5 Minerals and Energy Resources

CHAPTER

Level - 1 CORE SUBJECTIVE QUESTIONS

MULTIPLE CHOICE QUESTIONS (MCQs)

1. Option (A) is correct
   Explanation: Non-metallic minerals do not contain metals. Example: Mica.
   Energy minerals are used to generate energy. Example: Natural gas (a fossil fuel).
   Bauxite is an ore of aluminum (a metallic mineral).
   Manganese is a metallic mineral used in steel production.
   Platinum is a precious metal, not an energy mineral.
2. Option (B) is correct
   Explanation: The correct order of states' share in manganese production in India, from highest to lowest, is:
   Madhya Pradesh: Approximately 33%
   Maharashtra: Approximately 25%
   Odisha: Approximately 19%
   Karnataka: Approximately 11%
3. Option (D) is correct
   Explanation: Bauxite is a crucial mineral used in the production of aluminium. Significant bauxite deposits in Odisha are found in districts such as Kalahandi, Koraput, and Sambalpur.
4. Option (D) is correct
   Explanation: Non-conventional sources of energy refer to renewable and sustainable energy sources that are not based on fossil fuels. Geothermal energy is derived from the heat inside the Earth's crust and is a renewable source of energy. Natural gas, petroleum, and coal are conventional energy sources as they are fossil fuels and non-renewable.
5. Option (D) is correct
   Explanation: Ferrous metals are those that contain iron as a primary component. Nickel is a ferrous metal as it is often found in iron-based alloys like stainless steel. Copper and Tin are non-ferrous metals because they do not contain iron. Bauxite is an ore of aluminium, which is also a non-ferrous metal.
6. Option (D) is correct
   Explanation: Odisha has the maximum production of iron-ore, i.e. 52%.
7. Option (C) is correct
   Explanation: Solar power panels use sunlight to generate electricity, making them a renewable, environmentally friendly, and sustainable source of energy. India receives abundant sunlight throughout the year, making solar energy practical for powering homes across different regions.
8. Option (C) is correct
   Explanation: These minerals were formed due to their concentration in horizontal strata, caused by deposition and accumulation.

MATCH THE FOLLOWING QUESTIONS

1. Option (B) is correct
   Explanation: Ferrous minerals contain iron. Example: Cobalt (used in alloys, magnetic materials).
   Non-ferrous minerals do not contain iron. Example: Bauxite (ore of aluminium).
   Non-metallic minerals do not contain metals. Example: Granite (igneous rock used in construction).
   Energy minerals are used for power generation. Example: Coal (a fossil fuel).
2. Option (A) is correct
   Explanation: Ferrous minerals are those that contain iron. Non-ferrous minerals are those that do not contain iron. Copper is one of the most widely used non-ferrous metals. Precious minerals are rare and valuable minerals often used in jewellery and as a store of value. Gold is one of the most well-known precious minerals.
3. Option (D) is correct
   Explanation: Natural gas is CNG (Compressed Natural Gas), Wax is used for making candles and Petroleum due to its high price and demand is known as black gold.

4. Option (A) is correct

Explanation: The Sundarbans, located in the coastal region of Bangladesh and West Bengal, India, is famous for its mangrove forests. Himachal Pradesh, a state in northern India, is known for its mountainous terrain and geothermal potential. Jaisalmer, located in the state of Rajasthan, India, is known for its vast desert landscapes and high wind speeds. Kerala has a nuclear power plant, the Kundankulam Nuclear Power Plant, which generates atomic energy.

ASSERTION-REASON QUESTIONS

1. Option (B) is correct

Explanation: The main use of manganese is for making iron and steel and it is used as the basic raw material for making its alloy. Small quantities of manganese are used for bleaching powder, insecticides and paints. Both assertion and reason are true but reason does not explain the use of manganese in manufacturing of steel.

2. Option (D) is correct

Explanation: Increased use of fossil fuels leads to air pollution, global warming, and climate change, which harm the environment. It does not create a healthy environment. Fossil fuels like coal, oil, and natural gas are naturally occurring resources that can be extracted from the Earth's crust.

3. Option (A) is correct

Explanation: Tidal energy is a renewable source of energy since it is generated from the natural movement of ocean tides, which occur due to gravitational forces from the Moon and Sun. Tidal energy is produced by the rise and fall of ocean tides, which can be harnessed using tidal barrages or underwater turbines. Both assertion and reason are true and reason correctly explains the assertion.

