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Minerals and Energy Resources

Introduction:

A mineral resource includes either the occurrence of solid resources of economic interest or on the surface of the earth in the form, quality (or quality), and quantity that has reasonable potential for economic recovery. Most of the iron ore in India is found in the Peninsular Plateau region in the rock crystals. The Damodar, Sone, Mahanadi and Godavari River valleys have more than 97% coal mines in India.

1. Mineral Resources



A mineral resource includes either the occurrence of solid resources of economic interest or on the surface of the earth in the form, quality (or quality), and quantity that has reasonable potential for economic recovery in the end.

2. Types of Mineral Resources



Minerals are classified on the basis of their physical and chemical properties as follows: **1. Metallic Minerals:**



These are minerals rich in metals e.g., copper, bauxite, iron, manganese, etc. These are of two types:

1. Ferrous Minerals:



These are rich in iron and an important source of iron.

2. Non- Ferrous Minerals:



These are iron-free and have a very high value for other metals. For example, Copper, bauxite, etc.

2. Non- Metallic Minerals:



These minerals do not contain iron content. They are divided into two groups: Organic Minerals:

These are made up of living organisms and buried plants. For example, coal, petroleum.

Inorganic Minerals:

These are part of their origin. For example, Mica, limestone, graphite, etc.

3. Mineral Resources Features



The main components of minerals are the following:

- 1. Its distribution over the earth is uneven.
- 2. There is a negative relationship between quantity and quality of minerals i.e. good quality minerals are less in quantity compared to low quality minerals.
- 3. Minerals are running out. Once used they cannot be completed immediately in time. Therefore, minerals should be stored and used wisely.

4. Mineral Distribution in India

Most of the iron ore in India is found in the Peninsular Plateau region in the rock crystals. The Damodar, Sone, Mahanadi and Godavari River valleys have more than 97% coal mines in India. The sedimentary vessels of Assam and the coastal region of the Arabian Sea (Gujarat and Mumbai High) are famous for their crude petroleum reserves. New fuel depots were also found in the Krishna-Godavari and Kaveri containers. Most of the major mineral resources come from the east of the line Mangalore connecting with Kanpur. Minerals are usually concentrated in three broad belts in India. There may be occasional incidents here and there in individual pockets.



These belts are: 1. North-Eastern Plateau Region:



The belt covers the provinces of Chotanagpur (Jharkhand), Odisha Plateau, West Bengal and parts of Chhattisgarh. Essential minerals are iron, coal, manganese, bauxite and mica. Due to the availability of these minerals, many iron and steel industries are found here.

2. South-Western Plateau Region:



The belt extends to the lowlands of Karnataka, Goa and the high plateaus of Tamil Nadu and Kerala. Iron ore and bauxite are concentrated here as well as high-grade iron, manganese and limestone. This belt is rich in charcoal pockets with the exception of the novel lignite. Novel has a deposit of lignite coals. Deposit of monazite sand and thorium is found in Kerala. Iron-ore mines are located in Goa.

3. North West Provinces:

The minerals of this band are associated with the Dharwad rock system found in Rajasthan and parts of Gujarat. Large minerals copper and zinc. Rajasthan is rich in building materials i.e. sandstone, granite, marble, fuller's earth and gypsum. Other cement industries are also concentrated here due to the availability of dolomite and limestone which are immature materials of these industries. Gujarat is rich in petroleum deposits. Salt is also produced in Gujarat and Rajasthan.

5. Other Locations / Regions

The eastern and western parts of the Himalayas are rich in minerals such as copper, lead, zinc, cobalt and tungsten. Assam Valley is rich in mineral oil. In addition, oil resources are also available in coastal areas near Mumbai Coast (Mumbai High).

1. Mineral Area Patterns:



The local pattern of some important minerals is as follows:

2. Ferrous Minerals:



India is well positioned with regard to iron minerals such as iron-ore, manganese, chromite, etc. These minerals provide a solid foundation for the development of metallurgical industries.

