IMPORTANT TERMS AND CONCEPTS

1. **Minerals** are natural chemical compounds, uniform in composition and structure and constituent of rocks.
2. **Ore:** A naturally occuring deposit which contains a mineral or minerals in sufficient concentration in order to extract it.
3. **Oil Refinery:** Crude oil from oil wells is refined in oil refineries.

Minerals

Minerals are classified as:

1. **Metallic Minerals:** These minerals give us metals like ores of iron, copper, gold, silver, lead, aluminium, etc.
2. **Non-Metallic Minerals:** These minerals do not contain metals for example coal, petroleum, mica, limestone, etc.

IMPORTANCE OF MINERALS

1. We earn foreign exchange by exporting minerals.
2. More than six lakh people are employed in this sector.
3. A number of industries are dependent on minerals.

Iron Ore

Iron ore is used in the production of iron and steel and is used in the making of all machinery. There are three main types of iron ore—Haematite, Magnetite and Limonite.

Iron Ore Fields

The iron ore in India has a high iron content. The area of iron ore is located close to coalfields and has a low sulphur content. Its by-product, Benzene, is used in making synthetic rubber.

The chief deposits of iron ore occur in:

1. **Odisha:** Good quality haematite (iron: 55–68%); Keonjhar, Mayurbhanj, Sundergarh, Kendujhar.
2. **Jharkhand:** Rich haematite (iron: 60–69%); Singhbhum, Palamau, Noamundi.
3. **Chhattisgarh:** Bastar and Durg districts; Iron is exported through Vishakhapatnam.
4. **Karnataka:** Magnetite and haematite found in Kemmangundi and Baba Budan hills. Kudremukh has very large and valuable iron ore deposits and supplies this raw material to Bhadravati Iron Works.
5. **Goa:** Small reserves but being a port, the export is easy. Chief areas are Bicholim and Ponda.
6. **Andhra Pradesh:** (Magnetite) Iron ore is found in:
   (*a*) Disticts of Cuddapah and Chabali,
   (*b*) Guntur and Nellore districts.
7. **Tamil Nadu:** Salem and Tiruchirapalli.
8. **Maharashtra:**
   (*a*) Lohara Hills in Chanda district
   (*b*) Ratnagiri, Raigarh and Satara districts.

India exports iron ore through the ports of Marmagao, Vishakhapatnam and Mangalore to Japan, Korea, European and the Gulf countries.

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MANGANESE

1. Manganese is mainly used in the manufacturing of steel and ferro-manganese alloy. It is also used in manufacturing bleaching powder, paints, disinfectants and other chemicals.
2. Odisha and Madhya Pradesh are the two leading producers of manganese.
3. Other producers are Goa, Karnataka, Rajasthan and Jharkhand.

BAUXITE

Bauxite is a rock which consists of hydrated aluminium oxides. Its colour ranges from white to red. Bauxite is used for the extraction of aluminium.

The main producers are:

1. **Odisha:** Odisha is the largest producer of bauxite in the country. The important districts are Kalahandi, Koraput, etc.
2. **Gujarat:** Gujarat is the second largest producer and produces about 17%. The main bauxite producing districts are Jamnagar, Kutch, Surat, etc.
3. **Jharkhand:** Jharkhand is the third largest producer and produces about 14%.

Uses of Aluminium:

(*a*) Aluminium is an important metal as it is extremely light, strong, does not rust, has good conductivity and great malleability.

(*b*) It is mainly used in the making of aeroplanes and electric wires.

COPPER

Copper, a non-ferrous base metal, has a variety of uses ranging from space programmes, railways, telecommunication, cables etc.

Copper is used in the following industries:

1. Meteorological (Rain Gauges)
2. Electrical Industry (Copper wires, numerous kinds of electrical equipments)

Cooper is a good conductor of heat, so it is extremely useful in refrigerations, utensils and in wires. Copper is malleable, easy to shape and ductile.

Distribution: The leading producers of copper are:

1. **Rajasthan:** Singhana belt is most important.
2. **Madhya Pradesh:** Leading producer. The state has rich reserves in Balaghat district.
3. **Jharkhand:** Singhbhum, Hazaribagh have good reserves.

Conventional Energy Resources

COAL

Coal is the most important mineral product required to generate thermal electricity. It is an inflammable substance found in the form of sedimentary rocks. Combustible matter in coal consists of carbon and hydrogen.

Formation of Coal

Coal has been formed from wood. Large areas of forests were buried under the sediments and the wood decomposed due to heat from below and pressure from above. During the process of change from wood to coal the amount of oxygen and nitrogen decreases and the proportion of carbon increases. The percentage of carbon depends upon the duration and intensity of heat and pressure on the wood.

Varieties of Coal

Coal can be divided into four categories:

Anthracite

This is the best variety with 80% carbon. It is hard, black and burns slowly without much smoke. It has the highest heating value. A small quantity is found only in Jammu and Kashmir.

