

Minerals and Energy Resources

Fastrack Revision

- ▶ Minerals are defined as naturally occurring homogeneous solid substances with a definable internal structure. Minerals are found in varied forms in nature, ranging from the hardest diamond to the softest talc.
- ▶ Over 2,000 minerals have been identified by their chemical and physical properties such as colour, hardness, crystal form, lustre and density.
- ▶ Minerals are usually found in 'ores'. The mineral content of the ore must be in sufficient concentration to make its extraction commercially viable. The concentration and the cost of extraction depends on the type of formation or structure in which they are found.

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An ore is an accumulation of one or more minerals in sufficient concentration mixed with other elements.

- ▶ India has fairly rich and varied mineral resources. However, these are unevenly distributed.
- ▶ The economic activity of extracting minerals from below the Earth's crust is called mining. Concentration of minerals in the ore, the ease of extraction and closeness to the market, etc., play an important role in affecting the economic viability of a reserve before mining.
- ▶ Some of the important minerals of India are discussed below:
 - ▶ **Iron Ore:** It is the basic mineral and the backbone of industrial development. The finest iron ore is **Magnetite**, with a very high iron content of up to 70%. **Haematite** ore has slightly lower iron content than magnetite (50–60%). Important iron ore belts in India are as follows:
 - Odisha–Jharkhand belt
 - Durg–Bastar–Chandrapur belt
 - Ballari–Chitradurga–Chikkamagaluru–Tumakuru belt
 - Maharashtra–Goa belt
 - ▶ **Manganese:** It is a metallic element mainly used in the manufacturing of steel and ferro-manganese alloys. India ranks fifth in the world in the production of manganese and Odisha is the largest producer of manganese ore in India. Other states are Madhya Pradesh and Karnataka.
 - ▶ **Copper:** Due to its excellent electrical conductivity, it is used to manufacture electric cables. It is also used in electronics and chemical industries. The Balaghat mines in Madhya Pradesh, Khetri mines in Rajasthan and Singhbhum district of Jharkhand are the leading producers of copper in India.
 - ▶ **Bauxite:** It is used for obtaining aluminium that is formed by decomposition of rocks rich in aluminium silicates. It combines the strength of iron with extreme lightness and has good conductivity and malleability. It is mainly found in Amarkantak plateau, Maikal hills and the plateau region of Bilaspur–Katni and in Odisha.
 - ▶ **Mica:** It is an important non-metallic mineral used in electrical and electronics industry due to its dielectric strength, insulating properties and resistance to high voltage. Mostly it is found in the Koderma–Gaya–Hazaribagh belt of Jharkhand.
 - ▶ **Limestone:** Limestone is a rock mineral used for smelting iron ore in blast furnaces of steel plants and is the basic raw material used to manufacture cement.
- ▶ We are rapidly utilising mineral resources that were formed in millions of years. The mineral resources are finite and non-renewable. Therefore, there is a need to conserve them.
- ▶ Energy is required for all activities. It is needed to cook, to provide light and heat, to drive vehicles and to operate machines. The following are the important sources of energy:

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In India, the major resources of Gondwana coal are located in the Damodar Valley (West Bengal–Jharkhand), Jharia, Raniganj and Bokaro. The Godavari, Mahanadi, Son and Wardha Valleys also have coal deposits.

- ▶ **Firewood and Cattle Dung:** These are commonly used in rural India. According to an estimate, more than 70% of the energy requirements are met by these two sources.
- ▶ **Coal:** Coal is used for power generation, supplying energy to industry as well as for domestic needs. Anthracite coal is the highest quality hard coal having high coke content.
- ▶ **Petroleum:** It provides fuel for heat and lightning, lubricants for machinery and raw materials for a number of manufacturing industries. Mumbai High produces about 63% of India's petroleum. The major off-shore fields are located in Ankeleshwar. Assam is the oldest oil producing state of India. Digboi, Naharkatiya and Moran–Hugrijan are the important oil fields of Assam.
- ▶ **Natural Gas:** It is a clean energy resource, usually found above petroleum. It is an environment-friendly fuel with low carbon emissions. The off-shore region of the Krishna–Godavari basin has the largest amount of natural gas currently available in India.

- **Electricity:** Electricity has a wide range of applications in the modern world and its per capita consumption is considered as an index of development.

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Electricity is generated in two ways viz. by running water (hydroelectricity) and by burning other fuels (thermal electricity).

- **Nuclear or Atomic Energy:** It is generated by altering the structure of atoms. This method generates a lot of heat which is used to generate electric power. Uranium and Thorium are used for generating atomic power.
- **Solar Energy:** India, being a tropical country, has abundant solar energy. It is used for a variety of purposes like electric power generation (using photovoltaic panels) and for heating purposes. India's largest solar power plant is located in Madhapur near Bhuj in Rajasthan.
- **Wind Power:** It is utilised to turn giant windmills to generate electric power. The largest wind farm cluster is located in Tamil Nadu from Nagarcoil to Madurai as well as in Jaisalmer, Rajasthan.

- **Biogas:** It is generated by decomposition of organic matter in biogas plants which are set-up at municipal, cooperative and individual levels. Biogas is a cheap and environment friendly fuel used for cooking and lighting.
- **Tidal Energy:** It is generated by movement of oceanic tides which can be harnessed to generate electricity. In India, the Gulf of Kambhat, the Gulf of Kutch in Gujarat on the Western coast and the Gangetic delta in Sunderban regions of West Bengal provide ideal conditions for utilising tidal energy.
- **Geo-thermal Energy:** It refers to electricity produced by using the heat from the interior of the Earth. To harness energy from hot springs, experimental projects have been set-up in the Parvati Valley in Himachal Pradesh and the Puga Valley in Ladakh.