4. Option (A) is true

Explanation: India has great potential for wind energy, especially in states like Tamil Nadu, Gujarat, Maharashtra, Rajasthan, and Karnataka. India is one of the leading producers of wind energy in the world. Wind is a freely available natural resource, and windmills can convert wind energy into electricity without fuel costs. Both assertion and reason are correct and reason is the correct explanation of assertion.

VERY SHORT ANSWER TYPE QUESTIONS

1. (i) Every sector of the national economy - agriculture, industry, transport, commercial and domestic needs inputs of energy. Energy is used for manufacturing of products.

(ii) The economic development plans implemented since independence necessarily required increasing amount of energy to remain operational.

2. (i) India is a tropical country so there is a high potential of solar energy.

(ii) Solar energy is fast becoming popular in rural and remote areas. Big solar power plants are being established in different parts of India.

3. (i) The largest wind farm cluster is located in Tamil Nadu, from Nagarcoil to Madurai.

(ii) Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and Lakshadweep have important wind farms.

(iii) Nagarcoil and Chesilmere are well known for effective use of wind energy in the country.

4. (i) Most of the minerals are too widely diffused to be of economic significance.

(ii) Common salt, magnesium and bromine are largely derived from ocean water.

(iii) The ocean beds, too, are rich in manganese nodules.

5. (i) In sedimentary rocks a number of minerals occur in beds or layers. They have been formed as a result of deposition, accumulation and concentration in horizontal strata.

(ii) Coal and some forms of iron ore have been concentrated as a result of long periods under great heat and pressure.

(iii) Another group of sedimentary minerals include gypsum, potash salt and sodium salt.

(iv) These are formed as a result of evaporation especially in arid regions. (Any two)

6. (i) Almost everything we use, from a tiny pin to a towering building or a big ship, all are made from minerals.

(ii) The railway lines and the tarmac (paving) of the roads, our implements and machinery too are made from minerals.

(iii) Cars, buses, trains, aeroplanes are manufactured from minerals and run on power resources derived from the earth.

(iv) Even the food that we eat contains minerals.

(v) In all stages of development, human beings have used minerals for their livelihood, decoration, festivities, religious and ceremonial rites. (Any two)

7. (i) The smaller occurrences are called veins and the larger are called lodes.
   (ii) In most cases, they are formed when minerals in liquid/ molten and gaseous forms are forced upward through cavities towards the earth's surface.
   (iii) They cool and solidify as they rise. Major metallic minerals like tin, copper, zinc and lead etc. are obtained from veins and lodes.
8. (i) There is an urgent need to develop a sustainable path of development.
   (ii) Promotion of energy conservation and increased use of renewable energy resources are twin planks of energy conservation.
   (iii) Judicious use of limited energy resources.
   (iv) Reduce, reuse and recycling of resources.
   (v) Stoppage of wastage of resources. (Any two)
9. (i) Limited availability of resources.
   (ii) The growing consumption of energy has resulted in depletion of fossil fuels.
   (iii) Rising prices of oil and gas and their potential shortages have raised uncertainties.
   (iv) Increasing use of fossil fuel has caused serious environmental problems.
   (v) Urbanisation and industrialisation.
   (Any two)

