

- Metallic minerals are of two types ferrous and non-ferrous.
- Non-metallic minerals are of two types organic fuels and inorganic minerals.
- Most of the metallic minerals in India occur in the peninsular plateau region.
- Over 97 per cent of coal reserves occur in the valleys of Damodar, Sone, Mahanadi and Godavari.
- Petroleum reserves are located in the sedimentary basins of Assam, Gujarat and Mumbai High.
- New reserves of petroleum are found in Krishna-Godavari Basin.
- The two main types of iron ore found in our country are haematite and magnetite.
- Orissa is the largest producer of iron ore.
- Orissa is the leading producer of Manganese.
- Orissa is the largest producer of Bauxite.
- Bauxite is the ore which is used in manufacturing of aluminium.
- Copper is alloyable, malleable and ductile. It is mixed with gold to provide strength to jewellery.
- Mica can be split into very thin sheets which are tough and flexible.
- Coal is mainly used in the generation of thermal power and smelting of iron ore.
- About 80 per cent of the coal deposits in India is of bituminous type and is of non-coking grade.
- Jharia is the largest coal field in India.
- Petroleum is also called **liquid gold** because of its scarcity and diversified uses.
- Oldest oil well is in Digboi in Assam.
- Largest oil well is Mumbai High.
- Thorium is mainly obtained from monazite beach sands.
- World's richest monazite deposits occur in Kerala.
- The two effective processes to tap solar energy are **photovoltaics** and **solar thermal technology**.
- Largest Wind power plant is at Lamba in Kachchh region of Gujarat.
- In India, a geothermal energy plant has been commissioned at Manikaran in Himachal Pradesh.

Q.1 What are minerals? Explain two types of minerals with one example of each.

Ans. **A mineral** is a natural substance of organic or inorganic origin with definite chemical and physical properties.

Classification of minerals on the basis of chemical and physical properties:

- i. **Metallic Minerals:** Are those minerals which contain metals and these are of two types:
 - a. **Ferrous Minerals** which contain Iron in it such as Iron, Manganese.
 - b. **Non-Ferrous Minerals** which do not contain iron such as Copper, Bauxite.
- ii. **Non-metallic minerals:** Are those minerals which do not contain metals. They are of two types:
 - a. **Organic Fuel Minerals** which are derived from the buried animal and plant life such as Coal and Petroleum.
 - b. **Inorganic Minerals** such as Mica, Limestone.

Q.2 Why conservation of minerals is necessary? Give three reasons.

Ans. Minerals have certain characteristics.

- i. Minerals are unevenly distributed over space.
- ii. There is inverse relationship in quality and quantity of minerals i.e. good quality minerals are less in quantity as compared to low quality minerals.
- iii. All minerals are exhaustible over time. These take long to develop geologically and they cannot be replenished immediately at the time of need.

Q.3 Mention any four steps/methods of conservation of minerals.

Ans. The steps are:

- i. The alternative energy sources like solar power, wind, wave, geothermal energy are inexhaustible resource. These should be developed to replace the exhaustible resources.
- ii. In case of metallic minerals, use of scrap metals will enable recycling of metals. Use of scrap is especially significant in metals like copper, lead and zinc in which India's reserves are low.
- iii. Use of substitutes for scarce metals may also reduce their consumption.
- iv. Export of strategic and scarce minerals must be reduced, so that the existing reserve may be used for a longer period.

Distribution of Minerals in India

Q.4 Describe the three broad belts of mineral concentration and distribution in India.

Ans. Most of the minerals are generally concentrated in three broad belts in India. These belts are:

- i. **The North-Eastern Plateau Region:** This belt covers Chotanagpur (Jharkhand), Orissa Plateau, West Bengal and parts of Chhattisgarh. Major iron and steel industry are located in this region. It has variety of minerals viz. iron ore coal, manganese, bauxite, mica.
- ii. **The South-Western Plateau Region:** This belt extends over Karnataka, Goa and Tamil Nadu and Kerala. This belt is rich in ferrous metals such as iron ore and manganese. Bauxite and limestone are also found. Coal deposits are low. Kerala has deposits of monazite and thorium.
- iii. **The North-Western Region:** This belt extends along Aravali in Rajasthan and part of Gujarat. Copper and zinc are major minerals. Rajasthan is rich in building stones i.e. sandstone, granite, marble. Gujarat is known for its petroleum deposits.
- iv. **Other regions:**
 - a. The Himalayan belt is another mineral belt where copper, lead, zinc, cobalt and tungsten are known to occur. Assam valley has mineral oil deposits.
 - b. Mumbai High has rich oil resources in off-shore-areas.

