Minerals and Energy Resources

Check Point 01

Q. 1. State one use of mineral in our daily life.

Answer: Minerals have a variety of practical uses in the pharmaceutical, manufacturing construction, petroleum and high-tech industries. Not only is it valued in the form of precious and semi-precious gemstones, but it is also essential for the proper functioning of human life. Other than the daily intake requirement of minerals by a human body, even the daily toothpaste we use has minerals in it. Abrasive minerals like silica and limestone are used as cleaning agents, while minerals like fluorite produce fluoride which prevents cavities. The white colouring of most toothpaste comes from titanium oxide which is derived from minerals such as rutile, ilmenite and anatase. The sparkle in some toothpaste comes from the mineral mica. Even the toothbrush and tube containing the paste is plastic which is mineral derivative from petroleum.

Q. 2. What differentiates a ferrous mineral from a non-ferrous mineral?

Answer: The term 'ferrous' means containing or consisting of iron. Ferrous minerals are those minerals that contain iron while non-ferrous minerals are those that do not contain iron. In the following table, their difference has been further illustrated.

Sr. No	Ferrous Mineral	Non-ferrous mineral
1.	These contain iron as an element in their composition.	These do not contain iron as an element of their composition.
2.	Because of the iron content, these show the high magnetic property.	Does not show any magnetic property.
3.	When exposed to the elements, they are highly corrosive.	When exposed to elements they are less corrosive.
4.	They have high tensile strength as they can carry a high amount of strain.	They have low tensile strength.
5.	They are essentially used in metallurgical industries.	They are essentially used in electrical industries.
6.	Examples include iron-ore, manganese etc.	Examples include copper, bauxite, lead, zinc, gold etc.

Q. 3. What are the important centres of bauxite deposits in India?

Answer: Bauxite is an important mineral as aluminium; an important metal in many industries. India's bauxite deposits are mainly distributed between the states of Madhya Pradesh and Chattisgarh. The main areas are found in the Amarkantak Plateau (Madhya Pradesh), Maikal Hills (Chattisgarh), and the plateau region of Bilaspur – Katni (between Madhya Pradesh and Chattisgarh).

Q. 4. State any one use of limestone.

Answer: Limestone is a sedimentary rock but composed majorly of the minerals - calcite and aragonite which are different forms of calcium carbonate. It is the basic raw material required in the cement industry and essential for smelting iron in the blast furnaces.

Q. 5. List two chief mica producing regions in India.

Answer: Mica is one of the indispensable minerals used in the electrical and electronic industries because of its excellent insulating properties and resistance to high voltage. The states of Jharkhand and Rajasthan have many mica producing belts. Koderma – Gaya Hazaribagh belt of Jharkhand is the leading producer of mica in India. In Rajasthan, Ajmer has important mica producing belt around it.

Q. 6. State one way by which mineral resources can be conserved.

Answer: Minerals are non -renewable resources and once depleted cannot be replenished for further usage. Thus, it is important that we conserve this so that future generations can also benefit from its use. One of the most important manners in which minerals can be conserved is through the funding of researches that can develop new technology that avoids the wastage of minerals and provides ways for maximum utilization.

Check Point 02

Q. 1. When and where was first oil field in India discovered?

Answer: Petroleum is the second most important energy resource after coal in India. Digboi in Assam also known as the Oil City is the oldest oil-producing centre in India. Crude oil was first discovered here in the late 19th century, and the first refinery was established here as early as 1901. The first oil well was also drilled here and is still in operation.

Q. 2. What are the various categories of coal?

Answer: Coal is an extremely important energy resource. It has several varieties based on the degrees of compression and the depth and time of burial. The following are the different varieties of coal.

● **Lignite –** This is the lowest quality of coal as it has the least carbon concentration. It is soft brown coal with high moisture content and mainly used in electricity generation.

● **Bituminous –** This is middle-quality coal with a high heating value. While it appears shiny and smooth, it may reveal a layered appearance on closer inspection. This type is highly popular for commercial use.

● **Anthracite –** This is the highest quality of coal with a lustrous black appearance. It is hard and brittle with a high percentage of fixed carbon and a low percentage of volatile material. It is mainly used in metal smelting and fabrication industries.

