MODE OF OCCURRENCE OF MINERALS

VEINS/IODES	BEDS/LAYERS	RESIDUAL MASS OF WEATHERED MATERIAL	ALLUVIAL DEPOSITS	OCEAN
1. occur in igneous and metamorphic rocks	1. occur in sedimentary rocks	1. formed due to decomposition of surface rocks and the removal of soluble contents.	1. minerals may occur as alluvial deposits in the sands of valley floors and the base of hills.	1. ocean waters contain vast quantities of minerals but these are too widely diffused to be of economic significance
2. found in cracks, crevices, faults or joints	2. formed as a result of deposition, accumulation and concentration in horizontal strata	2. bauxite is formed this way	2. these are called placer deposits	2. metals: common salt, magnesium and bromine
3. smaller occurrences are called veins, larger are called iodes	3. coal and iron ore have been concentrated as a result of long periods under great heat and pressure		3. these contain minerals which are not corroded by water	3. the ocean beds are rich in manganese nodules
4. formed when mineral in liquid/molten form and gaseous forms are forced upward through cavities towards the surface. they cool and solidify as they rise.	4. gypsum, potash salt and sodium salt have been formed as a result of evaporation especially in arid regions		4. metals: gold, silver, platinum	

MODE OF OCCURRENCE OF MINERALS (cont)

5. metals: tin, copper, zinc, lead

Minerals are usually found in ores. The term ore is used to describe an accumulation of any mineral mixed with other elements. The mineral content of the ore must be in sufficient concentration to make its extraction commercially viable. The type of formation or structure in which they are found determines the relative ease with which the mineral ores may be mined. This also determines the cost of the extraction.

NON CONVENTIONAL SOURCES OF ENERGY

NUCLEAR/ATOMIC ENERGY	SOLAR ENERGY	WIND POWER	BIOGAS	TIDAL ENERGY	GEO THERMAL ENERGY
1. obtained by altering the structure of atoms.	1. india is a tropical country and has enormous possibilities of tapping solar energy	1. india has great potential for wind power	1. shrubs, farm waste, animal and human waste are used to produce biogas for domestic consumption in rural areas.	1. oceanic tides can be used to generate electricity.	1. refers to heat and electricity produced by using the heat from the interior of the earth
2. energy is released in the form of heat and this is used to generate electric power.	2. photovoltaic technology converts sunlight directly into energy	2. the largest wind farm cluster in located in tamil nadu from nagarcoil to madurai	2. decomposition of organic matter yields gas which has higher thermal efficiency in comparison to kerosense, dung cake and charcoal.	2. floodgate dams are built across inlets. during high tide water flows into the inlet and gets trapped when the water gate is closed.	2. the earth grows progressively hotter with increasing depth.

NON CONVENTIONAL SOURCES OF ENERGY (cont)					
3. uranium and thorium which are available in jharkhand and rajasthan are used for generating atomic power.	3. it will minimise the dependance of rural households on firewood and dung cakes which will in turn contribute to environmental conservation and adequate supply of manure in agriculture	3. apart from these, andhra pradesh, karnataka, gujarat, kerala, maharashtra and lakshadweep have important wind farms	3. bio gas plants are set up at municipal, cooperative and individual levels.	3. the water is retained by the flood gate and flows back into the sea via a pipe that carries it through a power generating turbine	3. where the geothermal gradient is high, high temperatures are found at shallow depths.
4. the monazite sands of kerala is also rich in thorium			4. the plants using cattle dung are known as gobar gas plants.	4. places: gulf of khambhat, gulf of kuchchh in gujarat, gangetic delta in sunderban regions of west bengal provide ideal conditions for tidal energy	4. ground water in such areas absorbs heat from the rocks and becomes hot.

NON CONVENTIONAL SOURCES OF ENERGY (cont)

5. provides benefits in form of energy and improved quality of manure and also prevents loss of trees

5. it is so hot that when it rises to the earths surface it becomes steam. this steam is used to drive turbines and generate electricity.

WHAT IS A MINERAL

1. a mineral is a homogenous naturally occuring substance with a definite internal structure

2. rocks are a combination of homogenous substances called minerals

3. a particular mineral that will be formed from a certain combination of elements depends upon the physical and chemical conditions under which the material forms

4. this gives us a wide range of colours, hardnes, crystal forms, lustre, density that a mineral possesses

NON - FERROUS MINERALS

COPPER

1. india is critically deficient in copper reserves and production

2. being malleable, ductile and a good conductor, copper is mainly used in electrical cables, electronics and chemical industries.