SHORT ANSWER TYPE QUESTIONS

1. (i) Energy is a basic requirement for economic development.
   (ii) Every sector of the national economic-agriculture, industry, transport, communication needs inputs of energy.
   (iii) Required in vehicles.
   (iv) To drive machinery in industries.
   (v) Required in all the facets of life.
   (vi) Required in household.
   (vii) Used in all commercial requirements.
   (Any three)
2. Conserving energy resources is essential for sustainable development. Three effective ways to conserve energy are:
   (i) **Promoting Energy Efficiency:** Use LED bulbs instead of incandescent bulbs. Switch to energy-efficient appliances like star-rated refrigerators and air conditioners.Improve industrial efficiency by using modern technology and recycling waste energy.
   (ii) **Using Renewable Energy Sources:** Shift from fossil fuels to solar, wind, hydro, and biogas energy for electricity generation. Encourage solar panels in homes and industries to reduce dependence on conventional energy.
   (iii) Adopting Responsible Consumption Habits:Switch off electrical appliances when not in use.Use public transport, carpooling, or cycling to reduce fuel consumption. Practice rainwater harvesting to conserve energy used in water distribution.
3. (i) Bellary-Chitradurga-Chikmaglur-Tumkur belt in Karnataka has large reserves of iron-ore.
   (ii) The Kudremukh mines located in the western ghats of Karnataka are a 100 per cent export units.
   (iii) Kudermukh deposits are known to be one of the largest reserves of iron-ore in the world.
   (iv) The ore is transported as slurry through a pipeline to a port near Mangalore.
4. (i) Peninsular rocks contain most of the reserves of coal, metallic minerals, mica and many other non-metallic minerals.
   (ii) Sedimentary rocks on the western and eastern flanks of the peninsula, in Gujarat and Assam have most of the petroleum deposits.
   (iii) Rajasthan with the rock systems of the peninsula, has reserves of many non-ferrous minerals. The vast alluvial plains of North India are almost devoid of economic minerals.
5. The mining activity is injurious to health of the miners and environment as:
   (i) The dust and noxious fumes inhaled by miners, make them vulnerable to pulmonary diseases.
   (ii) The risk of collapsing mine roofs is always there.
   (iii) Inundation and fires in coal mines are a constant threat to miners.
   (iv) The water source in the region get contaminated due to mining.
   (v) Dumping of waste and slurry leads to degradation of land, soil and rise in stream and river pollution. (Any three)
6. Natural gas is used as a source of energy as well as an industrial raw material.
   (i) It can be transported easily through pipelines.
   (ii) Pipelines have helped in setting up fertiliser plants and power plants on their way.
   (iii) Natural gas is a clean source of energy. It is an environmental-friendly fuel because of the low carbon emission.
7. (i) India is a tropical country, therefore it receives sunlight in abundance throughout the year.
   (ii) Solar plant can be easily established in rural and remote areas.

(iii) It will minimise the dependence of rural households on firewood and dung cakes which in turn will contribute to environmental conservation and adequate quantity of manure.

(iv) Solar energy is an important alternate source of energy. Use of solar energy will reduce the pressure on conventional source of energy.

8. (i) Minerals are considered to be the backbone of the economy.

(ii) Industry and agriculture depend on mineral deposits.

(iii) The substances manufactured from also depend on mineral deposits.

(iv) Total volume of workable mineral deposits is very less – only 1% of the earth's crust.

(v) Mineral resources are being consumed rapidly, and minerals require millions of years to be created and concentrated.

(vi) 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.

(vii) Mineral resources are finite and non-renewable.

(viii) The rich mineral deposits of our country are extremely valuable but short-lived possessions. (Any three)

LONG ANSWER TYPE QUESTIONS

1.

	Conventional sources	Non-conventional sources
(i)	Conventional sources of energy are exhaustible.	Non-conventional sources are renewable.
(ii)	Conventional sources of energy take a long time to form.	Non-conventional forms of energy are readily available.
(iii)	Conventional forms of energy are usually derived from fossil fuels.	Non-conventional sources of energy are derived from sources like sun, wind and Earth.
(iv)	Conventional sources of energy are relatively cheaper.	Non-Conventional energy sources are initially expensive but become cheaper in due course of time.
(v)	Conventional sources of energy are not sustainable.	Non-conventional sources of energy are sustainable.
(vi)	Conventional sources of energy often cause air and water pollution.	Non-conventional sources of energy cause less damage to the environment.
(vii)	Examples of Conventional sources of energy are firewood, petroleum, coal, natural gas etc.	Examples of non-conventional energy sources are solar, tidal, wind, hydel power.

(Any five)

2. (i) Judicious use of limited energy resources.

(ii) For example, as concerned citizens we can do our bit by using public transport systems instead of individual vehicles.

(iii) Switching off electricity when not in use.

(iv) Using power saving devices.

(v) Using non-conventional sources of energy.

3. (i) Natural Gas can be used as a domestic and industrial fuel.

(ii) It is used as fuel in power sector to generate electricity.

(iii) It is used for heating purpose in Industries.

(iv) It is used as raw material in chemical, petrochemical and fertiliser industries, as transport fuel and as cooking fuel.

(v) Natural gas is also emerging as a preferred transport fuel (CNG). (Any five)

(vi) It is used as cooking fuel (PNG) at homes.