● **Peat –** contains less than 40-55 per cent of carbon. It also contains a sufficient amount of volatile matter and a lot of moisture.

Q. 3. In which region the largest amount of natural gas is produced in India?

Answer: Natural gas is a clean energy resource. It is often found in association with petroleum and is used not only as a source of energy but also as a raw material in the petrochemical industry. Assam, Tripura, Andhra Pradesh, Telangana and Gujarat have onshore fields that are also major producers of natural gas. Assam had the highest percentage in the gross production of onshore natural gas in the year 2016-17.

Q. 4. Which minerals are used to generate atomic power?

Answer: The release of nuclear energy to generate heat through nuclear reactions is called atomic power. The generated heat is mostly used to further generate electricity. It is one of the less carbon-intensive methods for electricity generation making it highly environmentally friendly. The main minerals that are used for nuclear reactions are uranium and thorium.

Q. 5. Where are geothermal energy project located in India?

Answer: The energy that is generated and stored in the earth is called geothermal energy. It is mostly used for electricity production and is a cost-effective and environmentally friendly energy source. But it is limited to areas with hot springs. Two experimental projects to harness this source has been set up in India. One is in Parvati Valley near Manikarn in Himachal Pradesh. The other is in Puga Valley, Ladakh.

Self Assessment

Q. 1. Which metal can be obtained from bauxite?

Answer: Bauxite is a non-ferrous mineral. It is a clay-like substance and a main source for the metal aluminium. It is the world's main source of aluminium. Aluminium is available from bauxite as it is formed from the decomposition of a wide variety of rocks rich in aluminium silicates. The metal aluminium is extremely important as it is highly malleable and ductile.

Q. 2. Give a list of various varieties of coal. Where can we obtain lignite?

Answer: Coal is an extremely important energy resource. It has several varieties based on the degrees of compression and the depth and time of burial. The following are the different varieties of coal.

Lignite – This is the lowest quality of coal as it has the least carbon concentration. It is soft brown coal with high moisture content and mainly used in electricity generation.

Bituminous – This is middle-quality coal with a high heating value. While it appears shiny and smooth, it may reveal a layered appearance on closer inspection. This type is **highly popular for commercial use.**

Anthracite – This is the highest quality of coal with a lustrous black appearance. It is hard and brittle with a high percentage of fixed carbon and a low percentage of volatile material. It is mainly used in metal smelting and fabrication industries.

Peat – contains less than 40-55 per cent of carbon. It also contains a sufficient amount of volatile matter and a lot of moisture.

In India, lignite deposits are found in Neyveli in Tamil Nadu.

Q. 3. Name the metal which is made up of a series of plates and leaves.

Answer: Mica is a non-metallic mineral which is made up of a series of plates and leaves. It is widely distributed and occurs in all rock types. It is available in a variety of colours and can be flaky. Mica is one of the indispensable minerals used in the electrical and electronic industries because of its excellent insulating properties and resistance to high voltage. The states of Jharkhand and Rajasthan have many mica producing belts. Koderma – Gaya Hazaribagh belt of Jharkhand is the leading producer of mica in India. In Rajasthan, Ajmer has important mica producing belt around it.

Q. 4: Classify energy resources.

Answer: The capacity to do work is called energy and it is essential for life processes. Any resource that can produce heat, power life, move objects and produce electricity is called an energy resource. Human energy consumption has grown steadily throughout history. Energy resources can be classified on a variety of basis like nature of their transaction, availability, etc. The most important classification is based on the conventionality in deriving the energy. According to this, energy resources are of two types –

(i) Conventional energy resources

(ii) Non-conventional energy resources.

a) Conventional energy resources – Any energy resource that is limited in nature and non-renewable and has been used since a long time is termed a conventional energy resource. Examples of this include coal, petroleum, natural gas and electricity.

b) Non-conventional energy resources- Any energy resource that is yet to be used on a large scale and can be naturally replenished on a human time scale is called non-conventional energy resource. Not only are these abundant in nature but also renewable. Examples of this include Nuclear or atomic energy, solar energy, wind power, biogas, tidal energy and geothermal energy.

