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Mineral & Energy Resources

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IMPORTANT TERM

- **Mineral:** A substance which is found in the earth's crust and which generally has a definite chemical composition.
- **Mineral Ore:** It is the raw material extracted from the earth mixed with soil and other impurities.
- **Mining:** It is an economic activity of extracting minerals from the earth
- **Fossil-Fuels:** There are fuels formed by the decomposition of organism under the earth or sea bed.
- **Non ferrous minerals:** Minerals devoid of iron contents are termed as non ferrous minerals. e.g. Zinc, lead.
- **Ferrous Minerals:** There are metals which contain Iron. e.g. Iron and Manganese ore.
- **Thermal electricity:** The electricity produced by using coal, petroleum, atomic minerals.
- **Hydro electricity:** The electricity generated by water.
- **Conventional resources:** These are non renewable sources of energy.e.g. coal.
- **Non-Conventional resources:** There are renewable sources of energy. e.g. solar energy.
- **Galena :** It is an Ore of Lead.



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Multiple Choice Questions

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1 The Monazite sands in Kerala is rich in

- (a) thorium
- (b) uranium
- (c) platinum
- (d) all of the above

2. Nagarcoil and Jaisalmer are well known for effective use of

- (a) solar energy
- (b) wind energy
- (c) atomic energy
- (d) tidal energy

3. The pair of states which has most of the petroleum deposits

- (a) Rajasthan and Karnataka
- (b) Assam and Gujarat
- (c) Gujarat and Maharashtra
- (d) Odisha and Goa

4. One of the following is a non-metallic mineral

- (a) manganese
- (b) copper
- (c) coal
- (d) granite

5. Aluminium is obtained from

- (a) bauxite
- (b) limestone
- (c) copper
- (d) manganese

6. Uranium and thorium used for generating nuclear power are found in

- (a) Godavari Basin
- (b) Gulf of Cambay
- (c) Manikarn in Himachal Pradesh
- (d) Aravalli ranges of Rajasthan

7. In which region of India tidal energy is produced?

- (a) Gulf of Kuchchh
- (b) Puga Valley of Ladakh
- (c) Gulf of Cambay
- (d) Madhapur near Bhuj

8. Tertiary coals occur in the

- (a) North-western states
- (b) Coastal states
- (c) North-eastern states
- (d) Southern states

9. Mica is used in electric and electronic industries because

- (a) of its insulating properties and resistance to high voltage
- (b) it is a good conductor of electricity
- (c) of its great malleability
- (d) of its sonorous nature

10. Limestone is the basic raw material of

- (a) Paper industry
- (b) Cement industry
- (c) Sugar industry
- (d) Textile industry

11. The larger occurrences of minerals of igneous and metamorphic rocks are called:

- (a) Veins
- (b) Lodes
- (c) Beds
- (d) Layers

12. In which one of the following states the largest wind farm cluster is located?

- (a) Gujarat
- (b) Kerala

- (c) Rajasthan
- (d) Tamil Nadu

13. Which of the following is the oldest oil producing state of India?

- (a) Gujarat
- (b) Madhya Pradesh
- (c) Assam
- (d) Andaman Nicobar island

14. Which one of the following non- conventional sources of energy is harnessed near Manikarn in Himachal Pradesh?

- (a) Geothermal Energy
- (b) Wind energy
- (c) Solar energy
- (d) None of the above

15. In which of the following iron ore belt Kudremukh mines are located?

- (a) Orissa-Jharkhand belt
- (b) Maharashtra-Goa belt
- (c) Durg-Baster-Chandrapur belt
- (d) Bellary-Chitradiga-Chikmagalur-Tumkur belt

16. Which one of the following states, is the largest producer of copper in India ?

- (a) Orissa
- (b) Karnataka
- (c) Madhya Pradesh
- (d) Gujarat

17. Which one of the following is largely derived from ocean water?

- (a) Bauxite
- (b) Magnesium
- (c) Gold
- (d) Mica

18. The highest quality of hard coal is:

- (a) Lignite
- (b) Bituminous
- (c) Peat
- (d) Anthracite

19. Which form of coal has a low carbon and high moisture contents and low heating capacity?

- (a) Peat
- (b) Lignite
- (c) Anthracite
- (d) Bituminous

20. Which one of the following factors is responsible for the sugar mills to shift and concentrate in the southern and western states of India?

- (a) Sugarcane is bulky raw material.
- (b) The sucrose content reduces with distance.
- (c) The cane produced has higher sucrose content.
- (d) The cooperative are not successful.

ANSWERS

- 1. a
- 2. b
- 3. b
- 4. d
- 5. a
- 6. a
- 7. a
- 8. c
- 9. a
- 10. b

- 11. b
- 12. d
- 13. c
- 14. a
- 15. d
- 16. c
- 17. b
- 18. d
- 19. a
- 20. c

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MOST IMPORTANT QUESTIONS



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1. How minerals are formed in sedimentary rocks? Name any two mineral formed due to evaporation especially in arid region.