3. mines: balaghat mines in madhya pradesh, khetri mines in rajasthan and singhbhum district of jharkhand

non ferrous minerals play a vital role in a number of metallurgical, engineering and electrical industries

NON - FERROUS MINERALS

BAUXITE

1. clay-like substance from which alumina and aluminum is obtained

2. formed by the decomposition of a wide variety of rocks rich in aluminium silcates

NON - FERROUS MINERALS (cont)

3. aluminium is an important metal because it combines the strength of metals such as iron with extreme lightness and also good conductivity and great malleability

4. india's bauxite deposits are mainly found in the amarkantak plateau, maikal hills and the plateau region of bilsapur-katni.

5. odisha was the largest bauxite producing state in india in 2016-17

6. panchpatmali deposits in koraput district are the most important bauxite states

ENERGY RESOURCES

1. energy is required for all activities

2. energy can be generated from fuel minerals like coal, petroleum, natural gas, uranium and from electricity

3. energy resources can be classified as conventional and non-conventional sources

4. conventional sources: firewood, cattle dung cake, coal, petroleum, natural gas and electricity

5. non conventional sources: solar, wind, tide, geothermal, biogas and atomic energy

ELECTRICITY

1. its per capita consumption is considered as an index of development

2. electricity is generated by running water which drives hydro turbines to generate hydro electricity and by burning other fuels such as coal, petroleum and natural gas to drive turbines to produce thermal power

3. hydro electricity is generated by fast flowing water which is a renewable resource

ELECTRICITY (cont)

4. hydro electric power plants: bhakra nangal, damodar valley corporation, the kopili hydel project, etc.

5. thermal electricity is generated by using coal, petroleum and natural gas. The thermal power stations use non-renewable fossil fuels to generate electricity

ENERGY RESOURCES

PETROLEUM

1. provides fuel for heat and lighting, lubricants for machinery and raw materials for a number of manufacturing industries

2. petroleum refineries act as a nodal industry for synthetic textile, fertiliser and numerous chemical industries

3. most petroleum occurrences in india are associated with anticlines or domes. It occurs when oil is trapped in the crest of the upfold. the oil bearing layer is a porous limestone or sandstone through which oil may flow

4. the oil is prevented from rising or sinking by intervening non porous layers

5. petroleum is also found in fault traps between porous and non porous rocks

6. mumbai high, gujarat and assam are major areas for petroleum production

7. places: ankeleshwar, digboi, naharkatiya and moran-hugrijan

MINERALS OF INDIA

FERROUS MINERALS

1. account for 3/4ths of the total value of production of metallic minerals

2. provide a strong base for the development of metallurgical industries

3. types of ferrous minerals: iron ore and manganese

the concentration of the mineral in the ore, the ease of extraction and closeness to market play an important role in affecting the economic viability of a reserve.

FERROUS MINERALS

MANGANESE

1. used in the manufacturing of steel and ferro-manganese alloy

2. nearly 10kg is required to manufacture 1 tonne of steel

3. used in manufacturing bleaching powder, insecticides and paints

4. states: andhra pradesh, madhya pradesh, karnataka, odisha, maharashtra

NON-METALLIC MINERALS

MICA

1. made up of a series of plates or leaves.

2. splits up easily into thin sheets

3. can be clear, back, red-yellow, black or brown

4. due to its excellent di-electric strength, low power loss factor, insulating properties and resistance to high voltage, mica is one of the most indispensable minerals used in electric and electronic industries

NON-METALLIC MINERALS (cont)

5. found in the northern edge of the chota nagpur plateau, koderma-gaya-hazaribagh belt of jharkhand, ajmer, nellore mica belt of andhra pradesh

NON CONVENTIONAL SOURCES OF ENERGY

1. the growing consumption of energy has resulted in the country becoming increasingly dependant on fossil fuels such as coal, oil and gas.

2. rising prices of oil and gas and their potential shortages have raised uncertainties about the security of energy supply in future which in turn has serious repercussions on the growth of the national economy.

3. moreover, increasing use of fossil fuels has caused serious environmental problems

4. hence there is a pressing need to use renewable energy sources like solar energy, wind, tide, biomass and energy from waste material

5. these are called non conventional sources of energy

CONSERVATION OF MINERALS

1. the total volume of workable mineral deposits is an insignificant fraction.

2. we are rapidly consuming mineral resources that required millions of years to be created and concentrated

3. the geological processes of mineral formation are so slow that the rates of replenishment are infinitely small in comparison to the present rates of consumption

4. mineral resources are finite and non renewable

CONSERVATION OF MINERALS (cont)

5. continued extraction of ores leads to increasing costs as mineral extraction comes from greater depths along with decrease in quality.