Q. 5. What is open pit mining?

Answer: The definition of an open pit mine is "an excavation or cut made at the surface of the ground for the purpose of extracting ore and which is open to the surface for the duration of the mine's life." To expose and mine the ore, it is generally necessary to excavate and relocate large quantities of waste rock. This form of mining is generally used when commercially useful rocks or ores are found near the earth surface. Quarries that provide building materials are often considered to be a form of open pit mining. This form of mining is carried on in the selected area until the mine is exhausted of beneficial materials or when there is a danger of a cave in. Often the exhausted mines are converted into landfills or lakes depending upon the associated geographical factors. Twin Creeks Gold Mine in Nevada , USA is a classic example of open pit mining. In India, Hutti Gold Mine in Raichur district of Karnataka is an example of open pit mining.

Q. 6. Name two minerals which are obtained from veins and lodes.

Answer: Minerals occur under a variety of circumstances. It is important to understand their occurrence as the type of formation in which they occur determines the relative ease and cost of extraction of said minerals. In igneous and metamorphic rocks, minerals in their molten or gaseous forms are often pushed nearer to the earth's surface through crevices. They cool and solidify in these crevices. The smaller occurrences are called veins while the comparatively larger ones are called lodes. Major metallic minerals like tin and copper occur in nature in this manner.

Q. 7. Koderma-Gaya-Hazaribagh belt of Jharkhand is rich in which mineral?

Answer: Koderma – Gaya Hazaribagh belt of Jharkhand is the leading producer of mica in India. The British Geological Survey reported that as of 2005, this area also had the largest deposits of mica in the world. Mica is one of the indispensable minerals used in the electrical and electronic industries because of its excellent insulating properties and resistance to high voltage.

Q. 8. What is geothermal energy? How can it be tapped?

Answer: The energy that is generated and stored in the earth is called geothermal energy. It is mostly used for electricity production and is a cost-effective and environmentally friendly energy source.

1. The geothermal energy is sourced not only from the original formation of the planet but also from the radioactive decay of materials.

2. With increasing depth, the internal temperature of the earth keeps increasing. The difference in temperature between the core and the surface or the geothermal gradient drives a continuous conduction of thermal energy.

3. In areas of shallow depth, this thermal energy is often absorbed by the surrounding groundwater and rocks and often rises as steam. This steam power is then used for the generation of electricity.

4. Thus areas near plate tectonic boundaries which often have hot springs or weaker surface cover are often tapped for sourcing geothermal energy. But owing to its limited area of occurrence, it has not been fully exploited for the benefits of mankind.

Q. 9. Which are the types of coal formation based n their geological ages? Where are they found in India?

Answer: Coal is an extremely important energy resource. It has been formed from the compression of plant materials over thousands of years. Coal deposits in India are of two distinct geological ages. The earliest coal deposits are of Permian age formed about 270 million years ago. At that time, South Africa, South America, Antarctica, Australia, India and Madagascar formed a landmass called Gondwanaland. Coal formed in Gondwanaland are known as Gondwana Coal. Other deposits of Tertiary age (30-60 million years) have been formed comparatively recently. These are known as Tertiary Coal. The following table gives the distribution of coal fields in India according to their geological type.

Coalfields	Locations	
	State	**Area**
Tertiary Coalfields	Meghalaya	Cherrapunji, Mawlong and Shillong
	Assam	Mikir Hills
	Arunachal Pradesh	Namchik and Namphuk fields
	Nagaland	
Gondwana Coalfields	West Bengal - Jharkhand	Raniganj, Jharia, Bokaro and Karanpur coalfields of Damodar valley
	River valleys in south India	Mahanadi valley, Son Valley, Godavari valley and Wardah Valley

The above is not an exhaustive list but merely an indicator of the important coal sources according to geological type in India. Coalfields are present in almost all the states of India.

Q. 10. Why should we conserve mineral and energy resources?

Answer: Any resource that is of economic interest and available for eventual economic extraction from the earth's crust is called a mineral resource. Any resource that can produce heat, power life, move objects and produce electricity is called an energy resource.