Energy is a basic need for economic development and we need to conserve it because every sector of the national economy i.e., agriculture, industry, transport, commercial and domestic, all need inputs of energy.



Practice Exercise



Multiple Choice Questions

- Which of the following characteristics of minerals is not a concern of geographers?
 - Minerals as part of the Earth's crust for better understanding of landforms
 - Distribution of minerals
 - Economic activities associated with minerals
 - Formation, age and physical and chemical composition of minerals
- Which of the following rocks consists of a single mineral?
 - Granite
 - Basalt
 - Limestone
 - Sandstone
- Which of the following minerals are metals like gold, silver and platinum?
 - Ferrous minerals
 - Non-ferrous minerals
 - Non-metallic minerals
 - Precious minerals
- In which type of rocks the minerals formed from solidification of molten matter in the crack, crevices, faults or joints are found?
 - Stratified rocks
 - Igneous and metamorphic rocks
 - Sedimentary rocks
 - None of the above
- Minerals are deposited and accumulated in the strata of which of the following rocks? (NCERT)
 - Sedimentary rocks
 - Igneous rocks
 - Metamorphic rocks
 - None of these

- Name the region having the highest and the lowest amounts of mineral deposits in India.
 - Delta regions
 - Northern plains
 - Valleys
 - Mountains
- Which of the following sedimentary minerals is formed as a result of evaporation, especially in arid regions?
 - Coal
 - Potash salt
 - Iron ore
 - Sulphur
- Which one of the following minerals is formed by decomposition of rocks, leaving a residual mass of weathered material? (NCERT)
 - Coal
 - Bauxite
 - Gold
 - Zinc
- Which of the following regions of India is almost devoid of economic minerals?
 - The Himalayan belt
 - The alluvial plains of North India
 - The Thar Desert
 - The Peninsular plateau
- Which of the following is the finest quality of iron ore with magnetic qualities?
 - Magnetite
 - Haematite
 - Siderite
 - Limonite

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Magnetite has a very high content of iron upto 70 per cent and has excellent magnetic qualities.



- Q 11.** Which one of the following iron-ore deposits are known to be one of the largest deposits in the world?
- Bailadila
 - Badampur
 - Kudremukh
 - Ratnagiri
- Q 12.** In which of the following iron ore belt Kudremukh mines are located?
- Odisha-Jharkhand belt
 - Maharashtra-Goa belt
 - Durg-Bastar-Chandrapur belt
 - Ballari-Chitradurga-Chikkamagaluru-Tumakuru belt
- Q 13.** Identify the mineral through its characteristic features.
- It is a metallic element used in manufacturing of steel and ferro-manganese alloys.
 - It is used in manufacturing insecticides, bleaching powder, etc.
 - India ranks fifth in the world in its production.
- Copper
 - Bauxite
 - Mica
 - Manganese
- Q 14.** Which is the basic raw material for the cement industry and essential for smelting iron ore in the blast furnace?
- Bauxite
 - Limestone
 - Mica
 - Aluminium
- Q 15.** Which of the following regions of India contain most of the reserves of coal, metallic minerals, mica and many other non-metallic minerals?
- The Himalayas
 - Alluvial plains of North India
 - Rock system of peninsula in Rajasthan
 - Peninsular plateau region
- Q 16.** Which of the following is a major metallic mineral obtained from veins and lodes?
- Tin
 - Iron
 - Manganese
 - Gold
- Q 17.** Koderma, in Jharkhand is the leading producer of which one of the following minerals?
- Bauxite
 - Mica
 - Iron ore
 - Copper
- Q 18.** Which one of the following minerals is contained in the monazite sand?
- Oil
 - Uranium
 - Thorium
 - Coal
- Q 19.** Identify the mineral with the help of following features.
- It is made up of a series of plates or leaves.
 - It splits easily into thin sheets.
 - It has excellent dielectric strength, insulating properties and resistance to high voltage.
- Copper
 - Bauxite
 - Mica
 - Limestone
- Q 20.** Mica is used in electric and electronic industries because:
- of its insulating properties and resistance to high voltage.
 - it is a good conductor of electricity.
 - of its great malleability.
 - of its sonorous nature.

- Q 21.** Which mine produces maximum copper in India?
- Kudremukh mines
 - Khetri mines
 - Balaghat mines
 - Singhbhum mines
- Q 22.** Which mineral found in Rajasthan, Kerala and Jharkhand, is used for producing electricity?
- Thorium
 - Bauxite
 - Mica
 - Copper
- Q 23.** Match Column I with Column II and choose the correct options:
- | Column I | Column II |
|--------------|--|
| A. Manganese | 1. It is an excellent conductor of electricity. |
| B. Copper | 2. It is used in electrical and electronics industry. |
| C. Bauxite | 3. It is used in the manufacturing of steel and ferromanganese alloys. |
| D. Mica | 4. It is used for obtaining aluminium. |
- | | | | | | | | |
|------|---|---|---|------|---|---|---|
| A | B | C | D | A | B | C | D |
| a. 1 | 2 | 3 | 4 | b. 2 | 3 | 4 | 1 |
| c. 1 | 3 | 2 | 4 | d. 3 | 1 | 4 | 2 |
- Q 24.** Which form of coal has a low carbon and high moisture content and low heating capacity?
- Peat
 - Lignite
 - Anthracite
 - Bituminous
- Q 25.** It is a low grade brown coal which is soft with high moisture content. Identify the correct option:
- Peat
 - Lignite
 - Bituminous
 - Anthracite

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Lignite is a low grade brown coal, bituminous coal is the most popular coal in commercial use and anthracite is the highest quality hard coal.

