

# UNIQUE STUDY POINT

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<b>Class:</b> X	<b>Subject:</b> Science	<b>Session:</b> 2025-26
<b>Chapter:</b> 05 - Mineral and Energy Resources	<b>Time:</b> 1½ Hours	<b>Max. Marks:</b> 40

## General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

## SECTION A - Multiple Choice Questions (1 mark each)

- Q1.** Which iron ore has magnetic properties?
- (a) Hematite
  - (b) Magnetite
  - (c) Limonite
  - (d) Siderite
- Q2.** Tertiary coal deposits in India are approximately how many million years old?
- (a) 30 million years
  - (b) 55 million years
  - (c) 100 million years
  - (d) 200 million years
- Q3.** Which coalfield is NOT located in the Damodar Valley?
- (a) Jharia
  - (b) Raniganj
  - (c) Bokaro
  - (d) Singarauli
- Q4.** The Krishna-Godavari basin is known for:
- (a) Coal deposits
  - (b) Natural gas reserves
  - (c) Iron ore
  - (d) Bauxite
- Q5.** Which is NOT a non-conventional source of energy?
- (a) Solar energy
  - (b) Wind energy

- (c) Coal
- (d) Biogas

**Q6.** Petroleum refineries act as a nodal industry for:

- (a) Iron and steel industry
- (b) Cement industry
- (c) Synthetic textile and fertilizer industries
- (d) Paper industry

**Q7.** Which state has the Panchpatmali deposits of bauxite?

- (a) Jharkhand
- (b) Odisha
- (c) Chhattisgarh
- (d) Gujarat

**Q8.** Hydroelectricity is generated by:

- (a) Burning coal
- (b) Fast flowing water
- (c) Nuclear reactions
- (d) Burning petroleum

**Q9.** India ranks among which position in wind power generation globally?

- (a) Top 10
- (b) Top 5
- (c) Top 3
- (d) Number 1

**Q10.** Marmagao port is used for exporting:

- (a) Coal
- (b) Iron ore
- (c) Petroleum
- (d) Bauxite

### SECTION B - Short Answer Questions (2 marks each)

**Q11.** Why is aluminium considered an important metal? Give two properties. (2 marks)

**Q12.** What is the difference between renewable and non-renewable resources? Give one example of each. (2 marks)

**Q13.** Name two areas in India that are ideal for tidal energy generation and explain why. (2 marks)

**Q14.** What are the twin benefits of biogas plants for farmers? (2 marks)

### SECTION C - Short Answer Questions (3 marks each)

**Q15.** Explain how thermal power and hydroelectric power are generated. Which one is renewable? (3 marks)

**Q16.** Why is conservation of energy resources essential? Suggest any two ways to conserve energy. (3 marks)

**Q17.** Describe the importance and uses of limestone. Where is it found in India? (3 marks)

## SECTION D - Long Answer Question (5 marks)

**Q18.** Discuss the various non-conventional sources of energy available in India. Why is there an urgent need to develop these sources? Explain any three non-conventional sources in detail. (5 marks)

## SECTION E - Case Study Based Questions (4 marks each)

**Q19.** Read the case study given below and answer the questions that follow:

*Natural gas is found with petroleum deposits and is released when crude oil is brought to the surface. It can be used as domestic and industrial fuel, in power sector to generate electricity, for heating purposes in industries, as raw material in chemical, petrochemical and fertilizer industries, as transport fuel (CNG) and as cooking fuel (PNG) at homes. India's major gas reserves are found in the Mumbai High and allied fields along the west coast which are supplemented by finds in the Cambay basin. The HVJ pipeline constructed by GAIL linked Mumbai High with various complexes in western and northern India.*

- (i) How is natural gas obtained? (1 mark)
- (ii) Name any two uses of natural gas. (1 mark)
- (iii) Where are India's major gas reserves located? (1 mark)
- (iv) What is the full form of HVJ pipeline? (1 mark)