4. (i) In igneous and metamorphic rocks, minerals may occur in the cracks, crevices, faults or joints. The smaller occurrences are called veins and the larger are called lodes.

(ii) In sedimentary rocks a number of minerals occur in beds or layers.

(iii) They have been formed as a result of deposition, accumulation and concentration in horizontal strata. Example are: Coal and some forms of iron ore.

(iv) Certain minerals may occur as alluvial deposits in sands of valley floors.

(v) Base of hills. These deposits are called 'placer deposits.' For example: Gold, silver, tin and platinum are most important among such minerals.

(vi) Another mode of formation involves the decomposition of surface rocks, and the removal of soluble constituents, leaving a residual mass of weathered material containing ores. Bauxite is formed this way. (Any five)

Level - 2 ADVANCED COMPETENCY FOCUSED QUESTIONS

MULTIPLE CHOICE QUESTIONS (MCQs)

1. Option (D) is correct

   Explanation: India is rich in mineral resources, but certain minerals like petroleum and copper are either not available in sufficient quantities or are not of high-grade quality. As a result, industrial demand exceeds domestic supply, leading to imports.

2. Option (C) is correct

   Explanation: Mineral resources are non-renewable and exhaustible, meaning once depleted, they cannot be replenished in a short time. Therefore, they must be used wisely, ensuring that current needs are met without compromising the needs of future generations. This approach is called sustainable and judicious use, which involves minimising wastage, recycling and reusing metals, and reducing overexploitation.

3. Option (C) is correct

   Explanation: Solar and wind energy are examples of non-conventional (renewable) energy sources that are environmentally friendly and sustainable. The increasing use of these sources reflects a global and national shift towards cleaner, greener energy alternatives to reduce pollution, dependence on fossil fuels, and carbon emissions.

4. Option (B) is correct

   Explanation: The uneven distribution of minerals means some states (like Jharkhand and Odisha) are rich in specific resources such as iron ore, while others may lack them. This makes regional planning essential to set up industries near resource-rich areas, develop transport and infrastructure, and ensure balanced regional development

5. Option (C) is correct

   Explanation: Excessive mining in tribal and forested regions leads to deforestation, loss of biodiversity, displacement of indigenous communities. This highlights the need for sustainable development, where economic growth through mining is balanced with ecological protection and social justice.

ASSERTION-REASON QUESTIONS

1. Option (A) is correct

   Explanation: Assertion is true because minerals are non-renewable because they do not regenerate quickly; they take millions of years to form under specific geological conditions.

   Reason is also true, since they are limited in quantity, overuse or unplanned extraction can lead to exhaustion, making conservation critical.

   Both assertion and reason are true and reason is the correct explanation of the assertion.

2. Option (C) is correct

   Explanation: Assertion is true. Conservation of mineral resources is essential for sustainable development, especially since many minerals are non-renewable.

   Reason is false because minerals in India are not available in unlimited quantities; they are finite and exhaustible, which is why judicious use is necessary.

3. Option (C) is correct

   Explanation: Assertion is true. Solar energy is a non-conventional (renewable) source of energy because it comes from the sun and is freely available and sustainable.

   Reason is false because solar energy is inexhaustible and clean, meaning it does not pollute and is not exhaustible like fossil fuels.

4. Option (A) is correct

   Explanation: Assertion is true because mining is directly associated with deforestation, removal of topsoil, and contamination of air and water due to heavy machinery and chemicals.

   Reason is also true because these effects cause serious environmental degradation, making the reason the correct explanation of the assertion.

   Both assertion and reason are true and reason correctly explains the assertion.

VERY SHORT ANSWER TYPE QUESTIONS

1. India imports certain minerals because:

   (i) **Uneven distribution and limited availability:** Not all essential minerals are found in sufficient quantity or quality across the country.

   (ii) **High industrial demand:** The domestic production of some minerals is not enough to meet the growing needs of sectors like energy, transport, and electronics.

   (iii) **Low-grade ores:** Some minerals available in India may be of inferior quality, making imports more viable.

   Example of an imported mineral and its use:

   Mineral: Copper

   Use: Used in electrical wiring, electronics, and manufacturing of alloys like bronze and brass.

2. The environmental consequences of mining activities are:

(i) **Deforestation and loss of biodiversity:** Large-scale clearing of forests for mining leads to habitat destruction, threatening wildlife and plant species.