6. improved technologies need to be constantly evolved to allow use of low grade ores at low costs

7. recycling of metals, using scrap metals and other substitutes are steps for conserving out mineral resources for the future

ENERGY RESOURCES

NATURAL GAS

1. found with petroleum deposits and is released when crude oil is brought to the surface

2. used as domestic and industrial fuel

3. used as fuel in power sector to generate electricity, for heating purpose in industries, raw material in chemical industries, petrochemical and fertiliser industries as transport and cooking fuel

4. with the expansion of gas infrastructure and local city gas distribution (COD) networks, natural gas is also emerging as a preferred transport fuel(CNG) and cooking fuel (PNG) at homes.

5. places: mumbai high, cambay basin, krishna-godavari basin

CONSERVATION OF ENERGY RESOURCES

1. energy is a basic requirement for economic development

2. every sector of the national economy - agriculture, industry, transport, commercial and domestic needs inputs of energy

3. the economic development plans required increasing amounts of energy to remain operational.

CONSERVATION OF ENERGY RESOURCES (cont)

4. as a result, consumption of energy in all forms has been rising all over the country

5. there is an urgent need to develop a sustainable path for energy development.

6. promotion of energy conservation and increased use of renewable energy sources are the twin planks of sustainable energy.

7. we have to adopt a cautious approach for the judicious use of our limited energy resources.

8. as citizens we can use public transport systems instead of individual vehicles, switching off electricity when not in use, using power saving devices and using non conventional sources of energy.

CONVENTIONAL SOURCES OF ENERGY

COAL

1. must abundant fossil fuel in india

2. used for power generation, to supply energy to industry as well as for domestic needs

3. india is highly dependant on coal for meeting its commercial energy requirements

4. coal is formed due to the compression of plant material over millions of years

5. coal is therefore found in a variety of forms depending on the degree of compression and the depth and time of burial

6. decaying plants in swamps produce **peat** which has low carbon and high moisture content and low heating capacity

7. **lignite** is a low grade brown coal which is soft with high moisture content. it is used for electricity generation

CONVENTIONAL SOURCES OF ENERGY (cont)

8. coal that has been buried deep and subjected to increased temperatures is **bituminous coal**. it is the most popular coal for commercial use.

9. **metallurgical coal** is high grade bituminous coal which has a special value for smelting iron in blast furnaces.

10. **Anthracite** is the highest quality hard coal.

11. jharia, raniganj, bokaro, the godavari, mahanadi, son and wardha valleys also contain coal deposits

12. meghalaya, assam, arunachal pradesh and nagaland also contain tertiary coal deposits

13. coal is a bulky material, which loses weight as it is reduced to ash.

14. hence, heavy industries and thermal power plants are located on or near the coalfields

HAZARDS OF MINING

1. dust and noxious fumes inhaled by the miners make them vulnerable to pulmonary diseases

2. rise of collapsing mine roofs, inundation and fires in coalmines are a constant threat.

3. the water sources in the region get contaminated due to mining

4. dumping of waste and slurry leads to degradation of land, soil, and increase in stream and water pollution.

5. stricter safety regulations and implementation of environmental laws are essential to prevent mining from becoming a killer industry

ROCK MINERALS

LIMESTONE

1. found in association with rocks composed of calcium carbonates or calcium and magnesium carbonates

2. found in sedimentary rocks

3. basic raw material for the cement industry and essential for smelting iron ore

FERROUS MINERALS

IRON ORE

1. basic mineral and the backbone of industrial development

2. india has fairly abundant resources of iron ore

3. india is rich in good quality of iron ores

4. magnetite is the finest iron ore with a very high content of iron up to 70%

5. it has excellent magnetic properties, especially valuable in the electrical industry.

6. hematite ore is the most important industrial iron ore in terms of the quantity used but has a slightly lower iron content than magnetite (50-60%)

7. Entire production of iron ore accrued from odisha, jharkhand, chattisgarh, karnataka

8. major iron ore belts in india:

- *odisha-jharkhand belt*: high grade hematite ore is found in odisha and jharkhand

- *durg-bastar-chandrapur belt*: very high grade hematite ores are found. it has the best physical properties needed for steel making

- *ballari-chitradurga-chikkamagaluru-t-umakuru belt*: very large reserves of iron ore

- *maharashtra-goa belt*: ores are not of very high quality, yet they are efficiently exploited. Iron ore is exported through marmagao port