While mineral resources provide the basic raw materials required by human society for development, energy resources provide the energy required for the functioning of human society. Like all resources, these are unevenly distributed throughout the world.

With uneven distribution comes uneven usage. These resources are also finite in nature. They have been formed over several millennia. Rapid exploitation of these resources for the development and progress of the complex modern society is depleting them at an alarming rate.

It has already been established that it takes millions of years for a viable mineral resource deposit to form. Same with conventional non-renewable energy resources. There is a huge disparity between the consumption rate and the replenishment rate of said resources. And this creates the need for the conservation of said resources.

If the humankind uses up the finite resources in one lifetime, the future generations will suffer. Without available resources, the economy will come to a halt leading to a halt in development and overall lowering of human living conditions.

Q. 11. What is the relevance of non-conventional sources of energy in a country like India? Why do you think so?

Answer: Any resource that can produce heat, power life, move objects and produce electricity is called an energy resource. Energy resources can be classified on a variety of basis like nature of their transaction, availability, etc. The most important classification is based on the conventionality in deriving the energy. According to this, energy resources are of two types –

a) Conventional energy resources

b) Non-conventional energy resources.

(a) Conventional energy resources – Any energy resource that is limited in nature and non-renewable and has been used since a long time is termed a conventional energy resource. Examples of this include coal, petroleum, natural gas and electricity.

(b) Non-conventional energy resources- Any energy resource that is yet to be used on a large scale and can be naturally replenished on a human time scale is called non-conventional energy resource. Not only are these abundant in nature but also renewable. Examples of this include Nuclear or atomic energy, solar energy, wind power, biogas, tidal energy and geothermal energy.

In a developing country like India, energy resources are highly important as they form the basis of the country's evolution. In such a scenario, non-conventional energy resources play a major role. Because of its geographic location, India has an abundant supply of non-conventional energy resources.

With research, it is possible to channel these sources for proper use, which in turn will lower India's dependency on conventional sources. India is affected in a negative manner by the rising oil and gas prices, switching resource options will lower the negative impacts. Conventional resources are mainly fossil fuels which inadvertently affect the environment. By switching to non-conventional resources, we will not only be

able to better the economy but also better the impacts on the environment and secure its future.

Q. 12. Why is the conservation of resources important? Discuss associated with it.

Answer: Conservation means the management of the resources for the benefit of the present as well as future generation. It does not mean the total curtailment of consumption but rather the controlled use of resources for greater benefits. Conservation of resources primarily includes reduction of wastage, controlled use and increased benefits. The term 'sustainable development' is frequently used to express the approaches to resource conservation. The importance of resource conservation has been provided in the following points –

a) Resource conservation is needed to maintain the essential ecological processes and life support system which in turn ensures the survival of all living species.

b) It is needed to satisfy the future need as a growing population size causes an increased demand for resources.

c) Finite nature of conventional resource forms like fossil fuels makes it imperative that resources are conserved to expand the time span of usage.

d) Resource conservation reduces environmental pollution and hence is important as environmental quality affects all species on earth.

Methods of resource conservation include the following –

a) Substitution – Development of substitutes is a major principle of resource conservation. Non -renewable energy resources like fossil fuels may be substituted with renewable energy resources.

b) Recycling – Certain resources can be recycled up to a certain limit and hence the declining trend in its quantity can be arrested for a time span. Iron is such a resource. If iron scraps are recycled in the iron and steel industry it can lower the dependence on raw iron.

c) Alternative technology – Alternative technology can protect the material environment, create a longer lifespan for finite resources and increase satisfaction from the same amount. It needs to be environmentally friendly and less exploitative for it to be successful.

d) Reduction of wastage – if wastages are reduced, a greater quantity of resources are available for consumption, and it will lead to resource conservation.

e) Development of awareness – No conservation programme can be successful if the people are not involved. Awareness regarding the importance of resources is imperative for its conservation.

f) Increased efficiency – Increased resource demand is met by the increased functional resource value from the same quantity of resource input. For e.g., modern fuel-efficient cars can cover longer distances for the same amount of petrol.