**Q20.** Read the case study given below and answer the questions that follow:

*We are rapidly consuming mineral resources that required millions of years to be created and concentrated. 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. Mineral resources are, therefore, finite and non-renewable. Continued extraction of ores leads to increasing costs as mineral extraction comes from greater depths along with decrease in quality. Improved technologies need to be evolved to use low grade ores at low costs. Recycling of metals, using scrap metals and other substitutes are steps in conserving mineral resources.*

- (i) Why are mineral resources called finite and non-renewable? (1 mark)
- (ii) What happens when minerals are extracted from greater depths? (1 mark)
- (iii) Name any two methods to conserve mineral resources. (1 mark)
- (iv) Why should we use low grade ores? (1 mark)

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## DETAILED ANSWER KEY - PAPER 04

### SECTION A - Answers to MCQs

**Ans 1.** (b) Magnetite

Magnetite has excellent magnetic properties and is especially valuable in the electrical industry.

**Ans 2.** (b) 55 million years

Tertiary coal deposits in India are only about 55 million years old and occur in northeastern states.

**Ans 3.** (d) Singarauli

Singarauli is not in Damodar Valley. Jharia, Raniganj, and Bokaro are the major coalfields in the Damodar Valley.

**Ans 4.** (b) Natural gas reserves

Along the East Coast, new reserves of natural gas have been discovered in the Krishna-Godavari basin.

**Ans 5.** (c) Coal

Coal is a conventional source of energy. Non-conventional sources include solar, wind, biogas, tidal, and geothermal energy.

**Ans 6.** (c) Synthetic textile and fertilizer industries

Petroleum refineries provide raw materials for synthetic textile, fertilizer and numerous chemical industries.

**Ans 7.** (b) Odisha

Panchpatmali deposits in Koraput district of Odisha are the most important bauxite deposits in the state.

**Ans 8.** (b) Fast flowing water

Hydroelectricity is generated by fast flowing water which drives hydro turbines, making it a renewable resource.

**Ans 9.** (b) Top 5

India has great potential of wind power and ranks among the top countries globally in wind power generation.

**Ans 10.** (b) Iron ore

Marmagao port in Goa is used for exporting iron ore from the Maharashtra-Goa belt.

### SECTION B - Answers to Short Answer Questions

**Ans 11.**

Aluminium is an important metal because of the following properties:

- 1. Strength with lightness:** It combines the strength of metals such as iron with extreme lightness.
- 2. Good conductivity and malleability:** It has good conductivity and great malleability, making it useful in various industries.

**Ans 12.**

**Renewable resources:** Resources that can be replenished naturally and will not get exhausted. They are sustainable.

**Example:** Hydroelectricity, solar energy, wind energy

**Non-renewable resources:** Resources that took millions of years to form and cannot be replenished in our lifetime. They will eventually get exhausted.

**Example:** Coal, petroleum, natural gas, minerals

### Ans 13.

Two areas ideal for tidal energy in India:

1. **Gulf of Khambhat and Gulf of Kutch in Gujarat** (western coast)
2. **Gangetic delta in Sunderban regions of West Bengal**

These areas are ideal because they have high tidal ranges and suitable coastal geography where floodgate dams can be built across inlets to trap water during high tide and use it to generate power as it flows back during low tide.

### Ans 14.

Twin benefits of biogas plants for farmers:

1. **Energy production:** They provide clean and efficient energy for cooking and lighting purposes.
2. **Improved manure:** The slurry left after biogas production serves as excellent organic manure for agriculture, improving soil quality and crop yield.

## SECTION C - Answers to Short Answer Questions

### Ans 15.

**Thermal power generation:**

- Thermal electricity is generated by burning fossil fuels like coal, petroleum and natural gas
- These fuels are used to drive turbines to produce electricity
- Thermal power stations use non-renewable fossil fuels

**Hydroelectric power generation:**

- Hydroelectricity is generated by running water (fast flowing water)
- The flowing water drives hydro turbines to generate electricity
- It is generated from multi-purpose projects and dams built on rivers

**Renewable source:** Hydroelectricity is renewable as water is a renewable resource that gets replenished through the water cycle, while thermal power is non-renewable as it uses fossil fuels.

