MINERALS AND MINES

Minerals are such naturally occurring substances that are present below the surface of the earth. The process, by which we exploit these minerals from below surface, is known as mining. Minerals are found in mixed forms with other elements in nature. Such mixtures are called 'ores'.

More than 3000 kind of minerals are present on the earth. Minerals, having an extract of metals in original form, are called metallic minerals. The minerals having no extract of metals are called non-metallic minerals. Minerals which provide energy, are called Energy minerals.

Rajasthan is a prosperous state in terms of minerals. Due to availability of various minerals in Rajasthan, it is known as the 'museum of minerals'. Approximately 67 minerals (44 main and 23 minor) are mined in Rajasthan. Rajasthan has a contribution of 22% in the total minerals production of the country. In terms of mineral wealth, Rajasthan stands at the second place after Jharkhand. From the view point of mineral production, Rajasthan ranks at the third place after Jharkhand and Madhya Pradesh. In terms of minerals, the Aravali Mountains and the south eastern plateau region are prosperous in the state, Due to the discovery in the past few decades, ample energy resources such as petroleum and natural gas have been found in the western part of the state. The state has monopoly in the production of such minerals a Wollastonite, Jasper, Emerald, Rock phosphate etc.

MINERAL BASED INDUSTRIES:

The mineral resources of the state provide a large variety and have great potentiality for the establishment of more mineral based industries.The commissioning of Zinc Smelter at Debari and the Cement Plant at Chittorgarh' are the recent land-marks in the development of mineral based industries in the State. With the start of production at Khetri, the State will have the biggest · copper complex in the country. Similarly the proposed fertilizer complex, utilizing Saladipura pyrites and Udaipur Phosphate rock, will be a milestone in the industrial development of the state and will provide opportunity for ancillary industries also. Development of mineral resources of the State has increased the scope both for big and small mineral based industries. There are many potential areas in the state where new cement plants can come up. Once the Khetri plant is commissioned and production of by-production sulphuric acid starts many industries using sulphuric acid as a raw mate· rial will come up. The mining and beneficiation project for fluorspar at Mando-ki-Pal will produce acid grade concentrates and provide avenues for chemical industries to come up. Ceramic unit_ and clay washing plants can be established in the state with its abundant resources of ceramic minerals. Similarly production of high quality decolorizes and bleaching -

clays can be started by setting up an activation plant for fuller's earth found in. the State. With barytes and sulphuric acid both available hear Udaipur; lithopone unit can also be set up.

Classification of Minerals:-

1. Metallic Minerals- Metallic minerals are minerals which contain one or more metallic elements.These are of two types Ferrous and Non-Ferrous minerals. Ferrous minerals are metallic minerals containing iron. While non-ferrous minerals are also metallic, but they do not contain iron.

A. Ferrous minerals – chromium, cobalt, Iron, Manganese, Nickel, Tungsten and Titanium etc.

B. Non-Ferrous minerals- Gold, Silver, Platinum, Lead, Zinc, Copper, Tin, Magnesium, Mercury etc.

2. Non Metallic Minerals- Non-metallic minerals are those which do not yield new products on melting. They are not so hard and have no shine or luster of their own. When hit, they may get broken into pieces. e.g. Mica, Gypsum, Stone, Clay, Energy minerals etc.

Minerals Rocks (Rajasthan's perspective):-

Dharwad Series Rocks- Dharwar Rock System is special because it is the first metamorphic sedimentary rocks in India. They are named Dharwar system because they were first studied in Dharwar region of Karnataka. But they are also found in Aravallis, Tamil Nadu, Chotanagpur plateau, Meghalaya, Delhi, and the Himalayas region.

- Found in Aravali in Rajasthan
- Maximum Metallic Minerals
- Most expensive Rocks
- g.- Gold, Silver, Iron

Vindhyan Series Rocks- Sandstone (maximum), Red stone, Kota stone and

Limestone.

Sedimentary Rocks- Sedimentary rocks are types of rock that are formed by the accumulation or deposition of mineral or organic particles at the Earth's surface, followed by cementation. Example Coal, Petroleum, Natural gas.

Minerals found in Rajasthan:

ARAVALI MOUNTAIN RANGE-

1. Copper: Rajasthan holds the first place in the base-metal field and in the years to come it will not only maintain its place but will also figure in the international map of the centres 'or activity in respect of working and winning of these metals. It is hoped that the increase in the tempo of base metal exploitation will go a logway y in curtailing the ever-increasing drain of our foreign exchange resources. The Khetri copper deposits, although they had a long tradition of being worked since the Mughal times, can well be taken· as a recent discovery. Their full potential as a major mineralised belt has come to light only through recent scientific exploration. The belt, as our present knowledge indicates, extends from Singhana to Raghunathpura and several economic deposits of copper andiron pyrites have been located in this belt. While the exploitation of the bigger deposits of copper as well as iron pyrites has been taken up, some of the smaller copper deposits still await effective utilisation. Similarly the investigation for copper in the Alwar district has brought to light two Small deposits of copper.