Thus, from the above discussion, we can establish that resource conservation is the need of the hour and there are a variety of ways in which it can be achieved.

Q. 13. Why is coal called the most important source of energy even today in India? Explain with reasons.

Answer: Coal is a solid black mineral made up of carbon, hydrogen, oxygen and nitrogen in varying proportions. it is a type of fossil fuel where trapped solar energy in dead and decaying plant matter has been compressed over a period of time to give its current form.

Coal is the most important source of energy today in India. Its importance can be seen by the extent of its use in various aspects of the development of the country.

a) Power generation – It is the most important source of commercial energy in India. The thermal power which accounts for four-fifth of the country's power generation is mostly coal-based. Development of power generation is key to industrial development. Some of the big coal-based thermal stations include Farakka (West Bengal), Singrauli and Dadri (Uttar Pradesh), Korba (Madhya Pradesh) and Ramagundam (Andhra Pradesh).

b) Iron and steel Industry –Presence of Coking and high-grade non-coking coal – an essential raw material for steel determines the location of the iron and steel industry. These types of coal are predominantly found in the eastern part of India which explains the concentration of said industries in this region.

c) Cement Industry – Coal is one of the primary raw materials for cement manufacturing and is also used as a source of power in the form of electricity. Cement is a necessary material for a developing country like India which is undergoing rapid urbanization.

d) By-products of coal and their industrial uses – Coal is a source of a number of raw materials for chemical industries. The major by-products like tar, coal gas, benzole are used in a variety of industries like plastics, organic chemicals, fertilizers and pharmaceutical industries. India has a shortage of petroleum which has resulted in the growth of coal use in chemical industries.

e) Transport fuel – Though this was in the past, yet India faced rapid development with the introduction of railways which heavily depended on coal for fuelling the steam-powered engines. Even though it is not relevant today, the development of the Indian economy as a whole was based on coal power.

Thus, from the above discussion, it is evident that coal despite having negative impacts on the environment is essential for the development and sustenance of the Indian

economy. This trend will continue until alternative forms of cheaper, sustainable power is made available to the industries and the public.

Q. 14. Explain the developments of non-conventional sources of energy in India.

Answer: Energy resources can be classified on a variety of basis like nature of their transaction, availability, etc. The most important classification is based on the conventionality in deriving the energy. According to this, energy resources are of two types –

a) Conventional energy resources

b) Non-conventional energy resources.

In a developing country like India, the economy is highly dependent on conventional resources. The developments of non-conventional sources of energy in India have been undertaken in the following manner –

A) Solar Thermal Energy – India being a tropical country has vast amounts of free sunlight which can be converted to solar thermal energy through technology. This energy can be further utilized to not only generate electricity for commercial purposes but also for individual uses through the use of solar cookers and solar water heaters. Although the initial cost was high , currently with lowered costs for the required technology , solar power is becoming popular in industrial and individual uses.

B) Wind Energy - Wind energy is another very important, clean and renewable source of energy which is slowly making its presence felt in India. Wind farms in Tamil Nadu (from Nagercoil to Madurai), Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and Lakshadweep are contributing towards the energy requirement in the country.

C) Biogas – Biogas originating from the anaerobic decomposition of bio-degradable materials is renewable and cleaner than other forms of energy. Its most popular use is as domestic fuel in rural areas. ‘Gobar gas plants’ that use the dung of cattle is an efficient use of manure and provides farmers not only with energy but also improved fertilizers.

D) Tidal energy - There are currently proposals for using tidal energy in India as the country has a vast coastline - about 6000 km and a number of places where we can conveniently harness energy from oceans.

E) Geothermal energy - The energy that is generated and stored in the earth is called geothermal energy. It is mostly used for electricity production and is a cost-effective and environmentally friendly energy source. But it is limited to areas with hot springs. Two experimental projects to harness this source has been set up in India. One is in Parvati Valley near Manikarn in Himachal Pradesh. The other is in Puga Valley, Ladakh.

Q. 15. Examine Tidal energy and Geothermal energy as sources of energy for the future.

Answer: Tidal energy and geothermal energy are non -conventional sources of energy as they have not been used on a large scale from a long time.