(ii) **Land degradation and pollution:** Mining causes soil erosion, contamination of water bodies with chemicals, and air pollution due to dust and emissions from machinery.

(Any one)

Mining can be made more sustainable by:

(i) Adopting eco-friendly mining techniques (e.g., controlled blasting, dust suppression).

(ii) Strict enforcement of environmental regulations.

(iii) Rehabilitation of mined areas through afforestation and soil restoration.

(iv) Promoting reuse and recycling of minerals to reduce extraction pressure. (Any one)

3. The reasons why non-conventional energy sources are being promoted in India are:

(i) **Sustainability and Renewability:** Non-conventional energy sources like solar and wind are renewable, meaning they do not get exhausted and can be used continuously without depleting natural resources.

(ii) **Environmentally Friendly:** These sources produce little to no pollution, helping reduce carbon emissions and combat climate change, making them crucial for clean and green development.

4. The challenges that arise due to uneven distribution of minerals in India are:

(i) **Regional imbalance in industrial development:** Mineral-rich states like Jharkhand and Odisha attract more industries, while mineral-poor states lag behind in industrial growth.

(ii) **Increased transportation cost:** Industries located far from mineral sources face higher costs for transporting raw materials, affecting profitability and efficiency.

(iii) **Overexploitation of resources in specific regions:** Concentrated mining activities in limited areas lead to environmental degradation and resource exhaustion.

(Any one)

Solution to address this issue:

Promote regional planning and equitable development by developing transport and infrastructure in mineral-poor areas, diversifying industrial base using technology and local resources, and encouraging inter-state cooperation for resource sharing

5. Energy resources influence economic growth by:

(i) **Powering industries:** Energy is essential for operating machines, running factories, and processing raw materials, making it a key driver of industrial production.

(ii) **Supporting agriculture and services:** Energy is needed for irrigation, transportation, and communication, which are vital for agricultural and service sector growth.

(iii) **Creating jobs and infrastructure:** Development of energy infrastructure leads to employment opportunities and boosts overall economic development.

(iv) **Attracting investment:** Reliable energy supply encourages both domestic and foreign investments, strengthening the economy. (Any one)

Conventional energy source:

Coal – widely used in thermal power plants and industries.

Non-conventional energy source:

Solar energy – harnessed through solar panels for electricity and heating.

SHORT ANSWER TYPE QUESTIONS

1. The measures to conserve mineral resources in India are:

(i) **Promote Recycling and Reuse:** Metals like copper, aluminium, and iron can be recycled to reduce the need for fresh extraction. Reuse of scrap metal conserves energy and extends the life of mineral reserves.

(ii) **Use of Alternative Resources and Substitutes:** Where possible, use substitute materials (e.g., plastics, composites, or renewable materials) to reduce pressure on mineral-based resources.

(iii) **Sustainable Mining Practices:** Encourage eco-friendly mining techniques that reduce waste and land degradation. Enforce strict environmental regulations and proper land restoration after mining is complete.

2. The advantages of using non-conventional sources of energy over conventional ones are:

(i) **Renewable and Inexhaustible:** Non-conventional sources like solar, wind, and biogas are renewable, meaning they can be used continuously without running out—unlike coal or petroleum.

(ii) **Environmentally Friendly:** These sources produce little to no pollution, helping reduce carbon emissions, air pollution, and global warming.

(iii) **Reduces Dependence on Fossil Fuels:** By using non-conventional sources, India can

reduce its reliance on imported fossil fuels, ensuring energy security and lowering the trade deficit.

3. The environmental problems caused by mining activities are:
   (i) **Deforestation:** Large-scale clearing of forests for mining operations leads to loss of biodiversity and destruction of natural habitats.
   (ii) **Land Degradation:** Mining strips away the topsoil, leading to soil erosion, making the land barren and unfit for agriculture or habitation.
   (iii) **Pollution:** Mining activities release dust and harmful chemicals into the air and water, causing air pollution and water contamination, which affect both humans and wildlife.

   Way to reduce their impact: Adopt eco-friendly and sustainable mining practices, such as controlled blasting, proper waste disposal, and land reclamation (planting trees and restoring the mined land), to minimise environmental damage.

