals are the ones that do not contain metals. Instead, they contain impure compounds or mineral fuels.

Extraction: Extraction is the process of taking out minerals from under the earth's surface so that useful materials can be derived from them.

Mining: Mining is a process of extraction or taking out minerals from rocks under the earth's surface.

Open-cast Mining: Open-cast mining is a method of extraction in which minerals lying at shallow depths are taken out by removing the surface layer.

Shaft Mining: Shaft mining is a method of extraction in which deep bores (called shafts) are made to reach mineral deposits lying at large depths.

Drilling: Drilling is another method of extraction in which deep wells are bored to take out minerals.

Quarrying: Quarrying refers to the process of extraction in which minerals lying very close to the surface are extracted just by digging them out.

Conventional Sources of Energy: Conventional power sources are those that have been in use for a long time.

Non-conventional Power Sources: Non-conventional power sources are those power sources that have come into use recently due to the depleting conventional resources and growing awareness.

Fossil Fuels: Fossil fuels are what the remains of plants and animals converted into after they remained buried under the earth for millions of years.

Thermal Power: The electricity obtained from coal is called thermal power.

Coal: Coal is a fossil fuel that was formed millions of years ago when giant ferns and swamps got buried under the layers of the earth.

Petroleum: Petroleum is a thick black liquid fossil fuel found between layers of rocks and drilled from oil fields.

Hydel Power: Hydel power is the energy possessed by river water (stored in dams) or rainwater falling from great heights.

Solar Energy: Solar energy is the heat and light energy captured from the sun.

Solar Cell: Solar cells are devices to convert solar energy into electricity.

Wind Energy: Wind energy is the energy possessed by moving air (wind).

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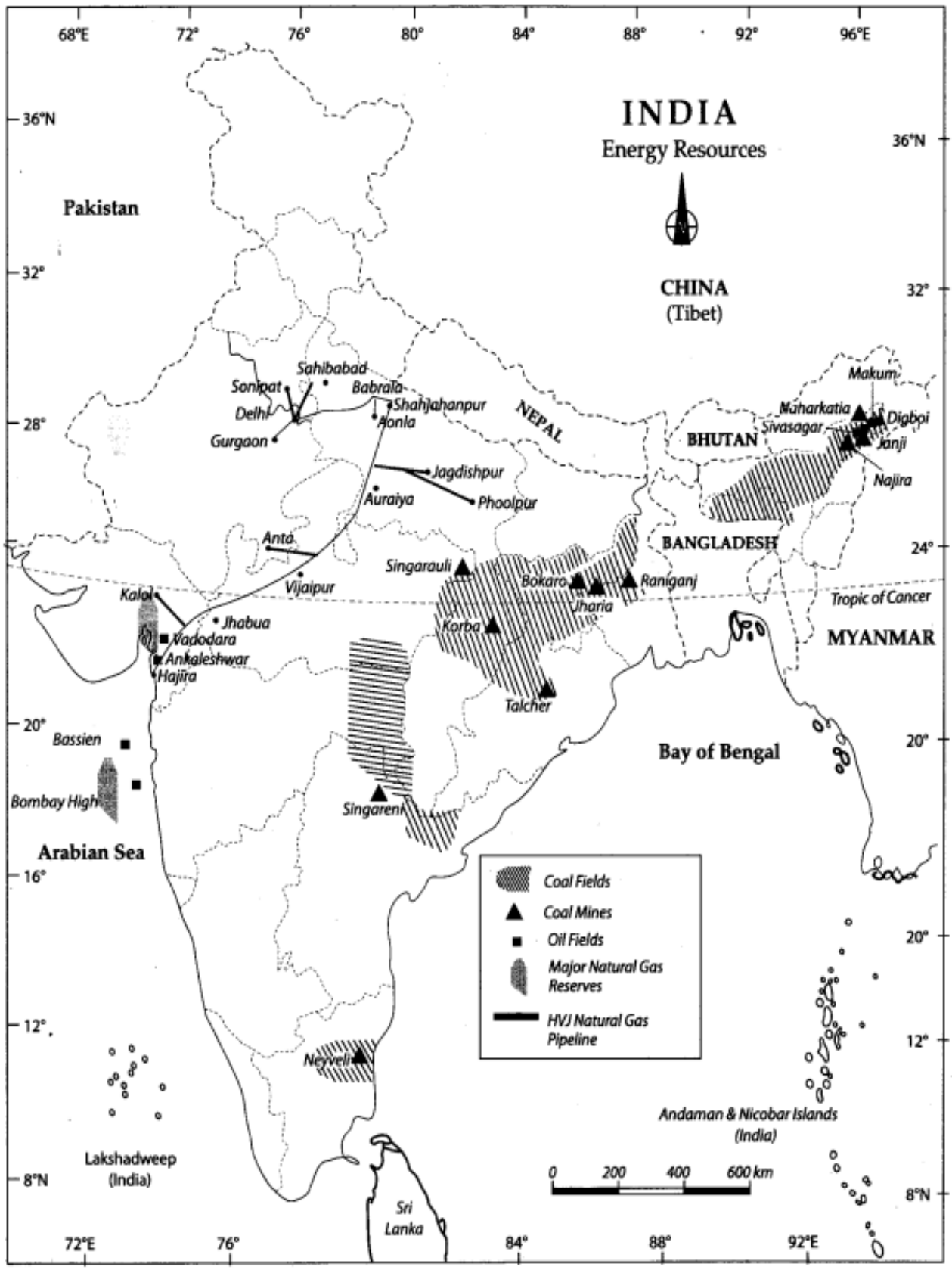
INDIA
Energy Resources
Pakistan
CHINA
(Tibet)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
Bay of Bengal
Arabian Sea
Sri Lanka
Andaman & Nicobar Islands (India)
Lakshadweep (India)
Tropic of Cancer
Sahibabad
Sonipat
Babrala
Delhi
Shahjahanpur
Aonla
Gurgaon
Jagdishpur
Phoolpur
Auraiya
Anta
Vijaipur
Kalol
Jhabua
Vadodara
Ankaleshwar
Hajira
Bassien
Bombay High
Singareni
Neyveli
Singarauli
Korba
Talcher
Bokaro
Jharia
Raniganj
Makum
Naharkatia
Sivasagar
Digboi
Janji
Najira
Coal Fields
Coal Mines
Oil Fields
Major Natural Gas Reserves
HVJ Natural Gas Pipeline
0 200 400 600 km
68°E
72°
76°
80°
84°
88°
92°
96°E
36°N
32°
28°
24°
20°
16°
12°
8°N