MINERAL RESOURCES

Iron Ore

Q.5 Name two types of iron ore found in India. Describe the distribution of iron ore in India.

Ans. India has rich and abundant resources of iron ore. The two main types of ore found in our country are haematite and magnetite.

Distribution of iron ore:

- i. About 95 per cent of total reserves of iron ore are located in the States of Orissa, Jharkhand, Chhattisgarh, Karnataka, Goa, Andhra Pradesh and Tamil Nadu.
 - a. In Orissa, iron ore occurs in Sundergarh, Mayurbhanj and Jhar.
 - b. In Jharkhand Poorbi and Pashchimi Singhbhum districts, Durg.
 - c. In Karnataka, iron ore deposits occur in Bellary district, Chikmagalur district.
 - d. Goa has also emerged as an important producer of iron ore.

Manganese

Q.6 What are the important uses of manganese? Name four largest producer of it.

Ans. The uses are:

- a. Manganese is an important raw material for smelting of iron ore
- b. Also used for manufacturing ferro alloys such as steel.

Manganese is found in:

- a. Manganese deposits are found in Dharwar rocks.
- b. Orissa is the leading producer of Manganese.
- c. Karnataka, Maharashtra and Madhya Pradesh are other 3 states.

Distribution of Other important minerals:

- i. **Bauxite:**
 - a. Bauxite is the ore which is used in manufacturing of aluminium.
 - b. Bauxite is found mainly in peninsular India and also in the coastal tracts of the country.
 - c. Orissa is the largest producer of Bauxite. Jharkhand, Gujarat, Chhattisgarh, Madhya Pradesh and Maharashtra are other major producers.
- ii. **Copper:**
 - a. Copper is an indispensable metal in the electrical industry for making wires, electric motors, transformers and generators.
 - b. It is alloyable, malleable and ductile. It is also mixed with gold to provide strength to jewellery.
 - c. The Copper deposits mainly occur in Jharkhand, Madhya Pradesh and Rajasthan.
- iii. **Mica:**
 - a. Mica is mainly used in the electrical and electronic industries.
 - b. It can be split into very thin sheets which are tough and flexible.
 - c. Mica in India is produced in Jharkhand, Andhra Pradesh and Rajasthan followed by Tamil Nadu, West Bengal and Madhya Pradesh.

CONVENTIONAL ENERGY RESOURCES:

- i. **Coal:**
 - a. **Important Uses:**
 - i. Coal is mainly used in the generation of thermal power
 - ii. It is also used for smelting of iron ore.
 - b. **Distribution of Coal:**
 - i. Coal occurs in rock sequences mainly of two geological ages, namely **Gondwana and tertiary deposits.**
 - ii. The most important **Gondwana coal fields** of India are located in Damodar Valley. They lie in Jharkhand-Bengal coal belt. Jharia is the largest coal field followed by Raniganj. The other river valleys associated with coal are Godavari, Mahanadi and Sone.
 - iii. **Tertiary coals** occur in Assam, Arunachal Pradesh, Meghalaya and Nagaland.
 - iv. Besides, the **brown coal or lignite** occurs in the coastal areas of Tamil Nadu, Pondicherry, Gujarat and Jammu and Kashmir.