Tidal energy :

1. Power generated from the tides and open ocean currents. Floodgate dams are built across inlets.

2. During high tide water flows into the inlet and gets trapped when the gate is closed.

3. After the tide falls outside the flood gate, the water retained by the floodgate flows back to the sea via a pipe that carries it through a power-generating turbine.

4. The energy that is generated and stored in the earth is called geothermal energy. It is mostly used for electricity production and is a cost-effective and environmentally friendly energy source.

Geothermal energy:

1. The geothermal energy is sourced not only from the original formation of the planet but also from the radioactive decay of materials.

2. With increasing depth, the internal temperature of the earth keeps increasing.

3. The difference in temperature between the core and the surface or the geothermal gradient drives a continuous conduction of thermal energy.

4. In areas of shallow depth, this thermal energy is often absorbed by the surrounding groundwater and rocks and often rises as steam.

5. This steam power is then used for the generation of electricity. Thus, areas near plate tectonic boundaries which often have hot springs or weaker surface cover are often tapped for sourcing geothermal energy.

Both these energy sources produce almost no pollution and is a renewable energy source. But there is a need a lot of research to make them commercially viable and available for the general masses. Even if these sources are not major players in the energy production scenario, they have great potential for future use as they are based on the inexhaustible gravitational forces of the earth.

Q. 16. ‘’In comparison to coal and oil, hydroelectricity is a key source of energy.’’ Comment on this statement.

Answer: 1. Coal is a type of fossil fuel where trapped solar energy in dead and decaying plant matter has been compressed over a period of time to give its current form. It is burned to provide the necessary energy which is converted further into thermal power, fuel and various other raw materials for industries.

2. 'Oil' or petroleum is a naturally occurring inflammable liquid that is primarily composed of hydro-carbons. It has high economic importance as it is used for transportation, generation of electricity, power industries etc.

3. Hydroelectricity is the electricity generated from hydropower which is the power generated by utilizing the energy potential of running water.

The following table will provide a comparative study of all three energy sources –

	Coal and Petroleum	**Hydroelectricity**
Advantages of hydroelectricity in comparison to coal and petroleum.	These are finite sources of energy and limited in amount.	It is a self-renewable energy source.
	The cost of accessing and developing is high for these sources of energy along with the cost of distribution.	This a cheaper source of energy as recurring expenses is very low for the generation of Hydropower.
	These are highly polluting and adversely affects the environment.	This is a non-polluting which is a big advantage in today's world crippled by air pollution.
Disadvantages of hydroelectricity in comparison to coal and petroleum.	The raw materials required for energy generation can be stored for further use.	Since the raw material in this source is running water, it cannot be stored.
	Though expensive, they are still cheaper than hydroelectricity which required the building of expensive dams.	The initial investment is prohibitive in some areas.

From the above table, we can observe that the advantages of hydroelectricity far outweigh the disadvantages of the same in comparison to coal and petroleum energy resources. With technological advances, it is possible that hydroelectricity will one day replace the more conventional power sources of coal and petroleum.

Q. 17. Explain the advantages of non-conventional sources of energy.

Answer: Energy resources can be classified on a variety of basis like nature of their transaction, availability, etc. The most important classification is based on the conventionality in deriving the energy. According to this, energy resources are of two types –

(a) Conventional energy resources

(b) Non-conventional energy resources.

For a long time, humankind has been dependent on conventional sources of energy to propel their development. But the finite nature of such sources has created a demand and supply gap in this world which has resulted in a variety of problems that include discrepancies in development, war mongering, ill-effects on environment etc. In such a scenario, non-conventional energy resources play a very important role as alternative energy sources. The following points describe the advantages that such sources of energy have.

Advantages of non-conventional sources of energy

● These sources are infinite sources of energy (sun, wind, rivers, organic matter, etc.) and contribute towards reduction of dependence on finite conventional energy resources, such as oil, natural gas, coal, etc.

● These sources are environment and human-friendly nature.

● They have better equal geographical distribution than conventional sources leading to the decentralisation of the energy system, making it possible for energy needs to be met at the regional and local level, thus relieving the pressure on infrastructure systems (electricity grids, roads, etc.) and reducing the losses from energy transmission.