3. Iron ore:

India has the largest steel reserves in Asia. Its high quality hematite and magnetic iron-ore are in high demand in the international market. Indian iron ore mines are located near coal mines in the North-Eastern Plateau region that are profitable for Indian iron ore industries. In 2004-05, India had about 20 billion tons of steel reserves. Few Indian regions have 95% of the total iron-ore resources in India. In Odisha, the main mines are located in Sundergarh, Mayurbhanj and Jhar. Gurumahisani, Sulaipat, Badampahar in Mayurbhanj and Kiriburu and Bonai (Sundergarh) have important mines. Jharkhand has the oldest mines in India. The important Noamundi and Gua mines in the Poorbi and Paschimi Singhbhum districts. Chhattisgarh The mine belt continued to Drug, Dantewada, Bailadila, Dalli and Rajhara. The most important mines in Karnataka are the Sundar-Hospet area of the Bellary district, Baba Budan hills and Kundremukh in the Chikmagalur Tumkur region, In Maharashtra, an important metal deposit is found in Chandrapur, Bhandara and Ratnagiri districts. Andhra Pradesh Areas of iron ore are the districts of Karimnagar Warangal, Kumool, Cuddapah and Anantapur. Some of these include Salem and Nilgiris Districts of Tamil Nadu district and Goa region.

4. Manganese:



It is an important commodity used in the iron and steel industry to dissolve iron-ore and to produce Ferro alloys. It is closely associated with the Dharwad system but is found in almost every geography. The key conditions are:

Odisha is the largest producer of manganese in India. The central part of India's iron-ore belt is rich in Odisha manganese mines. Important mines are found in the provinces of Bonai, Kendujhar, Sundergarh, Gangapur, Korpet, Kalahandi and Bolangir. Karnataka Dharwad, Bellary, Belgaum, North Canara, Chikmagalur, Shimoga, Chiradurg and Tumkur. Maharashtra The main disadvantage of its mines is that they are located far away from iron and steel plants. Nagpur, Bhandara and Ratnagiri have manganese mines. Madhya Pradesh Balaghat, Chhindwara, Nimar, Mandla and Jhabua districts have manganese mines. Other manganese producers are Andhra Pradesh, Goa and Jharkhand.

5. Non- Ferrous Minerals:



India has high bauxite deposits but is deficient in other non-ferrous minerals.

1. Bauxite:

It is a metal used to make aluminum and aluminum products. It is found in laterite rocks mainly in the plains or hilly areas of peninsular India and in coastal areas.

The key conditions are:

- 1. Odisha is a major producer of bauxite and key producing areas are Kalahandi, Sambalpur, Bolangir and Koraput.
- 2. Jharkhand Petlands of Jharkhand Lohardagga home rich deposit.
- 3. Gujarat Bhavanagar and Jamnagar are important bauxite sites.
- 4. The plateau region of Chhattisgarh Amarkantak has a high bauxite deposit.
- 5. Madhya Pradesh Katni-Jabalpur and Balaghat have significant bauxite deposits.
- 6. Some Tamil Nadu, Karnataka and Goa are other bauxite producers.

2. Copper:

It is practical, attractive and ductile and is an important commodity in the electrical industry used to make wires, electric motors, transformers and generators. It is also used to power gold jewelry. The key conditions for copper production are:

- 1. Jharkhand Singhbhum District
- 2. Madhya Pradesh Balaghat
- 3. Rajasthan Jhunjhunu and Alwar
- 4. Andhra Pradesh Agnigundala in Guntur district
- 5. Karnataka Chitradurga and Hasan
- 6. Tamil Nadu District of South Arcot

3. Non-Metallic Minerals:



Limestone, dolomite, phosphate and mica are other non-ferrous minerals produced in India. Mica is important among them while others are manufactured for home use.