4. (i) **Coal Energy:**
   Availability: Found mainly in the eastern and central parts of India.
   Examples: Jharkhand, Odisha, Chhattisgarh, and West Bengal have rich coal reserves. The Jharia coalfields in Jharkhand are one of the most important coal-producing areas.
   (ii) **Hydel (Hydroelectric) Energy:**
   Availability: Best harnessed in hilly regions with high rainfall and river systems.
   Examples: Himachal Pradesh, Uttarakhand, and parts of the North-East (like Arunachal Pradesh) are ideal for hydropower. The Bhakra Nangal project on the Sutlej River is a major hydel project.
   (iii) **Solar Energy:**
   Availability: Abundantly available in western and southern India, where there is high solar insolation and clear skies.
   Examples: Rajasthan, Gujarat, and Tamil Nadu have large solar power plants.
   The Bhadla Solar Park in Rajasthan is one of the world's largest.

   This variation shows that energy planning must be regional and resource-based. India's energy mix depends on local geographical and climatic factors, supporting sustainable and efficient energy use.

5. The ways in which energy resources contribute to the development of a nation like India are:
   (i) **Industrial Growth:** Energy is essential for running factories and machinery, enabling the growth of industries such as steel, textiles, chemicals, and cement, which form the backbone of economic progress.
   (ii) **Agricultural Development:** Energy supports agriculture through irrigation systems, operation of pumps, and use of farm machinery, helping increase productivity and reduce dependence on manual labour.
   (iii) **Infrastructure and Transportation:** Energy powers transport networks, communication systems, and construction activities, all of which are vital for connectivity, trade, and infrastructure development.

CASE BASED QUESTIONS

1. (i) Energy is a basic requirement for economic development. Every sector of the national economy- agriculture, industry, transport, commercial and domestic- needs inputs of energy. Sustenance of future depends upon conservation of energy in all realms.
   (ii) India is the world's third-largest energy consuming country. Rising incomes, improving standards of living, economic development, rising population and technological developments are increasing the consumption of energy all over India.
   (iii) The statement "Energy saved is energy produced" means that conserving energy is as effective as generating new energy because:
   (1) **Efficiency Reduces Waste:** By using energy-efficient appliances, switching off unused devices, and optimizing industrial processes, we reduce energy wastage. This reduces the need for extra power production.
   (2) **Lower Demand on Resources:** Producing electricity often requires burning fossil fuels, which depletes natural resources and pollutes the environment. Saving energy directly reduces this dependency.

   Thus, every unit of energy saved is equivalent to producing that much extra energy, making conservation as powerful as generation.

2. (i) In India, coal is the most abundantly available fossil fuel.
   (ii) Coal is important for our economy as it provides affordable electricity to households, businesses, manufacturing facilities, transportation and communication systems.
   (iii) Coal is a bulky material, which loses weight on use as it is reduced to ash. Hence, heavy industries and thermal, power stations are located on or near the coalfields.

3. (i) Option (B) is correct
   Explanation: The Chota Nagpur Plateau is rich in minerals like iron ore, coal, manganese, and bauxite, making it India's mineral heartland.

(ii) Option (B) is correct

Explanation: They are renewable and environmentally friendly because non-conventional energy sources like solar and wind are sustainable and help reduce pollution and dependence on fossil fuels.

(iii) Impact: Uneven distribution leads to regional imbalance, where mineral-rich states develop faster due to industrial growth, while others remain underdeveloped due to lack of resources.

Two sustainable mining measures:

(i) Scientific mining techniques to reduce land degradation and ensure efficient resource use.

(ii) Rehabilitation and reforestation of mined areas to restore ecological balance and support local communities.

4. (i) Mineral distribution is uneven in India because minerals are found concentrated in certain geological formations, while many other regions have very few or no mineral deposits.

Jharkhand is one state rich in mineral resources like coal, iron ore, and bauxite.

(ii) Environmental impact: Groundwater contamination due to chemical runoff from mining sites.

Social impact: Displacement of tribal communities without proper compensation or rehabilitation.

(iii) Two sustainable mining practices:

(1) Adoption of scientific and regulated mining methods to minimise environmental damage.

(2) Rehabilitation of mined areas through reforestation and restoring ecological balance.

Importance of shifting to non-conventional energy sources:

It reduces dependency on fossil fuels, helps lower pollution, and supports clean, renewable, and long-term energy solutions essential for sustainable development in India.