- Q 26.** Petroleum refineries do not act as a 'nodal industry' for which of the following industry?
- Synthetic textile
 - Silk textile
 - Fertilizers
 - Chemical industries
- Q 27.** Read the passage given below and answer the question that follows:
- Natural gas is an important clean energy resource found in association with or without petroleum. It is used as a source of energy as well as industrial raw material in the petrochemical industry. It is considered as an environment friendly fuel.
- Why is natural gas considered an environment friendly fuel?
- Because of its use in petrochemical industry as raw material
 - It is an important clean energy resource
 - Because of low carbon dioxide emissions
 - It provides fuel for heat and lighting.

Q 28. Choose correct option from Column I and Column II.
(CBSE 2020)

Column I	Column II
A. Mayurbhanj Iron Ore Mines	1. Gujarat
B. Chandrapura Thermal Power Plant	2. Jharkhand
C. Bauxite Mines	3. Odisha
D. Kalol Oil Fields	4. Amarkantak

a. A-1 b. B-2 c. C-3 d. D-4

Q 29. In which of the following states Kaiga Nuclear Power Plant is located? (CBSE 2020)

- a. Karnataka b. Kerala
c. Tamil Nadu d. Telangana

Q 30. In which of the following states is Kalpakkam Nuclear Power Plant located? (CBSE 2020)

- a. Gujarat b. Odisha
c. Kerala d. Tamil Nadu

Q 31. Which place in India is well-known for effective use of wind energy?

- a. Jodhpur b. Jaisalmer
c. Bikaner d. Jalpur

Q 32. What is the correct sequence of generating geothermal energy?

- (i) It is so hot that when it rises to the Earth's surface it turns into steam.
(ii) Groundwater in such areas absorbs heat from the rocks and becomes hot.
(iii) This steam is used to drive turbines and generate electricity.
(iv) Geothermal energy exists because the Earth grows progressively hotter with increasing depth.

- a. (iv), (i), (ii), (iii) b. (ii), (i), (iv), (iii)
c. (i), (ii), (iii), (iv) d. (iii), (ii), (i), (iv)

Q 33. Read the following statements carefully and choose the correct option:

Statement (I): Mica is a mineral made up of plates or leaves.

Statement (II): Mica deposits are found in the northern edge of the Chota Nagpur plateau.

- a. Statement (I) is correct and (II) is incorrect.
b. Statement (I) is incorrect and (II) is correct.
c. Both statements are incorrect.
d. Both statements are correct.

Q 34. Read the following statements carefully and choose the correct option:

Statement (I): Flood gate dams are built across rivers so that water flows into inlet and gets trapped during high tides.

Statement (II): Trapped water flows back via a pipe that carries it through a power generating turbine.

- a. Statement (I) is correct and (II) is incorrect.
b. Statement (I) is incorrect and (II) is correct.
c. Both statements are incorrect.
d. Both statements are correct.



Assertion & Reason Type Questions

Directions (Q. Nos. 35-44): In the following questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option:

- a. Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are correct but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true, but Reason (R) is false.
d. Assertion (A) is false, but Reason (R) is true.

Q 35. **Assertion (A):** Geological processes of mineral formation is slow.

Reason (R): Mineral resources are consumed very quickly than they are formed.



TiP

Mineral formation is slow as it requires millions of years to be created, but are used very quickly in comparison.

Q 36. **Assertion (A):** Minerals have wide range of colours, hardness, crystal forms and lustre.

Reason (R): Minerals are formed under different physical and chemical conditions.

Q 37. **Assertion (A):** India is fortunate to have fairly rich and varied mineral resources.

Reason (R): These variations exist largely because of the differences in the geological structure, processes and time involved in the formation of minerals.

Q 38. **Assertion (A):** Iron ore is the basic mineral and backbone of India.

Reason (R): India is rich in good quality iron ore.



TiP

Iron ore is the basic mineral and the backbone of industrial development. India is rich in good quality iron ores. Iron ore is largely exported from India.

Q 39. **Assertion (A):** Consumption of energy in all forms has been declining all over the country.

Reason (R): Implementation of economic development plans necessarily require increasing amounts of energy to remain operational.

Q 40. **Assertion (A):** The energy resources need to be conserved.

Reason (R): The energy resources are being rapidly depleted.

Q 41. **Assertion (A):** Promotion of energy conservation and increased use of renewable energy sources are the twin planks of sustainable energy.

Reason (R): Energy is a basic requirement for economic development.

Q 42. **Assertion (A):** Natural gas is considered an environment friendly fuel.

Reason (R): Natural gas is a clean source of energy and has low carbon emission.

- Q 43. Assertion (A): Petroleum is the second highest energy source used in India after coal.
Reason (R): Natural occurrence of petroleum in India is associated with anticlines and fault traps of tertiary rocks.
- Q 44. Assertion (A): Solar energy has a bright future in India.
Reason (R): It is easy to establish solar plants in urban and rural areas.