Bituminous

This contains 60-80% carbon and is dense, compact and black in colour. Because of its high carbon content and less moisture, it is used for heating purposes as well as for the production of coke and gas. It is found in Bihar, Odisha, Madhya Pradesh and West Bengal.

Lignite

It is a low grade coal with about 60% carbon. Its colour varies from dark to black brown. It produces less heat, crumbles easily and is found in Rajasthan, Tamil Nadu, Assam and Jammu and Kashmir.

Peat

This contains 50-60% carbon and does not make good fuel. It burns like wood, gives less heat, gives out more smoke and leaves a lot of ash after burning.

Classification of Coalfields

Coalfields in India may be divided into two main categories:

1. **Gondwana Coalfields:** Strata containing coal extend from Bengal, Jharkhand, Bihar, Odisha to Madhya Pradesh.
2. **Tertiary Coalfields:** Found in Assam and Rajasthan.

Gondwana Coalfields

The Gondwana coal is said to be 250 million years old and includes mainly coking, non coking and bituminous coal. It contains sulphur and phosphorus in small quantities and is generally free from moisture. 80 out of 113 major coalfields are located in the Gondwana region.

Areas Where Found

The basins of some rivers have deposits of this type:

(*a*) Damodar Basin (West Bengal)

(*b*) The Mahanadi Basin (Madhya Pradesh and Odisha)

(*c*) The Son Basin (Madhya Pradesh and Bihar)

(*d*) The Godavari Basin (Andhra Pradesh)

(*e*) Narmada, Indravati, etc.

Distribution of Coal according to State

Bihar and Jharkhand

(*a*) Jharia fields are the most important due to the abundance, high quality and accessibility. It is situated to the south-west of Dhanbad.

(*b*) Bokaro field lies to the west and produces about a million tonnes of coal.

(*c*) North and South Karanpura (Jharkhand).

(*d*) Giridih (Jharkhand) produces good-quality coal.

Odisha

(*a*) The Talcher Coalfield is one of the oldest coalfields and third most important after Raniganj and Jharia coalfields. Most of the coal is of low grade and is suitable for steam and gas production. It supplies coal to Rourkela Steel Plant.

(*b*) Another important coalfield is the Rampur-Hingir coalfield lying in Sambalpur and Sundergarh District.

West Bengal

Raniganj is the most important coalfield in the state and the second largest in the country. The total coal reserves are about 2691 crore tonnes. The non-coking coal is mainly used by the railways. Coal is being supplied to Durgapur and Bandel.

Madhya Pradesh

The main coalfields are:

(*a*) Singrauli and Suhagpur
(*b*) Rampur, Tatapani
(*c*) Sundergarh, Korba
(*d*) Raigarh

Andhra Pradesh

Most of the coal mines are located in the Godavari delta and the largest deposits are found in Singareni, Adilabad and Karimnagar. Coal is supplied to Thermal Power Stations at Ramagundam and Nellore.

Maharashtra

(*a*) The important coalfields are located at Chandrapur, Ballarpur and Warsova.

(*b*) There are large amounts of steam and gas coal in Nagpur district. Most of the coal found here is used by the railways and the Thermal Power Stations at Kalyan, Trombay, Bhusaval, etc.

Tertiary Coalfields

The important areas where tertiary coal is found are: Assam, Meghalaya, Arunachal Pradesh, West Bengal (hilly region), Jammu and Kashmir and Tamil Nadu.

The coal produced in Namchuk, Namphuk and Makum coalfields is of good semi-coking coal with a high percentage of phosphorus. Coal is mainly used by the railways and tea factories in Assam and West Bengal.

Lignite a brown coal is mined at Neyvelli (Tamil Nadu), Raisi (Kashmir) and Pallau (South Rajasthan)

Advantages of Coal

1. Provides heat required for industries
2. Reduces dependence on oil
3. Generation of Electricity
4. A number of by-products are derived.

Disadvantages of Coal

1. Being heavy, transportation difficult
2. Polluting the environment
3. Coal mining is inefficient in India.

Problems of Coal Mining in India

1. Most of the northern as well as the western parts of India do not have coalfields as most of the major coalfields are found in Odisha, West Bengal and Jharkhand. The industries using coal they have to pay higher prices as coal being a bulky commodity has to be transported over long distances.
2. A large amount of coal has to be taken out from deep underground mines where effectiveness of machinery is reduced. Thus the employment of manpower is more.