LONG ANSWER TYPE QUESTIONS

1. (i) The major environmental impacts of mining are:

(1) Land Degradation: Open-cast mining leads to removal of topsoil and loss of fertile land, making it unsuitable for agriculture or habitation.

(2) Deforestation and Biodiversity Loss: Mining often requires clearing forests, resulting in habitat destruction and endangering local wildlife.

(3) Water and Air Pollution: Toxic chemicals and heavy metals from mining contaminate groundwater and nearby water bodies. Dust and emissions cause air pollution, affecting both human health and the environment.

(ii) Two measures to promote sustainable development of mineral resources are:

(1) Scientific and Regulated Mining: Use of eco-friendly technologies, proper waste disposal, and environmental impact assessments before mining begins.

(2) Land Reclamation and Afforestation: After mining is completed, the land should be reclaimed and reforested to restore the natural ecosystem and benefit local communities.

2. (i) There a need to shift from conventional to non-conventional energy sources because:

(1) Conventional sources like coal, petroleum, and natural gas are non-renewable, limited in supply, and cause pollution and greenhouse gas emissions.

(2) Shifting to non-conventional (renewable) sources is essential because they are clean, sustainable, environment-friendly, and help reduce India's dependence on imported fossil fuels.

(3) It also supports energy security, climate change mitigation, and rural development.

(ii) Three non-conventional energy sources and one advantage of each:

(1) Solar Energy: It is abundantly available in most parts of India and pollution-free.

(2) Wind Energy: It is renewable and efficient, especially in coastal and plateau regions.

(3) Biogas (from organic waste): It provides clean fuel, helps manage waste, and supports rural livelihoods.

3. (i) The problems of uneven distribution of minerals are:

(1) Minerals are not found uniformly across the country.

(2) States like Jharkhand, Odisha, Chhattisgarh, and Karnataka are rich in minerals such as iron ore, coal, and bauxite, while many other states have limited or no mineral reserves.

(3) This leads to regional imbalance in industrial development and creates economic disparities between states.

(ii) Consequences of overexploitation:

(1) Environmental degradation: Excessive mining causes deforestation, soil erosion, and pollution of air and water.

(2) Depletion of resources: Overuse reduces the availability of minerals for future generations, making them scarce and expensive.

(iii) Solutions to ensure efficient and balanced use of mineral resources:

(1) Adopt sustainable and scientific mining methods: This includes eco-friendly technologies, reclamation of mined land, and proper waste management.

(2) Encourage recycling and efficient use: Promote the reuse and recycling of minerals (e.g., scrap metal) to reduce pressure on new extraction and ensure long-term availability.

4. (i) Conservation of resources means the careful and efficient use of natural resources to ensure that they are available for future generations. It involves minimising wastage, promoting sustainable use, and protecting the environment while meeting present needs.

(ii) Minerals are considered non-renewable because they are formed over millions of years through natural geological processes. Once extracted and used, they cannot be replenished within a human timescale, making them finite and exhaustible.

(iii) The ways to conserve mineral and energy resources are:

(1) Promote recycling and reuse: Reusing metals and recycling materials like aluminium, copper, and paper reduces the need for fresh extraction.

(2) Use energy-efficient technologies: Encouraging energy-saving appliances, fuel-efficient vehicles, and LED lighting reduces the pressure on energy resources.

(3) Shift to renewable energy sources: Use of solar, wind, and biogas helps reduce dependence on fossil fuels and ensures long-term sustainability.

5. (i) Two economic benefits of mining:

(1) Raw Material for Industries: Mining provides essential minerals like coal, iron ore, and bauxite that are critical for industries such as steel, power, and construction.

(2) Employment and Revenue Generation: Mining activities create jobs for local populations and contribute to the economic development of mineral-rich regions through taxes and royalties.

(ii) Two environmental impacts of mining:

(1) Deforestation and Land Degradation: Large-scale mining leads to clearing of forests, loss of biodiversity, and soil erosion, affecting the ecosystem.

(2) Water and Air Pollution: Chemicals used in mining can contaminate water bodies, and dust from excavation causes air pollution, harming human health and wildlife.

(iii) One social impact of mining activities:

Displacement of Tribal and Local Communities: Mining often leads to forced displacement of people from their ancestral lands without adequate compensation or rehabilitation, causing loss of livelihood and cultural identity.