Answers

- | | | | | |
|---------|---------|---------|---------|---------|
| 1. (d) | 2. (c) | 3. (d) | 4. (b) | 5. (a) |
| 6. (b) | 7. (b) | 8. (b) | 9. (b) | 10. (a) |
| 11. (a) | 12. (d) | 13. (d) | 14. (b) | 15. (d) |
| 16. (a) | 17. (b) | 18. (c) | 19. (c) | 20. (a) |
| 21. (b) | 22. (a) | 23. (d) | 24. (a) | 25. (b) |
| 26. (b) | 27. (c) | 28. (c) | 29. (a) | 30. (d) |
| 31. (b) | 32. (b) | 33. (d) | 34. (b) | 35. (b) |
| 36. (a) | 37. (b) | 38. (a) | 39. (d) | 40. (a) |
| 41. (b) | 42. (a) | 43. (b) | 44. (a) | |



Source Based Questions

Source 1

Read the source given below and answer the questions that follow by choosing the most appropriate option:

India is fortunate to have fairly rich and varied mineral resources. However, these are unevenly distributed. Broadly speaking, peninsular rocks contain most of the reserves of coal, metallic minerals, mica and many other non-metallic minerals. Sedimentary rocks on the Western and Eastern flanks of the peninsula, in Gujarat and Assam have most of the petroleum deposits. 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. These variations exist largely because of the differences in the geological structure, processes and time involved in the formation of minerals.

- Q 1. Where are most of the reserves of coal, metallic minerals, mica and many other non-metallic minerals found?
- | | |
|---------------------|----------------------|
| a. Igneous rocks | b. Sedimentary rocks |
| c. Peninsular rocks | d. Metamorphic rocks |
- Q 2. Which part of India is devoid of economic minerals?
- | |
|--|
| a. Gujarat |
| b. Assam |
| c. Rajasthan |
| d. Vast alluvial plains of North India |

- Q 3. Why is there uneven distribution of mineral resources in India?

- | |
|--|
| a. Lack of economic minerals |
| b. Differences in geological structure |
| c. Different processes and time involved in minerals formation |
| d. Both b. and c. |

- Q 4. Which mineral resources are found in abundance in the sedimentary rocks on the Western and Eastern flanks of the peninsula?

- | | |
|-----------------------|--------------------------|
| a. Metallic minerals | b. Non-metallic minerals |
| c. Petroleum deposits | d. Non-ferrous minerals |

- Q 5. In which of the following places most of the petroleum deposits are found?

- | |
|--|
| a. Gujarat |
| b. Assam |
| c. Western and Eastern flanks of peninsula |
| d. All of the above |

- Q 6. Two statements are marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

Assertion (A): Minerals are an indispensable part of our lives.

Reason (R): Minerals have a universal use and they are used to manufacture everything we use in our day-to-day lives.

- | |
|---|
| a. Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A). |
| b. Both Assertion (A) and Reason (R) are correct, but Reason (R) is not the correct explanation of Assertion (A). |
| c. Assertion (A) is true, but Reason (R) is false. |
| d. Assertion (A) is false, but Reason (R) is true. |

Answers

- | | | | | | |
|--------|--------|--------|--------|--------|--------|
| 1. (c) | 2. (d) | 3. (d) | 4. (c) | 5. (d) | 6. (a) |
|--------|--------|--------|--------|--------|--------|

Source 2

Read the sources given below and answer the questions that follow:

Source A : Petroleum

Most of the petroleum occurrences in India are associated with anticlines and fault traps in the rock formations of the tertiary age. In regions of folding, anticlines or domes, it occurs where oil is trapped in the crest of the upfold. The oil bearing layer is a porous limestone or sandstone through which oil may flow. The oil is prevented from rising or sinking by intervening non-porous layers.

Source B: Solar Energy

India is a tropical country. It has enormous possibilities of tapping solar energy. Photovoltaic technology converts sunlight directly into electricity. Solar energy is fast becoming popular in rural and remote areas. The largest solar plant

of India is located at Madhapur, near Bhuj, where solar energy is used to sterilise milk cans. It is expected that use of solar energy will be able to minimise the dependence of rural households on firewood and dung cakes, which in turn will contribute to environmental conservation and adequate supply of manure in agriculture.

Source C: Conservation of Energy Resources

Energy is a basic requirement for economic development. Every sector of the national economy—agriculture, industry, transport, commercial and domestic—needs inputs of energy. The economic development plans implemented since independence necessarily required increasing amounts of energy to remain operational. As a result, consumption of energy in all forms has been steadily rising all over the country.

Source A: Petroleum

Q 1. Highlight the regions of occurrence of petroleum in India.

- Ans.** Petroleum occurs in India in the following regions:
- Anticlines and fault traps in the rock formations of tertiary age.
 - In the crest of the upfold where oil is trapped in the regions of folding, anticlines or domes.

Source B: Solar Energy

Q 2. Why is solar energy fastly becoming popular in rural and remote areas of India?

- Ans.** Solar energy is fastly becoming popular in rural and remote areas of India due to the following reasons:
- Solar plant can be easily established in rural and remote areas.
 - It minimises the dependence of rural households on firewood and dung cakes which contributes to environmental conservation.

Source C: Conservation of Energy Resources

Q 3. Why does the consumption of Energy steadily rising all over the country?

- Ans.** The consumption of energy is steadily rising all over the country due to the following reasons:
- Every sector of the national economy such as agriculture, industry, transport, commercial and domestic require inputs of energy.
 - The economic development plans implemented since independence necessarily require increasing amounts of energy to remain operational.

Very Short Answer Type Questions ➡

Q 1. What are minerals?

- Ans.** Minerals are naturally occurring homogeneous solid substance with a definable internal structure.

Q 2. How do minerals occur?

- Ans.** Minerals occur in ores. An ore is an accumulation of one or more minerals in sufficient concentration mixed with other elements.

Q 3. What are Non-metallic minerals?

- Ans.** Non-metallic minerals are those which do not yield new products on melting. These are generally associated with sedimentary rocks.

Q 4. How do minerals occur in sedimentary rocks?

(CBSE 2016)

- Ans.** Minerals occur in sedimentary rocks in beds or layers. They have been formed as a result of deposition, accumulation and concentration in horizontal strata.