1. Mica:



Mica is widely used in the electronics / electronics industry which can be divided into very thin, strong and flexible sheets. Due to its resistant quality, it is used in the electronics and electronics industry. The key producer countries are:

- 1. The Jharkhand Hazaribagh plateau produces high quality mica. '
- 2. Andhra Pradesh Nellore Region is an important producer of mica, producing the best quality mica.
- 3. Rajasthan The 320-kilometer stretch from Jaipur to Bhilwara near Udaipur produces mica.
- 4. Karnataka Mysore and Hasan are key producers of mica.
- 5. Other cities like Coimbatore, Tiruchirappalli, Madurai and Kanyakumari (Tamil Nadu), Ratnagiri (Maharashtra), Alleppey, (Kerala), Purulia and Bankura (West Bengal) also known as mica deposits.

2. Energy Resources:



All sectors of the economy i.e., agriculture, industry, transport is controlled by energy from mineral oil whether it is a common or unconventional energy source.

6. Conservation Sources of Energy

These end naturally e.g., fossil fuels such as coal, petroleum and natural gas.



1. Coal:

1. It is required for the production of thermal energy and the melting of iron-ore.

2. India has about 80 percent bituminous coal of uncooked quality.

3. It is located in a series of two rocks namely the Gondwana coal fields and the tertiary coal mines.

2. Gondwana Coal Fields:

Damodar Valley is an important coal field in India. Jharkhand and West Bengal coal have the full potential of this coal field. Jharia (the largest coal field), Raniganj (second largest fields), Bokaro, Giridih, Karanpura are important coal mines in the valley. Other tributaries are the Godavari, Mahanadi and Sone rivers.

3. High coal fields:

Important states are: Meghalaya Daranggiri, Cherrapunji, Mewling and Langrin (Meghalaya).

Assam Makum, Jaipur and Nazira in Upper Assam. Arunachal Pradesh Namchik-Namphuk, Jammu and Kashmir, Kalakot and Others Nagaland state

4. Other Coal Forums:

Besides, brown coal or lignite coal is found in the coastal areas of Tamil Nadu, Puducherry, Gujarat and Jammu and Kashmir.

1. Petroleum:



Crude petroleum contains hydrocarbons of liquid and gaseous forms that vary in chemical composition, color, and specific gravity. It is used as a source of energy for all the internal combustion engines of cars, trains and planes. It is also used as a raw material in the petrochemical industry to produce fertilizers, synthetic rubber, synthetic fiber, pharmaceuticals, Vaseline, cosmetics, wax soap and cosmetics, etc. It is also called liquid gold due to shortage and different uses. Crude oil is found in sedimentary rocks of high-grade age. Prior to independence, Digboi was the only oil-producing region in India but after independence in 1956, a Commission on Oil and Natural Gas was established.

2. The petroleum producing regions are:

- 1. Assam Digboi, Naharkatiya and Moran.
- 2. Gujarat and Mumbai High Ankaleshwar, Kalol, Mehsana, Nawagam, Kosamba and Lunej. The Krishna, Godavari and Kaveri basin also have oil and natural gas reserves on the east coast of India.

There are two types of oil refining in India:

- 1. Field Based Refineries Digboi is an example of field-based filtering.
- 2. Market Based Refineries at Barauni is an example of market-based filters. There are 21 filters in total from June 2011.
- 3. Natural Gas:



- 1. Occurrence with oil as well as separation in gas reserves in India.
- 2. These gas valleys are found near the Eastern coast of Tamil Nadu, Odisha, Andhra Pradesh, Tripura, Rajasthan, Gujarat and Maharashtra.
- 3. Gujarat and Maharashtra have coastal natural gas resources.
- 4. According to the survey report, there are indications of major gas fields in Ramanathapuram in the Tamil Nadu province.
- 4. Unusual Power Sources:



- 1. Unlike conventional energy sources, renewable energy sources are renewable namely solar, wind, hydrogeothermal and biomass and are not harmful to the ecosystem.
- 2. Their use ensures sustainable development as these are environmentally friendly and affordable energy sources.
- 5. Nuclear Energy Sources:



- 1. Nuclear power has emerged as a potential source in recent times.
- 2. Uranium and thorium are the main minerals used to produce nuclear energy.
- 6. Uranium Deposit in India:



It is found in the Dharwad rock system. The most important regions are:

- 1. Jharkhand Singhbhum (with brass band)
- 2. Rajasthan Udaipur Regions, Alwar, Jhunjhunu.
- 3. Chhattisgarh Durg District in Maharashtra Bhandara District.
- 4. Himachal Pradesh Kullu Region.

7. Thorium Deposit in India:



It is found in very few places in India:

- 1. Kerala (sand of monazite and ilmenite beach) districts of Palakkad and Kollam.
- 2. Andhra Pradesh Visakhapatnam.
- 3. Odisha Mahanadi River delta.

These three provinces have the richest monazite deposits in the world. Nuclear power development began after the establishment of the Atomic Energy Institute in Trombay in 1954 which was renamed the Bhabha Atomic Research Center in 1967. Tarapur (Maharashtra), Rawatbhata near Kota (Rajasthan), Kalapakkam (Tamil Nadu), Narora (Uttar Pradesh), Kaiga (Karnataka) and Kakarapara (Gujarat) are some of the nuclear power plants in India.

8. Solar Power:



Sun energy is captured in two ways namely photovoltaic cells and solar thermal technology and converted to electricity is called solar energy. Its construction is simple, environmentally friendly and expensive. It is 7% and 10% more efficient than coal-based fuels and nuclear fuel, respectively. Heaters, dryers, stoves and other heating equipment use more solar energy than others. Gujarat, Rajasthan and the Western part of India have high potential for solar energy development.

9. Wind Energy:



Wind energy is a non-polluting and renewable resource. With a turbine, wind kinetic energy can be converted into electrical energy. Electricity can be produced by permanent wind systems such as commercial winds, western lands or seasonal winds such as hurricane winds. In addition, electricity generation can also be done with local air, land and sea air. India has already started generating wind power to reduce the import duty on oil. It is estimated that India has 50000 megawatts of air production, of which a quarter can be used easily. Rajasthan, Gujarat, Maharashtra and Karnataka have high potential for improving wind power.

10. Tidal and Wave Energy:



The ocean currents are a reservoir of energy. It is known that huge waves are occurring along the west coast of India. Many efforts for the efficient use of ocean waves and tides were made from the 17th and 18th centuries. But these waves have not been used properly due to lack of technology

Geothermal Energy. Magma reaching the surface emits high temperatures. This heat energy can be converted into electrical energy by tapping them.

11. Geothermal energy:



The main sources of this energy are magma, hot springs (hot water), hot geysers, etc. Geothermal energy is becoming more important and can be used as an alternative to conventional energy sources. In Manikaran India in Himachal Pradesh, a geothermal power plant has been launched.

12. Bio-Energy:



Bio-energy refers to the energy found in biological products including agricultural residues, municipal waste, industrial waste and more. It can be converted into electricity or electric power, heat energy or cooking gas. This can also solve the problem of garbage and waste in urban areas as energy can also be found in this. It can contribute to improving the economic well-being of rural people in developing countries, increasing environmental problems such as pollution, waste management, improving independence and reducing pressure on the fuel system. The OKHLA (Delhi) project is a model that generates municipal waste energy.

7. Mineral Resources Conservation

There are some ways we can conserve mineral resources:

- 1. The adoption of renewable resources in place of depleted resources such as solar power, wind, and geothermal energy can save our renewable resources.
- 2. Reuse of discarded metals should be encouraged.
- 3. The use of substitutes for rare metals may reduce their use.
- 4. Exports of strategic and rare minerals should be reduced, so that the designated area can be used for a longer period of time.

	Questions For Practice																	
1.	The iro follows (a) 20 (c) 40	on cor 5?) - 30%) - 50%	ntent ir % (% (n Hem (b) 30 (d) 60	natite is 0 - 40% 0 - 70%	as 1	(a) (c) 2. Wł ha:	 (a) Iron (b) Copper (c) Bauxite (d) Mica Which out of the following states has major oil fields?					Which of ferrous min (a) Zinc (c) Chromi	the follo eral? (b ite (d	win) N	g is not a Manganese ron		
2.	Lignite (a) Jh (c) Bo	e coal aria okaro	is avail ((able a (b) N (d) Ra	t? ovel aniganj	1	(a) Assam (b) Bihar (c) Rajasthan (d) Tamil Nadu					22.	Where is a located?	the large	est :	solar plant		
3.	What is famo (a) Iro (c) Mi	miner ous for on icah	al, Haz ? (ariba (b) Co (d) Co	gh Plate opper oal	au I	3. w ʻliq (a) (c)	uid gold'? Water Coal	(b) (d)	Petro Merc	leum ury	23.	(c) Kaiga (d) Chandrapur Which of the following minerals is known as brown diamond?					
4.	Which largest (a) As (c) Ra	of the oil fie sam ajastha	ese pro lds? (an (ovince (b) B (d) Ta	s have t ihar amil Nao	the du	14. Which fossil fuel is called liquid gold?(a) Mica (b) I (c) Manganese(b) I (c) Manganese(a) Petroleum (c) Natural Gas(b) Coal (c) All of these24. Lignite coal is found in? (a) Jharia) I l) I in?) E	ron Lignite Bokaro			
5.	What energy (a) Hy (c) Ho	is the ? ydel ot	e sourc ((ce of (b) T (d) W	renewal he sun /ind	ble 1	5. Or fol wa (a) (c)	 On which station out of the following, the first atomic station was set up? (a) Kalapakkam (b) Narora (c) Rana Pratap Nagar 					(c) NeyvelWhich of metallic mir(a) Copper(a) Silver	i (d the follo neral? (b) F owin) (Raniganj ng is non- Gold		
6.	What India? (a) Jh (c) No	What is the largest coal mine in ndia? a) Jharia (b) Raniganj c) Novel (d) Singareni						 (d) Tarapur. 16. Manikaran (Himachal Pradesh) is popular for production of? (a) Solar Freezer 					 26. Which one of these is not a renewable energy resource? (a) Natural Gas 					
7.	Which of the following is not a metallic mineral? (a) Iron (b) The stone will strike						 (a) Solar Energy (b) Wind Energy (c) Geothermal Energy (d) Tidal Energy 					 (b) Geothermal Energy (c) Solar Energy (d) Wind energy 27. Which one of the following is 						
8.	 (c) Ma Where (a) Na (c) W 	e) Manganese (d) Copper Where is the big solar plant? I) Nasi (b) Madhupur I) Wellington (d) Chandrapur					7. W Inc (a) (c)	When was the Gas AuthoritIndia Limited set up?(a) 1983(b) 1984(c) 1985(d) 1986				28	famous Cop (a) Baster (c) Nellore Which of t	per mine (b (d be follow	?) F () J	Khatri haria		
9.	Which copper (a) Th (c) Ne	Which of the following is a famous copper mine? (a) The Lord (b) Cage (c) Nellore (d) Iharia						18. Out of the following, which mineral is called 'Brown diamond'? (a) Iron ore (b) Lignite (c) Manganese (d) Mica 2						 conventional source of energy? (a) Natural Gas (b) Petroleum (c) Coal (d) Wind 29 Bhabha Atomic Research Centre is 				
10.	 .0. Which of the following is a ferrous mineral? (a) Bauxite (b) Steel (c) Micah (d) Coal 						19. Which is the best quality of iron ore?(a) Hematite (b) Siderite(c) Magnetite (d) Limonite					situated in? (a) Mathura (b) Bengaluru (c) Tarapur (d) Kota 30. The iron content in Hematite is? (a) 20 - 30% (b) 30 - 40% (c) 40 - 50% (d) 60 - 70						
11. Which of the following is an ore of aluminum?						of 2	 20. Where is Digboi oil field located? (a) Assam (b) Rajasthan (c) Maharashtra (d) Tamil Nadu 											
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