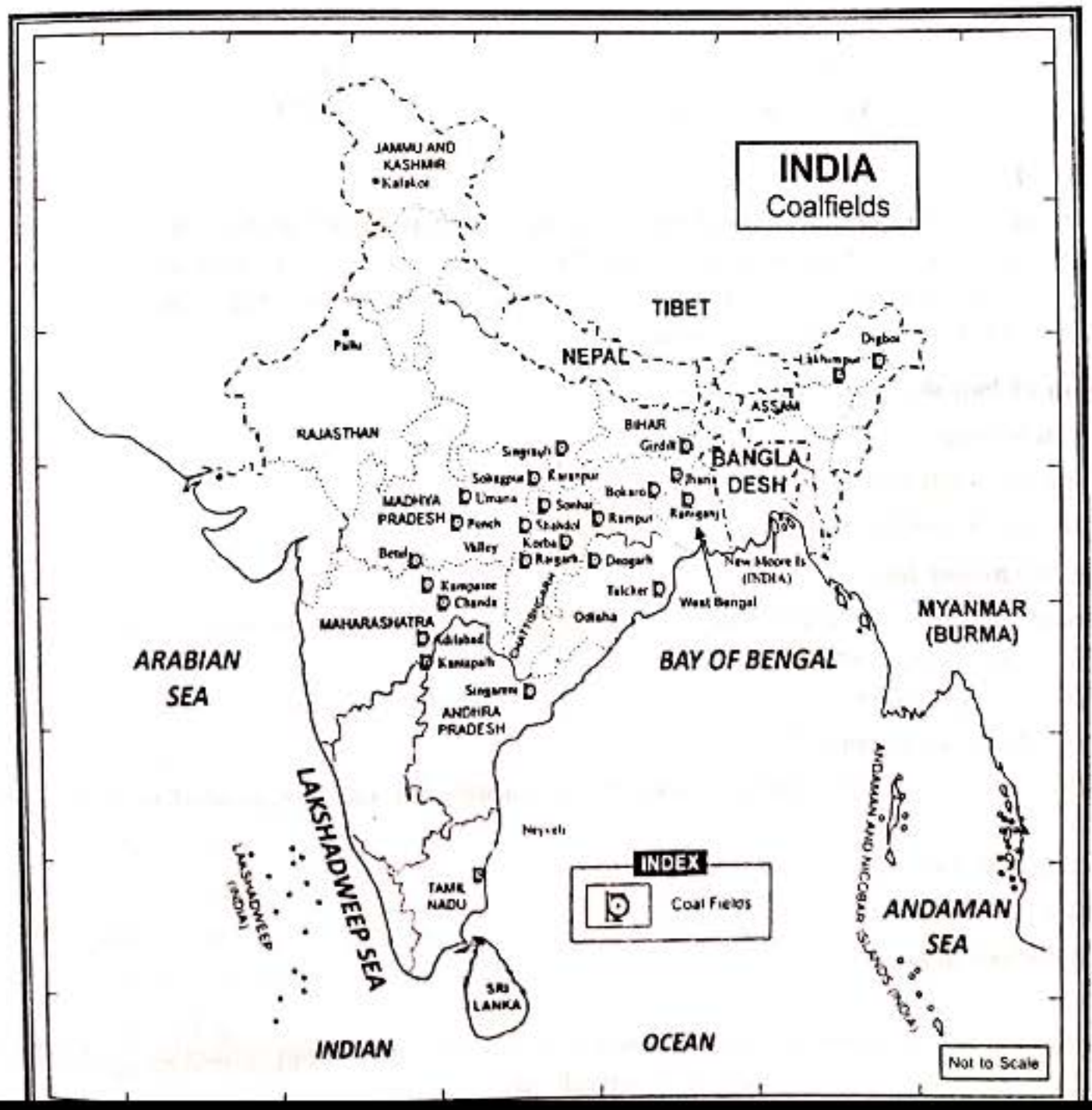
3. There are heavy losses due to fires and pilferage.
4. In most mines outdated methods are used which reduces the rate of production of coal.
5. Insufficient supply of power hampers production.
6. High ash content and low calorific value of coal reduces its energy output and create problems of ash disposal.

Measures Taken to Conserve Coal

The following measures are suggested for the conservation of coal in India:

1. New techniques should be developed and adopted for coal mining.
2. Selective mining should not be encouraged to prevent wastage of coal.
3. Small and uneconomic collieries should be joint and made into more profitable units.
4. Superior-quality coal should be washed and blended with inferior-quality coal and used in industries.
5. Private sector investment should be encouraged as the public sector alone cannot meet the increasing demand for coal.

Important Coalfields



Uses of Coal in India

Coal is used in the following industries:

1. Railways
2. Iron and Steel factories
3. Ships
4. Production of Electricity
5. Glass
6. Cement
7. Chemicals
8. Fertilizers
9. Jute industry
10. Textile industry
11. Minor Industries

Statewise Distribution of Coal

State	Reserve (million tonnes)
1. Odisha	160.00
2. West Bengal	58,012.22
3. Madhya Pradesh	17,956.78
4. Andhra Pradesh	26,419.25
5. Maharashtra	15,636.09
6. Uttar Pradesh	8,080.69
7. Meghalaya	1,061.80
8. Assam	459.43
9. Jharkhand	340.14
10. Arunachal Pradesh	90.23