Q 5. Where do minerals occur in igneous and metamorphic rocks?

(CBSE 2017)

- Ans.** Minerals occur in igneous and metamorphic rocks in the cracks, crevices, faults or joints of the rocks.

Q 6. Name the mineral found in association with rocks composed of calcium carbonates or calcium and magnesium carbonates.

- Ans.** Limestone is found in association with rocks composed of calcium carbonates or calcium and magnesium carbonates.

Q 7. How did the Bailadila iron ore field get its name?

(CBSE 2016)

- Ans.** Bailadila Iron ore got its name as it looks like the hump of an ox.

Q 8. What is the main characteristic of ferrous minerals? Give one example.

- Ans.** Presence of Iron content is the main characteristic of ferrous minerals. For example, manganese.

Q 9. Why is copper mainly used in electrical cables and electronic industries?

(CBSE 2016)

- Ans.** Copper is mainly used in electrical cables and electronic industries as it is malleable, ductile and a good conductor of heat and electricity.

Q 10. Why aluminium metal has great importance?

(CBSE 2016)

- Ans.** Aluminium metal has great importance because it combines the strength of metals such as iron with extreme lightness as well as with good conductivity and great malleability.

Q 11. Name any two conventional sources of energy.

- Ans.** Cattle dung and coal are the two conventional sources of energy.

Q 12. Which is the oldest oil producing state of India?

- Ans.** Assam is the oldest oil producing state of India.

Q 13. Why should the use of cattle cake as fuel be discouraged?

(CBSE 2015)

- Ans.** The use of cattle cake as fuel should be discouraged due to the following reasons:
- It creates pollution.
 - It consumes the most valuable manure that could be used in agriculture.

Q 14. How are Gobar gas plants beneficial to the farmers?

(CBSE 2016)

Ans. Gobar gas plants are beneficial to the farmers in the form of energy and improved quality of manure.

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Biogas provides the most efficient use of cattle dung and prevents the loss of trees and manure due to burning of fuel wood and cow dung cakes.

Q 15. Why is energy needed? Write one reason.

Ans. Energy is needed to generate the electricity that we need for our homes, schools, businesses and factories.

Q 16. Study the picture and answer the question that follows:



Which hazard of mining is depicted in the above picture?

Ans. The hazard depicted is, "Air pollution due to generation of dust in the mining areas".

Q 17. How is nuclear electricity produced?

Ans. Nuclear electricity is produced from uranium and thorium.

Q 18. Why is conservation of minerals important?

Ans. Conservation of minerals is important for the following reasons.

- (i) Minerals are exhaustible.
- (ii) They are limited.

Q 19. A concerted effort has to be made for sustainable development. Suggest any one step in conserving our mineral resources for the future.

Ans. The step to conserve our mineral resources for the future is improved technology/recycling of metals using scrap metals and other substitutes.

Q 20. At which place in India, experimental project for geothermal energy has been set-up?

Ans. Experimental project for geothermal energy has been set-up in Manikaran.

Q 21. 'Energy saved is energy produced.' Support the statement.

(CBSE 2023)

Ans. Energy saved is energy produced due to:

- (i) Using more and more public transport systems and less of individual vehicles.
- (ii) Using non-conventional sources of energy because they are renewable and inexhaustible.

Q 22. Why is there a pressing need to use Non-conventional energy resources? Explain.

(CBSE 2023)

Ans. Non-conventional sources of energy are very economical in use as compared to conventional sources. Thus, to save expenses, we should use renewable energy sources.



Short Answer Type Questions

Q 1. 'India has fairly rich and varied mineral resources across different regions.' Support the statement with examples.

(CBSE SQP 2020)

Ans. The given statement can be supported using the following examples:

- (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 having 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.

Q 2. How is mining activity hazardous? Explain.

(CBSE 2016)

Ans. Mining activity is hazardous in the following ways:

- (i) The dust and noxious fumes inhaled by miners make them vulnerable to pulmonary diseases.
- (ii) The risk of collapsing mine roofs, inundation and fires in coal mines are a constant threat to miners.
- (iii) Dumping of waste and slurry leads to degradation of land, soil and increase in stream and river pollution.
- (iv) The water sources in the region get contaminated due to mining.

Q 3. Which are the two most important varieties of iron ore?

Ans. The two most important varieties of iron ore are as follows:

- (i) **Magnetite:** This is the best quality of iron ore and contains about 70% iron. It has excellent magnetic qualities, especially valuable in the electrical industry.
- (ii) **Haematite:** It is the most important industrial iron ore in terms of quantity used. It contains about 50% to 60% of pure iron.

Q 4. Describe any three characteristics of the Durg-Bastar-Chandrapur iron ore belt in India.

(CBSE 2017)

Ans. The three characteristics of the Durg-Bastar-Chandrapur iron ore belt in India are:

- (i) It lies in Chhattisgarh and Maharashtra and comprises of high grade haematite iron ore.

- (ii) Very high grade haematites are found in the famous Bailadila range of hills in the Bastar district of Chhattisgarh.
- (iii) Iron ore from these mines is exported to Japan and South Korea via Visakhapatnam port.

Q 5. Why is aluminium an important metal? Describe its distribution in India.

Ans. Aluminium is an important metal because it combines the strength of metals such as iron, with extreme lightness and also with good conductivity and great malleability. Aluminium is extracted from bauxite. In India, its distribution is as follows:

- (i) India's bauxite deposits are mainly found in the Amarkantak plateau, Malkaj hills and the plateau region of Bilaspur-Katni.
- (ii) Odisha is the largest bauxite producing state in India.
- (iii) Panchpatmali deposits in Koraput district are the most important bauxite deposits in the state.