● They cover a wider range of energy uses from individual level to industrial level. (Solar power can be used for solar cookers as well as to generate thermal power for a factory)

● With low operating costs and lower levels of influence by international markets, it is an economic boon for developing and under developed countries in the world.

● These energy sources are having the ability to create jobs at the local level as the plants and other technological needs are local based.

From the above points it is evident that non-conventional energy sources are advantageous in the log run not only for individuals but the countries as well as the world as a whole.

Q. 18. What are the main qualities of iron ore deposit in India? Also discuss the distribution of iron mines in India? Mineral in India are unevenly distributed. Explain.

Answer: The rocks and minerals from which metallic iron can be economically extracted is called iron ore. This mineral is used to make pig iron which in turn is used to make steel making it the backbone for industrial development in any country. Iron ore is of four different types as outlined below –

a) Magnetite – This is the best quality of iron ore with a up to or more than 70%of iron content. It is magnetic in nature making it a good conductor and highly valuable in the electrical industry.

b) Haematite – The second grade of iron ore has an iron content of 50 – 60% and is a very important source for industrial iron.

c) Limonite – This is an inferior iron ore as the iron content is around 40 -50% but economically viable because it can be accessed through open -cast mining.

d) Siderite – This is an iron carbonate with less than 40% of iron content making it the most inferior type of iron ore. But there are uses for it because of its elf-fluxing nature due to the presence of lime.

India is the 5th largest producer of iron ore in the world. The main qualities of the iron ore deposits found in India have been outlined below –

i) Average metal content of the ores is one of the highest (64%) among the major iron ore producing countries of the world.

ii) Production is dominated by haematite and magnetite. Mining of inferior quality ores is insignificant.

iii) Mining of iron ores in India is open-cast or surface-mining. Since underground mining is not needed, cost of mining is low.

Distribution of iron-ore in India

1) Odisha-Jharkhand belt: In Odisha high grade hematite ore is found in Badampahar mines in the Mayurbhanj and Kendujhar districts. In the adjoining Singbhum district of Jharkhand haematite iron ore is mined in Gua and Noamundi.

2) Durg-Bastar-Chandrapur belt: lies in Chhattisgarh and Maharashtra. Very high grade hematites are found in the famous Bailadila range of hills in the Bastar district of Chhattisgarh. The range of hills comprise of 14 deposits of super high grade hematite iron ore which is best for steel making steel making. Iron ore from these mines is exported to Japan and South Korea via Vishakhapatnam port.

3) Ballari-Chitradurga-Chikkamagaluru- Tumakuru belt in Karnataka has large reserves of iron ore. The Kudremukh mines located in the Western Ghats of Karnataka are a 100 per cent export unit. Kudremukh deposits are known to be one of the largest in the world. The ore is transported as slurry through a pipeline to a port near Mangaluru.

4) Maharashtra-Goa belt includes the state of Goa and Ratnagiri district of Maharashtra. Though, the ores are not of very high quality, yet they are efficiently exploited. Iron ore is exported through Marmagao port.

Iron ore is also mined in Andhra Pradesh and Tamil Nadu.

Mineral in India are unevenly distributed.

Mineral resources provide the basic raw materials required by human society for development. Minerals found in their raw forms are called ores. India has a rich and

varied source of minerals. Although the vast alluvial plains of India do not have mineral deposits, the rich concentrations make up for this lack.