It is Non ferrous metal, mostly found in the veins of the igneous and metamorphic rocks. The copper is malleable and ductile and good conductor of electricity. Rajasthan is on second place in country in production of copper.

Copper mines found in Rajasthan are -

- Khetri- singhana (Jhunjhunu)
- Banno Baalo ki Dhani, Neem ka thana (sikar)
- Kho- Dariba (Alwar)
- Pur-Agucha, Gulabpura (Bhilwara)
- Anjani, Salumber (Udaipur)
- Bidasar (Churu)

Production – Hindustan Copper Limited (HCL) under Ministry of Mines.

2. Iron Ore- India is endowed with fairly abundant resources of iron ore. It has the largest reserve of iron ore in Asia. The two main types of ore found in our country are haematite and magnetite. The iron ore mines occur in close proximity to the coal fields in the north eastern plateau region of the country which adds to their advantage.

Deposits of Iron-ore in Rajasthan-

- Morija-banol (Jaipur)
- Neemla-Raisela (Dausa)
- Dabla-singhana (Jhunjhunu)
- Nathara ki Pal, Thur Hunder (Udaipur)

3. Lead-Zinc and Silver: Rajasthan has monopoly in production of lead-zinc. In Rajasthan, the deposits of lead zinc are found in the Achaean and protozoic era rocks. The production of silver is in the form of mixed metal with lead and zinc. The setting up of zinc smelter at Debari is a land-mark in our efforts to cut down the base: metal imports. The sulphuric acid obtained as by-product is used to produce superphosphate. Another by-product is cadmium.

Deposits and Mines in Rajasthan-

- Zawar, Debari (Udaipur)
- Rajpura-Dariba (rajsamand)
- Rampura-Agucha, Gulabpura (Bhilwara)
- Chouth ka Barbara (Sawai Madhopur)
- Gudda- Kishoridas (Alwar)

MINERAL DEPOSITS IN WAGAD BELT-

Diamond: Diamond is a type of carbon that has its atoms arranged in a diamond cubic crystal structure. Another solid form of carbon known as graphite is the chemically stable form of carbon at ambient temperature and pressure, but diamond almost never transforms to it. Any natural material with the maximum hardness and thermal conductivity is diamond. The only diamond mine in Rajasthan is Kesharpura (Rajasamand).

Gold is a thick, soft, malleable, and ductile metal that is bright, somewhat reddish yellow in colour. Gold is a transition metal in chemistry. It's one of the least reactive chemical elements, and it's solid at room temperature.

- Jagpura – Bhikhia (Banswara)
- Anandpura – Bhukhia (Banswara)
- Ghotiya amba (Banswara)

Manganese: Manganese ore deposits of low grade occur in Banswara district. It is a hard brittle silvery metal, often found in minerals in combination with iron. Manganese oxide is used as an oxidising agent, as a rubber additive, in glass making, fertilisers, and ceramics. Manganese sulfate can be used as a fungicide.

- Leelwani (Banswara)
- Kalakhunt (Banswara)
- Talwara (Banswara)

Fluorite: The deposit is now belonging exploited by the Rajasthan Industrial and Mineral Development Corporation. It crystallizes in isometric cubic habit, although octahedral and more complex isometric forms are not uncommon.

BYJU'S EXAM PREP

- Mando ki Pal (Dungarpur)

CLAY MINERALS

Clay minerals are the characteristic minerals of the earths near surface environments. They form in soils and sediments, and by digenetic and hydrothermal alteration of rocks. Water is essential for clay mineral formation and most clay minerals are described as hydrous alumina silicates. Clay found in Rajasthan are-

- China clay – Bikaner
- Bal Clay – Bikaner
- Fire clay- Bikaner
- Fuller's clay/Bleaching clay- Barmer
- Silica sand- Boond and Jaipur

STONE MINERALS:

Marble- Stones have been significant in human life since ancient times. Different kinds of building and decorative stones are used today in building construction industry. Amongst them, marble is an important stone. Rajasthan has monopoly in the production of marble. The marble of Makrana in Rajasthan is world famous. The Agra Fort, Taj mahal and Victoria Palace are built with the marble of Makrana.