Q 6. What are the uses of limestone? Mention any two states which are the major producers of limestone.

Ans. The uses of limestone are as follows:

- (i) It is the basic raw material for the cement industry.
- (ii) It is an essential element for smelting iron ore in the blast furnace.

Two major producers of limestone are Andhra Pradesh and Madhya Pradesh.

Q 7. What are the major properties of mica? Mention any three.

OR

Why is mica considered the most important mineral in electric and electronic industries? Give three reasons. (CBSE 2016)

Ans. Mica is considered the most important mineral in electric and electronic industries due to its following properties:

- (i) It is a mineral made up of a series of plates or leaves.
- (ii) It splits easily into thin sheets. These sheets are so thin that a thousand can be layered into a mica sheet of a few centimetres thickness.
- (iii) It can be black, green, red, yellow or brown.
- (iv) It has excellent dielectric strength and has low power loss factor.
- (v) It has insulating properties and is resistant to high voltage. (Any three)

Q 8. Describe any three characteristics of Odisha-Jharkhand belt of iron ore in India. (CBSE 2017)

Ans. The three characteristics of Odisha-Jharkhand belt of iron ore in India are as follows:

- (i) High grade haematite ore is found in Odisha.
- (ii) It is mainly found in Badampahar mines in the Mayurbhanj and Kendujhar districts.
- (iii) Haematite iron ore is found in Gua and Noamundi in the adjoining Singhbhum district of Jharkhand.

Q 9. Which is the most abundantly available fossil fuel in India? Assess the importance of its different forms. (CBSE 2015)

Ans. The most abundantly available fossil fuel in India is coal.

The importance of its different forms are as follows:

- (i) Lignite is used for generation of electricity.
- (ii) Bituminous coal is used commercially, especially for smelting iron in blast furnaces.
- (iii) Anthracite coal is used in metal smelting and fabrication industries as a reduction agent. It is also used in residential and commercial space heating.

Q 10. 'Natural gas is an important source of energy'. Support the statement. (CBSE 2017)

OR

What is the importance of natural gas as a source of fuel/energy?

Ans. Natural gas as a source of energy/fuel is important because of the following reasons:

- (i) It is an important clean energy source.
- (ii) It is used both as a source of energy and as an industrial raw material in the petro-chemical industry.
- (iii) It is used as a source of energy in numerous industries.
- (iv) Use of Compressed Natural Gas (CNG) for vehicles to replace liquid fuel is gaining wide popularity in the country these days.

Q 11. What is gobar gas or biogas?

Ans. Gobar gas is a gas which is produced from the organic wastes such as farm waste, shrubs, animal and human wastes. It has the following properties:

- (i) It is a non-conventional source of energy.
- (ii) It has higher thermal efficiency in comparison to kerosene, dung, coal and charcoal.
- (iii) It does not cause any pollution.

Q 12. Name the minerals used for generation of nuclear power. Where are they found in India?

Ans. Uranium and thorium are used for the generation of nuclear power.

In India, they are found in the following places:

- (i) Jharkhand
- (ii) Aravalli ranges of Rajasthan.
- (iii) Monazite sands of Kerala.

COMMON ERROR

Students get confused in writing the names of states, so they are advised to learn them properly.

Q 13. 'Crude oil reserves are limited all over the world. If people continue to extract it at the present rate, the reserves would last only 35-40 years more.' Explain any three ways to solve this problem.

Ans. Crude oils are produced in thousands of years by the decomposition of organic matter under the surface of the Earth under extreme temperature and pressure. The production rate of these reserves is very slow as compared to the extraction rate by the human beings. Due to the rapid development of industries, this rate has increased.

The three ways to solve this problem are:

- (i) To ensure that the available resources are used in a very judicious way and not wasted.
- (ii) To evolve substitutes like solar energy and wind energy which are clean, green and renewable.
- (iii) To educate the new generation about conservation of resources and aiming towards sustainable development.



TiP

Briefly explain the statement and then write relevant measures to solve the problem of shortage of oil reserves.

Q 14. What is tidal energy? Name a region of India which provides ideal conditions for utilising tidal energy.

Ans. Energy produced with the help of oceanic tides is referred to as tidal energy. Floodgate dams are built across inlets. During high tide, water flows into the inlets and gets trapped when the gate is closed. After the tide falls outside the floodgate, the water retained by the floodgate flows back to the sea via a pipe that carries it through a power-generating turbine.

In India, the Gulf of Kutch, provides ideal conditions for utilising tidal energy. A 900 MW tidal energy power plant is set up here by the National Hydropower Corporation.

Q 15. What efforts are required to use mineral resources in a planned and sustainable manner? Explain in three points.

OR

'A concerted effort has to be made in order to use mineral resources in a planned and sustainable manner.' Suggest and explain any three measures.

(CBSE 2020)

Ans. The following measures have to be used in order to use the mineral resources in a planned and sustainable manner:

- (i) We should recycle the metal or metal made products to prevent its scarcity, e.g., recycling of steel blade.
- (ii) Traditional technologies should be replaced with new and improved technologies so as to minimise the wastages.

- (iii) The resources should be replaced with the recyclable resources when they cannot be recycled or reused, e.g. using green gas instead of coal for the purposes of cooking.



Long Answer Type Questions

Q 1. 'Minerals are an indispensable part of our lives.' Support this statement with a suitable example.