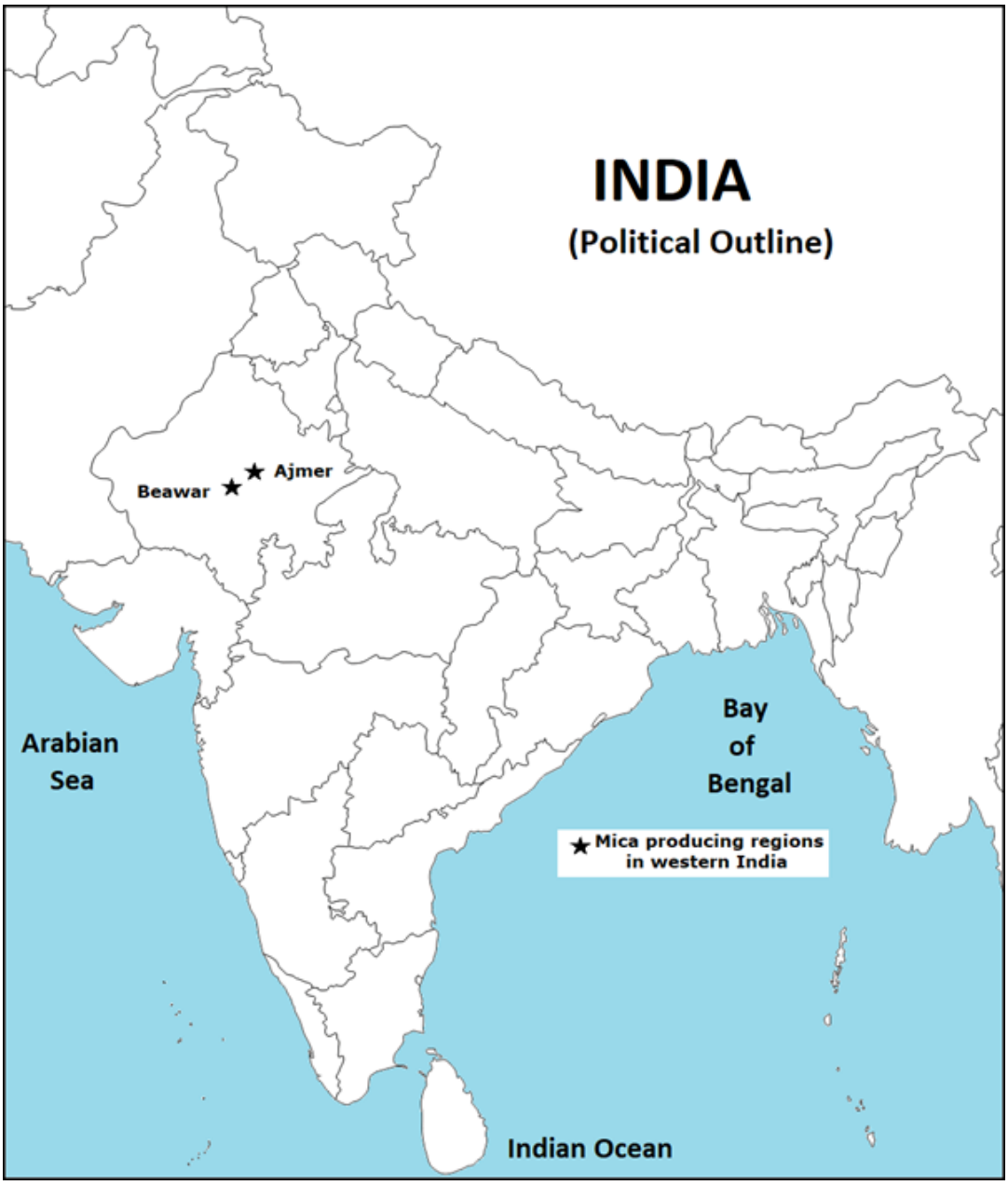
Peninsular rocks in the Deccan region and eastern plateau area contains most of the coal reserves, metallic and non-metallic minerals as well. Sedimentary rocks of the western and eastern coasts in Gujrat and Assam are rich in petroleum reserves. The rock system of Rajasthan has several important deposits of non-ferrous minerals.

It is evident from the distribution that India though blessed with a variety of mineral reserves is also hampered by their uneven distribution. Mineral formation processes can be blamed for this uneven distribution. Differences in geological structures, processes and time required in the formation of minerals have led to this uneven distribution of minerals in India.

Q. 19 A. On the political map, locate, mark and label the following with appropriate symbols.

Mica producing region of Western India

Answer:



Q. 19 B. On the political map, locate, mark and label the following with appropriate symbols.

Nuclear power plant in Tamil Nadu and Gujarat.

Answer: