

Chapter-5

Minerals and Energy Resources



Intro:-

- Minerals are an indispensable part of our lives. {Pin to ship}

"Homogenous naturally occurring substance with a definable internal structure".

Rocks Minerals

→ Rocks are combinations of homogenous substance called minerals.

↓
Formation depends upon the physical & chemical conditions.

Geographers

- Study minerals as a part of earth crust.
- Above the earth.

Geologist

- Study formation of minerals, their age, physical & chemical composition.
- Below the earth

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① Mode of occurrence of Minerals :-

- Found in "ores" { Minerals mixed with other element }
- 1) Veins and lodes - e.g. - Tin, Copper and zinc.
- 2) Beds and layers - e.g. - Coal and gypsum.
- 3) Residual mass of weathered material - e.g. - Bauxite.
- 4) Alluvial deposits - e.g. - Gold, silver and tin.
- 5) Ocean water - e.g. - Salt, magnesium and bromine.

② Classification of Minerals :-

© Distribution of Minerals:

- Peninsular Rocks :

→ Coal, metallic minerals, mica and many other non-metallic minerals.

- East and West of Peninsula

→ Petroleum

- Rajasthan

→ Non-Ferrous minerals {copper}

- North India

→ Devoid of economic minerals.

© Ferrous Minerals: {Contain Iron Content}

$\frac{3}{4}$ of total metallic minerals, base for metallurgical industries

→ Iron ore

- Back bone of industrial development

- Magnetite {70% Iron Content}

- Excellent magnetic qualities.

- Hematite (50-60% Iron content)
↓
- Industrial iron
- Manganese
- Used in making steel ferro-manganese alloy.
- Used in manufacturing bleaching powder, insecticides and paints.

Note:- In 2018-19 almost entire production of iron ore (97%) accrued from Odisha, Chattisgarh, Karnataka & Jharkhand, the remaining production (3%) was from other States.

© Major Iron Ore Belts in India:-

1) { Orissa - Jharkhand Belt }

- Hematite ore found in Badampahar, Gua and Noamundi.
- Port → Paradwip port.

2) { Purg - Bastar - Chandra pur }

- Chattisgarh and Maharashtra
- Hematite ore found in Bailadila range of Bastar district.

• Port → Vishakhapatnam port.

3) {Bellary - Chitradurga - Chikmagalur - Tumkur}

• Kudremukh mines is 100% export unit

• Port → Mangalore {Through Pipeline}

4) {Maharashtra - Goa Belt}

• Goa and Ratnagiri district of Maharashtra

• Port → Mormogao.



• Non - Ferrous Minerals

• Not - Sufficient { 1/3 }

• Minerals such as Copper, Bauxite, Zinc, lead and Gold,

• Used in metallurgical engineering and electrical.

→ Copper

• India is critically deficient in copper production,

• Malleable, Ductile and the good conductors therefore have high demand.

- The Balghat — Madhy Pradesh, Khetri mines — Rajasthan and Singhbhum district of Jharkhand are leading producers of copper.

→ Bauxite | 1-

- Bauxite → Alumina → Aluminium
- It combines strength of metal e.g. Iron with extreme lightness, good conductivity and great malleability.
- Mainly found in Amerkantalak plateau, Maikal hills plateau region of Bilaspur - Katni.
- Orissa → largest producer of Bauxite. — Koraputh

⊙

Non-Metalliu Minerals and Rock Minerals.

→ Mica :-

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- Modern series of plates.
- Used in electronic industries due to dielectric strength, low power loss factor, insulating properties & resistance to high voltage.

Northern edge →

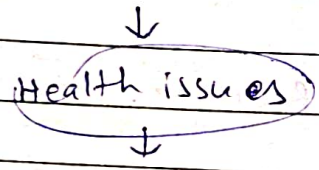
- Chota Nagpur plateau, Koderma.
- Gaya-Hoanibagh, AJmer, Rajasthan and Nellore mica belt of A.P.

→ limestone

- Rock composed of calcium carbonates or calcium and magnesium carbonate.
- Essential for smelting iron ore in blast furnace and cement industries.
- A.P., M.P., Rajasthan, Gujarat, T.N. and many more.

⊙ Hazards of Mining & Need for Conservation.

{ Impact on miners }



- Dust and noxious fumes are inhaled.
- vulnerable to pulmonary disease.

{ Impact on environment }

Water source get contaminated

Pumping of waste & slurry

↓
Degradation of land, soil, and river pollution.

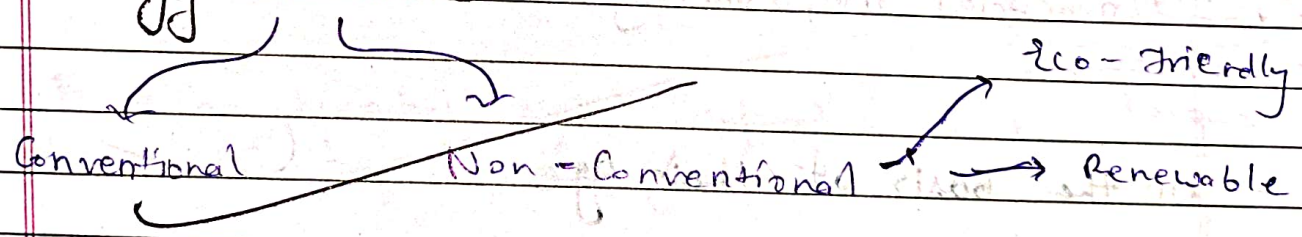
→ Conservation of minerals

- our dependency on minerals & availability to us
- 1% of earth's crust.
- Formation \neq Consumption.
- ∴ Finite & non-renewable.
- Continued extraction → cost & greater depth, decreased quality.

→ Steps for conservation:

- Improved technology, recycling of metals, using other alternatives and substitutes.

© Energy Resources



- | | |
|---------------|----------------------------|
| • Coal | • Nuclear or Atomic Energy |
| • Petroleum | • Solar energy |
| • Natural gas | • Wind energy |
| • Electricity | • Bio-gas |
| | • Tidal energy |
| | • Geothermal Energy |

→ Coal → extremely important source of energy
used for power generation to supply
to industry as well as for domestic
needs. ↓

Formation depends upon degree
of compression, depth and time
of burial

- | | |
|----------------------------|-------------------------------------|
| • Peat | • Lignite |
| i) low carbon | i) low grade brown coal. |
| ii) high moisture | ii) soft with high moisture content |
| ∴ low heating capacity | |
| • Bituminous | • Anthracite |
| i) Deep inside the earth. | i) Highest quality |
| ii) Temperature | ii) Hard coal age |
| ∴ Commercial use, smelting | |

on the basis of their age

- | | |
|--|------------------------|
| → Gondwana Coal | → Tertiary Coal |
| • 200 million ago | • 55 million ago |
| • Damodar Valley, Jharkhand,
Raniganj, Bokaro | • North eastern states |

Remember coal is a bulky material which loses weight ~~loses~~ on use as it is reduced to ash. Hence, heavy industries and thermal power stations are located on or near the coal fields.

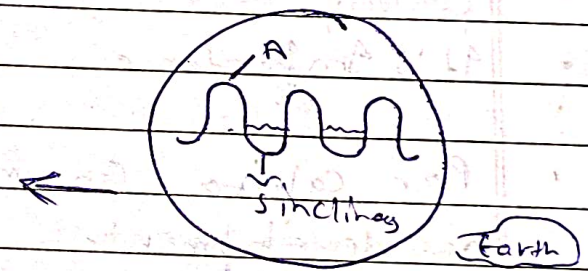
→ **Petroleum and Natural Gas:-**



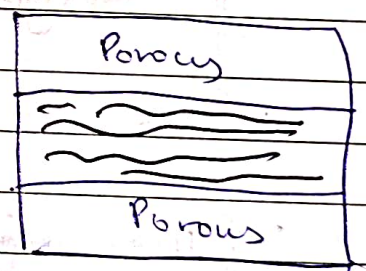
- Petroleum Industry ^{act} as a "Nodal Industry".

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- Anticlines and fault traps in rocks formed during tertiary age



- Porous and ~~non porous~~ non porous layer and gas been lighter usually occurs above the oil



- Found in - Mumbai high, Gujarat (Ankleshwar), Assam & Digboi.

Natural Gas → Source of energy as well as an industrial raw material.

- Found in association with or without petroleum.
- Environmental friendly low Carbon dioxide emission.

- Krishna Godavari basin, Mumbai high, Gulf of Cambay, HVJ pipeline (Hazira - Vijapur - Jagdishpur) = Artery to Indian gas production.
- Power and fertilizer industries are key users.
- CNG (Compressed Natural Gas) is used in vehicles to replace liquid fuels.

→ Electricity:-

- It's importance
- Per capita consumption is considered as index of development.

Hydro electricity thermal ⚡

- Produced by running water.
- Use renewable source
- Multipurpose river projects like Bhakra Nangal, Panodar valley crop.
- By Burning coal petroleum & natural gas.
- Use non renewable fossil fuel.

→ Non-Conventional Source of Energy:

Need for it

↓
Consumption of fossil fuels

↓
Depletion of resources

↓
Price rise ↑

↓
Uncertainties in future and environmental problems.

↓
Renewable source of energy.

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→ Nuclear or Atomic Energy: Uranium, Thorium etc.

- Obtained by altering the structure of atom.
- Uranium & thorium are used.
- Found in Jharkhand, the Aravali ranges of Rajasthan and the monazite sand of Kerala (rich in thorium).

→ Solar energy:

- Photovoltaic technology converts sunlight directly into electricity.
- Solar energy is fast becoming popular in rural and remote areas.

• Solar plants will contribute to environmental conservation and adequate supply of manure in agriculture.

→ Wind energy :-

• Potential of wind
• Largest wind farm cluster.

↓
Nagarcoil to Madurai (T.N.)

• A.P., Karnataka, Gujarat, Kerala, Maharashtra, etc.

→ Bio gas :-

• Shrub, farm waste, animal and human waste is used to make biogas.

• "Coobar Gas Plant" → Two benefits

Source of energy

Quality of manure +
Prevents the loss of tree.

MEU

→ Tidal energy: Oceanic tides can be used to generate electricity

- Gullt of khambat, the gulf of kachchh in Gujarat on the western coast and Gangetic delta in Sunderban regions of West Bengal provide ideal conditions for utilizing tidal energy.

→ Geothermal energy: Refers to the heat & electricity produced by using the heat from the interior of the earth.

- Parvati valley near Manikaran in Himachal Pradesh and Pujan valley Ladakh.

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② Conservation of Energy Resources

Increasing development = Need for energy increase

∴ Consumption of energy is also increasing

↓
we should use sustainable energy.

Use public transportation.

- Switch off electricity when not in use.
- Using power saving devices.
- Using non-conventional sources of energy

Energy saved is energy produced