(CBSE 2016)

Ans. Minerals are an indispensable part of our lives. This statement can be supported with the help of the following examples:

- (i) The railway lines and the tarmac (paving) of the roads are made from minerals.
- (ii) Cars, buses, trains and aeroplanes are manufactured from minerals and run on power resources derived from the Earth.
- (iii) The food we eat also contains minerals.
- (iv) In all stages of development, human beings have used minerals for their livelihood, decoration, festivities, religious and ceremonial rites.
- (v) Almost everything we use, from a tiny pin to a towering building or big ships, are all made from minerals.



TiP

Try to give supportive statements using suitable examples in points.

Q 2. Distinguish between metallic and non-metallic minerals.

Ans. Difference between metallic and non-metallic minerals are:

S.No.	Basis of Difference	Metallic Minerals	Non-metallic Minerals
(i)	Malleability	These are <u>malleable</u> , i.e., these can be beaten into sheets.	These are <u>brittle</u> in nature.
(ii)	Ductility	These are <u>ductile</u> , i.e., these can be drawn into wires.	These are <u>non-ductile</u> .
(iii)	Conduction	These are <u>good conductors</u> of heat and electricity.	These are <u>bad conductors</u> of heat and electricity, except graphite.
(iv)	Physical state	All metals are <u>solid</u> except <u>mercury</u> .	They may be <u>solid, liquid or gaseous</u> .
(v)	Examples	Iron ore, copper, lead, nickel etc.	Mica, salt, sulphur, granite, etc.



Q 3. How can biogas solve the energy problem mainly in rural India? Give some suggestions to improve the biogas energy production in rural areas.

- Ans. Biogas can solve the energy problem in rural areas due to the following reasons.
- (i) It produces gas having higher thermal efficiency than charcoal and kerosene.
 - (ii) It provides a way for optimum use of plant and animal wastes.
 - (iii) It provides enriched organic manure which can supplement or even replace chemical fertilizers.
 - (iv) It burns smoothly and does not leave much of the residue behind.

Some suggestions to improve the biogas energy production in rural areas are:

- (i) People in the rural areas should be provided with monetary assistance by the government.
- (ii) Awareness must be created to use these alternative sources of energy.

Q 4. Highlight the importance of petroleum. Explain the occurrence of petroleum in India. (CBSE 2016)
OR

What is the next major source of energy after coal in India? Describe any three advantages of it. Explain its occurrence also. (CBSE 2017)

- Ans. Petroleum is a major source of energy next to coal in India. The following points highlight its importance:
- (i) It provides fuel for heating and lighting and lubricants for machinery.
 - (ii) It provides raw material for a number of manufacturing industries.
 - (iii) Petroleum refineries act as a 'nodal industry' for synthetic textiles, fertilizers and numerous chemical industries.

Petroleum occurs at the following places in India:

- (i) **Assam:** It is the oldest oil producing state of India. The major oil-fields of Assam are:
 - (a) **The Digboi:** It is the oldest oil field of India (i.e., since 1866).
 - (b) **The Naharkatiya:** It is located in the South-West of Digboi.
 - (c) **Rudrasagar, Sibsagar and Moran-Hugrijan:** These are the other major oilfields of Assam.
- (ii) **Oilfields in Western India:** These include the following:
 - (a) **Gujarat:** It produces about 18% of the total oil production of India. Ankeleshwar, Khambhat, Ahmedabad and Kalol fields are the major oilfields of Gujarat.

(b) **Off-shore Oilfields:** The largest mineral oil deposits of India are found in the off-shore sea at Mumbai High (63%). It is located in the continental shelf, off the coast of Maharashtra, about 176 km North-West of Mumbai.

COMMON ERROR
Students do not mention the correct places of occurrence of petroleum in India.

Q 5. 'Nuclear energy is expected to play an increasingly important role in India.' Give arguments to support this statement.

- Ans. Nuclear energy is expected to play an increasingly important role in India due to the following reasons:
- (i) India has limited reserves of coal and petroleum. Nuclear energy minerals like thorium are found in plenty in India. Hence, nuclear energy can compensate for deficiency in fossil fuels.
 - (ii) Nuclear power stations can be established easily and conveniently in those areas where other sources are not available.
 - (iii) It is very economical too.
 - (iv) Nuclear power releases tremendous amounts of energy. India can utilise this energy for peaceful purposes such as generation of electricity.
 - (v) Nuclear energy is a very clean energy if it is well designed and well managed. It has no atmospheric pollution and produces little waste.

Q 6. Distinguish between conventional and non-conventional sources of energy.

Ans. Difference between conventional and non-conventional sources of energy are:

S. No.	Basis of Difference	Conventional Sources	Non-conventional Sources
(i)	Usage	These sources are being used since a long time.	These are being used in recent times.
(ii)	Other name	These are also called as non-renewable sources of energy.	These are also called as renewable sources of energy.
(iii)	Exhaustibility	These are generally exhaustible.	These are usually inexhaustible.
(iv)	Pollution	These spread pollution.	These are eco-friendly.

(v)	Examples	These include <u>firewood, cattle dung cake, coal, petroleum, natural gas and electricity</u> (both hydel and thermal)	These include <u>solar, wind, tidal, geothermal, biogas and atomic energy.</u>
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Q 7. Why is it necessary to conserve mineral resources? Suggest any four ways to conserve mineral resources. (CBSE 2017)

Ans. Mineral resources are exhaustible resources. We cannot replenish them after they are exhausted as the geological process of mineral formation is very slow. If they are exhausted, then industrial production will halt and the developmental process will come to a stand still. So, it is important to conserve minerals.

The following measures can be adopted for conservation of minerals:

- (i) Wastage in mining and processing should be minimised.
- (ii) Recycling of metallic minerals should be maximised.
- (iii) We should increase the use of non-conventional sources of energy more and more such as solar, wind, etc.
- (iv) We should use minerals in a planned and sustainable manner.
- (v) Wherever it is possible, recyclable plastic materials should be used.
- (vi) Recycling of metals should be encouraged.