### Ans 16.

**Why conservation is essential:**

Conservation of energy resources is essential because:

- Growing consumption has made India increasingly dependent on fossil fuels which are finite
- Rising prices and potential shortages create uncertainties about energy security
- Increasing use of fossil fuels causes serious environmental problems
- India is one of the least energy efficient countries in the world
- We need to develop a sustainable path of energy development for future generations

**Ways to conserve energy:**

1. **Use public transport:** Using public transport systems instead of individual vehicles reduces fuel

consumption significantly.

2. **Switch off electricity when not in use:** Turning off lights, fans, and appliances when not needed and using power-saving devices helps conserve electricity.

**Ans 17.**

**Importance and uses of limestone:**

- Limestone is the basic raw material for the cement industry
- It is essential for smelting iron ore in the blast furnace
- It is used in construction industry
- It is found in association with rocks composed of calcium carbonates

**Distribution in India:**

Limestone is found in sedimentary rocks of most geological formations. Major limestone producing states include:

- Rajasthan (22% - largest producer)
- Madhya Pradesh (13%)
- Chhattisgarh (11%)
- Andhra Pradesh (13%)
- Other states like Karnataka, Telangana, Gujarat, Tamil Nadu and Maharashtra also produce limestone

**SECTION D - Answer to Long Answer Question**

**Ans 18.**

**Non-conventional sources of energy in India:**

India has various non-conventional sources including solar energy, wind energy, tidal energy, geothermal energy, biogas and atomic/nuclear energy.

**Urgent need to develop these sources:**

1. Growing consumption has made India dependent on fossil fuels
2. Rising prices and potential shortages of oil and gas create uncertainties about energy security
3. Increasing use of fossil fuels causes serious environmental problems
4. Fossil fuels are non-renewable and will eventually get exhausted
5. India is blessed with abundance of sunlight, water, wind and biomass

**Detailed explanation of three non-conventional sources:**

**1. Solar Energy:**

- India is a tropical country with enormous possibilities of tapping solar energy
- Photovoltaic technology converts sunlight directly into electricity
- Solar energy is becoming popular in rural and remote areas
- Big solar power plants are being established across India
- It will minimize dependence on firewood and dung cakes
- Contributes to environmental conservation and ensures adequate manure supply

**2. Wind Power:**

- India has great potential for wind power generation
- Largest wind farm cluster is located in Tamil Nadu from Nagarcoil to Madurai
- Other important wind farms are in Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and

Lakshadweep

- Nagarcoil and Jaisalmer are well known for effective use of wind energy
- Wind energy is clean and renewable

### 3. Biogas:

- Produced from shrubs, farm waste, animal and human waste
- Decomposition of organic matter yields gas with higher thermal efficiency than kerosene and dung cakes
- Plants are set up at municipal, cooperative and individual levels
- Gobar gas plants in rural India provide twin benefits - energy and improved quality of manure
- By far the most efficient use of cattle dung
- Prevents loss of trees and manure due to burning of fuel wood

## SECTION E - Answers to Case Study Based Questions

### Ans 19.

- (i) Natural gas is found with petroleum deposits and is released when crude oil is brought to the surface.
- (ii) Two uses of natural gas are: (1) As domestic and industrial fuel, and (2) As transport fuel (CNG). (Other acceptable answers: power generation, heating in industries, raw material in fertilizer industries, cooking fuel PNG)
- (iii) India's major gas reserves are located in Mumbai High and allied fields along the west coast, supplemented by finds in the Cambay basin.
- (iv) HVJ stands for Hazira-Vijaipur-Jagdishpur pipeline.

### Ans 20.

- (i) Mineral resources are called finite and non-renewable because geological processes of mineral formation are so slow that rates of replenishment are infinitely small compared to consumption rates, and once exhausted they cannot be replenished in our lifetime.
- (ii) When minerals are extracted from greater depths, it leads to increasing costs of extraction along with decrease in the quality of ore.
- (iii) Two methods to conserve mineral resources are: (1) Recycling of metals and using scrap metals, and (2) Using substitutes instead of minerals.
- (iv) We should use low grade ores because improved technologies can allow their use at low costs, helping to conserve high grade ores for the future and extending the life of mineral deposits.

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