- ii. **Petroleum:**
 - a. **Important uses:**
 - i. Crude petroleum consists of hydrocarbons of liquid and gaseous states.
 - ii. It is an essential source of energy. (in automobiles, railways and aircraft)
 - iii. Its numerous by-products are processed in petrochemical industries such as fertiliser, synthetic rubber, synthetic fibre, medicines, vaseline, lubricants, wax, soap and cosmetics.
 - b. **Distribution:**
 - i. Crude petroleum occurs in sedimentary rocks of the tertiary period.
 - ii. Before 1956 Digboi in Assam was the only oil producing region.
 - iii. Now oil is produced in Gujarat (Ankaleshwar, Kalol, Mehsana)
 - iv. Oil is also produced at Mumbai High off shore 160 kms from Mumbai.
 - v. New oil deposits have been found in Krishna-Godavari and Kaveri Basin.
 - c. **Oil Refineries:**
 - i. There are two types of oil refineries in India: (a) field based and (b) market based.
 - ii. Digboi is an example of field based and Barauni is an example of market based refinery.
- iii. **Natural Gas:**
 - a. The Gas Authority of India Limited transport and market natural gas.
 - b. Natural Gas is obtained along with oil.
 - c. Gas reserves have been found in the eastern coast (Tamil Nadu, Orissa and Andhra Pradesh), as well as in Tripura, Rajasthan and off-shore wells in Gujarat and Maharashtra.
- iv. **Nuclear Energy Resources:**
 - a. Nuclear energy is obtained from uranium and thorium.
 - b. **Uranium** deposits occur in the Dharwar rocks along the Singbhum, Rajasthan, Chhattisgarh, Maharashtra and Himachal Pradesh.
 - c. **Thorium** is mainly obtained from monazite beach sands along the coast of Kerala, Tamil Nadu, Andhra Pradesh and Mahanadi river delta in Orissa.
 - d. The important nuclear power projects are Tarapur (Maharashtra), Rawatbhata near Kota (Rajasthan), Kalpakkam (Tamil Nadu), Narora (Uttar Pradesh), Kaiga (Karnataka) and Kakrapara (Gujarat).

NON-CONVENTIONAL ENERGY RESOURCES

- i. **Solar Energy:**
 - a. Sun rays tapped in photovoltaic cells can be converted into energy, known as solar energy.
 - b. Solar thermal technology has some relative advantages over all other non-renewable energy sources.
 - i. It is cost competitive,
 - ii. Environment friendly and
 - iii. Easy to construct.
 - c. Solar energy is 7 per cent more effective than coal or oil based plants.
 - d. It is 10 per cent more effective than nuclear plants.
 - e. It is generally used more in appliances like heaters, crop dryers, cookers, etc.
 - f. The western part of India has greater potential for the development of solar energy in **Gujarat and Rajasthan**.

- ii. **Wind Energy:**
 - a. Wind energy is absolutely pollution free, inexhaustible source of energy.
 - b. The permanent wind systems (the trade winds, westerlies) seasonal wind (monsoon) local winds, land and sea breezes can also be used to produce electricity.
 - c. In Rajasthan, Gujarat, Maharashtra and Karnataka, favourable conditions for wind energy exist.
 - d. Wind power plant at Lamba in Gujarat in Kachchh is the largest in Asia. Another, wind power plant is located at Tuticorin in Tamil Nadu.
- iii. **Tidal and Wave Energy:**
 - a. Ocean currents are the store-house of large energy.
 - b. Large tidal waves are known to occur along the west coast of India.
 - c. Hence, India has great potential for the development of tidal energy along the west coasts.
- iv. **Geothermal Energy:**
 - a. When the magma from the interior of earth, comes out on the surface, tremendous heat is released. This heat energy can be successfully tapped and converted to electrical energy.
 - b. The hot water that gushes out through the geyser wells is also used in the generation of thermal energy. It is popularly known as Geothermal energy.
 - c. In India, a geothermal energy plant is at Manikaran in Himachal Pradesh.
- v. **Bio-energy:**
 - a. Bio-energy refers to energy derived from biological products which includes agricultural residues, municipal, industrial and other wastes.
 - b. Bio-energy can be converted into electrical energy, heat energy or gas for cooking.
 - c. Bio-energy can also process the waste and garbage.
 - d. This will improve economic life of rural areas in developing countries, reduce environmental pollution, enhance self-reliance and reduce pressure on fuel wood.
 - e. One such project converting municipal waste into energy is Okhla in Delhi.

Differences between conventional sources of energy and non-conventional sources of energy.

- i. Conventional sources of energy such as coal, petroleum, natural gas and nuclear energy are exhaustible raw materials whereas non-conventional sources such as solar, wind, hydro-thermal and biomass are sustainable and renewable resources.
- ii. Conventional sources are unevenly distributed whereas non-conventional sources are more equitably distributed.
- iii. Conventional sources of energy create pollution whereas non-conventional sources are environmental friendly.
- iv. The non-conventional energy sources will provide more sustained, eco-friendly cheaper energy after the initial cost.