(Any Four)

Q 8. 'Consumption of energy in all forms has been rising all over the country. There is an urgent need to develop a sustainable path of energy development and energy saving'. Suggest and explain any three measures to solve this burning problem.(CBSE 2016)

Ans. Energy is a basic requirement for economic development. The strategy of economic development that India adopted since independence necessarily required increasing the amount of energy consumption. As a result, consumption of energy in all forms has been rising.

To take care of this, various measures that need to be adopted are as follows:

- (i) We need to increase the use of renewable energy resources like solar, wind power, biogas, tidal energy and geothermal energy. This will decrease the dependence on non-renewable sources.
- (ii) We have to adopt a cautious approach for judicious use of our limited energy resources. For example, as a concerned citizen we can use public transport system in place of individual vehicle.

- (iii) Another measure that need to be adopted is promotion of energy conservation, for example, switching off electrical devices when not in use, using power saving devices.

Q 9. 'Energy saved is energy produced'. Assess the statement. (CBSE 2017)

Ans. Energy needs of the country are tremendously increasing with the growth of economy, but the sources of energy are not growing, rather they are depleting. It is therefore, necessary to conserve energy resources in the following manner:

- (i) Use public transport system Instead of individual vehicles to reduce loss of energy.
- (ii) Switching off electricity when it is not in use.
- (iii) Using power saving devices.
- (iv) Stress on the use of non-conventional sources of energy.
- (v) Minimum use of high power consuming electrical gadgets like air conditioners, room heaters, etc.

The above measures will help to save energy and the energy saved can be used for productive purposes. So, it can be concluded that energy saved is energy produced.

Q 10. Analyse the impact of mining activities on the local environment and the health of the surrounding communities. (CBSE SQP 2023-24)

Ans. Mining activities have significant impact on the local environmental and the health of surrounding communities.

Here are some of the common impacts:

- (i) Mining activities release harmful particles into the air, including dust, sulfur dioxide and nitrogen oxide.
- (ii) The dust and noxious fumes inhaled by miners make them vulnerable to pulmonary diseases.
- (iii) The use of heavy machinery and explosives in mining activities can create significant noise pollution, which can have negative impacts on the mental and physical health of nearby residents.
- (iv) Mining activities can also result in the displacement of local communities, who may be forced to relocate due to the construction of new mines or the expansion of existing ones.
- (v) Mining activities involve the use of heavy machinery and chemicals, which can result in soil and water pollution.



Chapter Test

Multiple Choice Questions

- Q 1. In which one of the following states is Rawatbhata Nuclear Energy Plant located?
- a. Gujarat b. Kerala
c. Punjab d. Rajasthan
- Q 2. Which of the following is an off-shore oil field?
- a. Ankeleshwar b. Digboi
c. Kalol d. Mumbai High
- Q 3. The toothbrush and tube containing paste are made up of plastic obtained from:
- a. mlca b. petroleum
c. fibre d. paper
- Q 4. Which one of the following places is known for lignite deposits?
- a. Khetri b. Neyveli
c. Balladila d. Bokaro
- Q 5. In which of the following Indian states is Badampahar mines in the Mayurbhanj and Kendujhar districts located?
- a. Karnataka b. Odisha
c. Chhattisgarh d. Jharkhand

Assertion and Reason Type Questions

Directions (Q. Nos. 6-7): In the questions given below, there are two statements marked as Assertion (A) and (R). Read the statements and choose the correct option:

- a. Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are correct, but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true, but Reason (R) is false.
d. Assertion (A) is false, but Reason (R) is true.
- Q 6. Assertion (A): Mining activity is often called a killer industry.
Reason (R): Mining helps in agriculture.
- Q 7. Assertion (A): Minerals are an indispensable part of our lives.
Reason (R): Minerals have a universal use they are used to manufacture everything we use in our day-to-day lives.

Source Based Question

- Q 8. Read the source given below and answer the questions that follow:
Though, several ores contain aluminium, it is from bauxite, a clay-like substance that alumina and later aluminium is obtained. Bauxite deposits

are formed by the decomposition of a wide variety of rocks rich in aluminium silicates. Aluminium is an important metal because it combines the strength of metals such as iron, with extreme lightness and also with good conductivity and great malleability. India's bauxite deposits are mainly found in the Amarkantak plateau, Maikal hills and the plateau region of Bilaspur-Katni. Odisha was the largest bauxite producing state in India in 2016-17. Panchpatmali deposits in Koraput district are the most important bauxite deposits in the state.

- (i) How are bauxite deposits formed?
(ii) Which characteristics of aluminium make it an important metal?
(iii) Where are India's bauxite deposits mainly found?

Very Short Answer Type Questions

- Q 9. Why is there a wide range of colours, hardness, crystal forms, lustre and density found in minerals?
Q 10. What are placer deposits?
Q 11. What are conventional sources of energy?
Q 12. Why does aluminium metal have great importance?

Short Answer Type Questions

- Q 13. Name the non-metallic mineral which can split easily into thin sheets. Mention its uses.
Q 14. Explain three factors that make mineral extractions commercially viable.
Q 15. What are the uses of copper? Name any two leading copper producing states of India.
Q 16. Which are the two main minerals used to obtain nuclear energy? Name any two states where these minerals are found.

Long Answer Type Questions

- Q 17. Why is it necessary to conserve mineral resources? Explain any four ways to conserve mineral resources.
Q 18. 'There is a pressing need for using renewable energy sources in India.' Justify the statement.