Different kinds with varying colored marble stones are found in the Rajasthan state-

- White Marble – Makrana (Nagaur)
- Black Marble – Bhaislana (Jaipur)
- Green Marble – Udaipur
- Pink Marble – Jalore & Banswara
- Yellow Marble – Jaisalmer
- Rainbow coloured Marble – Pali

Limestone- Vindhyan, Aravalli, Ajabgarh and Raialo, all these geological formations have contributed quality limestone occurring in various parts of the state· Three cement plants at Lakheri, Sawai Madhopur and Chittogarh have. been in production and three more cement plants near Nimbahera in Chittorgarh district, near Beawar in Ajmer district.

- Cement grade – Chittorgarh
- Chemical grade – Nagaur and Jodhpur
- Steel grade – (Sonu region) Jaisalmer

MINERALS FOUND ONLY IN RAJASTHAN:

- Garnet /Blood stone – Tonk, Ajmer and Bhilwara
- Ochre – Chittorgarh
- Jasper – Jodhpur
- Emerald – Kala Guman Mines (Rajsamand)
- Wollastonite – (Bel ka magra) sirohi.

ATOMIC MINERALS:

- Uranium – Khandela (Sikar), Umra (Udaipur)
- Thorium – (Sardarpura) Bhilwara, Bhadrvan (Pali)

TUNGUSTEN: Tungusten is obtained from wolframite ore. It is mainly found with granite and pegmatite rocks. It is a highly strategic important mineral. It is used in making electric bulbs, strengthening steel, metal cutting tools and making arms of strategic importance. In addition to it is used in X-ray, Radio and Television equipments and dying and printing industries.

The main deposits of Tungsten are found in Rewat and Bhakri of Degana of Nagaur district and Balda area of Sirohi district is done by Tungsten Development Department of Rajasthan state.

In addition to this, deposits of Tungsten in Amaritya of Dungarpur district, Kun of Udaipur district, Barathia in Pali and Ladera-sukun area of Ajmer district. The state produces 75% of total Tungsten of the country.

GYPSUM: In India the maximum quantity of gypsum is found in Rajasthan. It is a layered mineral.There are great possibilities for the development of this mineral in state. The maximum use of this mineral is in making fertilizer. Besides this, it is also used in making plaster of paris, cement, paint, acid, ammonium sulphate etc. It is mined at four major areas in Rajasthan-

- Bikaner- Jamsar, Lunkaransar
- Nagaur- Bhadwasi, Goth-Manglod, Mangol
- Jaisalmer- Mohangarh
- Barmer- Hamirwali

ENERGY MINERALS;

Petroleum- Petroleum is the second important source of energy after Coal. Petroleum is used in means of transport and production of energy. The presence of

petroleum is possible only in sedimentary rocks. Mineral oil is a mixture of hydro-carbon compounds. Petroleum was formed due to organisms living in sea being pressed between the sedimentary rocks in the geological age.

In Rajasthan, Sedimentary rocks are found in Bikaner, Jaisalmer and Western Jodhpur. The reserve of Petroleum are found these rocks. The Gudamalani area of Barmer is a major area of mineral oil reserve. Large reserve have been found in Barmer-sanchor basin the Cairn Energy India Limited of Britain has got the permission of mining the oil in 'Nagar" village and Mamiyo ki Dhani of Gudamalani tehsil. This oil well has been named 'Rageshwari'. 31 wells have have been drilled including the 'Mangla' well in the Barmer-sanchore Basin. Tanot, Ghotaru, Dandewala, Sadewala, Manihari Tibba and Longewala are the major areas of mineral oil in Jaisalmer.

Petroleum storage Basins and oil mined companies in Rajasthan are-

- Barmer-Sanchore Basin – Cairn Energy
- Rajasthan Self Basin – ONGC and PDVSA
- Bikaner-Nagaur Basin – IOCL and ESSAR
- Hadoti/Vindhyan Basin – ONGC and Cairn Energy.

Natural Gas- Natural Gas was discovered in Focus Energy's exploration block, around 25 km from the Pakistan border, in the same stratigraphic area as the one producing multi-trillion cubic feet fields of Sawan and Miano.

COAL- Coal is a one of the important minerals which is mainly used in the generation of thermal power and smelting of iron ore. Coal occurs in rock sequences mainly of two geological ages, namely Gondwana and tertiary deposits.

In addition, Lignite Coal have been Produced in Rajasthan –

Kapoordi, Jalipa, Giral, Bhadres in Barmer and Palana in Bikaner are the major mines of Lignite Coal in Rajasthan.