Ans. In sedimentary rocks a number of minerals occur in beds and layers.

- They have been formed as a result of deposition, accumulation and concentration in horizontal strata.
- Coal and some forms of iron ore have been concentrated as a result of long periods under great heat and pressure.
- Another group of sedimentary minerals include gypsum, potash salt and sodium salt. These are formed as a result of evaporation especially in arid region.

2. What is the contribution of coal in the installed capacity of electricity? Why is the share of coal continuing to be highest?

Ans. 62% is the contribution of coal in the installed capacity of electricity. The share of coal is continuing to be highest because of the following facts:

- India has a huge resource of coal of different kinds, such as anthracite, bituminous, lignite and peat.
- The potential of India in the field of hydel power is quite high but only one sixth has been developed.
- Electricity produced by nuclear plants is only in the initial stages. This way is not properly developed.

3. How would you classify the types of coal on the bases of geological ages?

Ans. Types of coal on the basis of geological ages

- **Gondwana Coal Fields:** The Gondwana coal fields are 250 million years of age. The major resources of Gondwana coal which are metallurgical coal are located in Damodar valley (West-Bengal-Jharkhand). Jharia, Raniganj, Bokaro and important coal fields. The Godavari, Mahanadi, Son and Wardha valleys also contain coal deposits.

- **Tertiary Coal Fields:** The Tertiary coal fields are only 55 million years old. Tertiary coals occur in the north eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.

4. How the people of rural areas get benefited from the setting up of biogas plants?

Ans. Shurbs, farm waste, animal and human waste are used to produce biogas for domestic consumption in rural areas.

- The plants using cattle dung are known as Gobar gas plants in rural areas.
- These provide twin benefits to the farmer of rural areas in the form of energy.
- Farmers also get improved quality of manure.
- Bio gas is far the most efficient use of cattle dung.
- It also prevents the loss of trees and manure due to burning of fuel wood and cow dung cakes.

5. What is Non - Conventional sources of energy? Discuss two sources of such types of energy.

Ans. Sources of energy which are renewable, eco-friendly and newer one are called non conventional sources of energy i.e. wind energy, geothermal energy, tidal energy etc.

GEO THERMAL ENERGY:

Geothermal energy refers to the heat and electricity produced by using the heat from the interior of the earth. Where the geothermal gradient is high , high temperature is found at shallow depth . There are several hot springs in India which could be used to generate electricity. Two projects, one is MANIKARAN in Himachal and second in PUGA VALLEY in Ladakh has been set up in India to harness Geothermal energy.

TIDAL ENERGY:

Oceanic tides can be used to generate electricity .During high tides water flows into the inlet and get trapped when it is closed. After the fall of tide the water flows back to the sea via pipe lines that carry it through power generating turbines. In India gulf of Kutch provides ideal conditions for tidal energy.

6.How can we conserve energy resources in India?

Explain.

Ans. Following efforts can be made to conserve energy resource in India:

- Using public transport instead of individual vehicles.
- Switching of electricity when not in use.
- Using power saving devices.
- More and more use of non conventional source of energy as they are renewable and ecofriendly.
- In automobiles electrical motors should be introduced.
- Intensified exploration and research of new sources of energy

7.What are Non-Conventional Sources of Energy? Why do they have a bright future in India.

Ans. Resources which we can use again and again and which are renewable in nature are non-conventional resources of energy. Due to the following reasons they have bright future in India.

Resources which we can use again and again and which are renewable in nature are nonconventional resources of energy. Due to the following reasons they have bright future in India.

- India is blessed with an abundance of sunlight, water, wind and bio mass.
- India is tropical country. It has enormous possibilities of tapping solar energy.
- India now ranks a wind super power in the world. States like Tamil Nadu, Andhra Pradesh, Karnataka, Gujarat,

Kerala, Maharashtra, and Lakshadweep have important wind farms

- **In India the Gulf of Kichchh, provides ideal conditions for utilizing tidal energy.**
- **There are several hundred hot spot springs in India, which could be used to generate Geo-Thermal Energy.**

8. Why there is a need of conservation of minerals?

Ans. The total Volume of workable mineral deposits in an insignificant fraction i.e. one percent of the earth's crust.

- **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 finite and non renewable.**
- **Mining of minerals causes great threat to the environment and health of the human beings. Due to the above discussed reasons it is necessary to conserve the minerals and use them in a judicious way.**

9. How would you classify the types of coal depending on the degrees of compression?

Ans. Following are the types of coal on the degree of compression:

- **Peat: Decaying plants in swamps produced peat, which has a low carbon and high moisture contents. It has very heating capacity.**
- **Lignite: Lignite is a low grade brown coal, which is soft with high moisture content. The principal lignite reserves are in Neyveli in Tamil Nadu and used for generation of electricity.**
- **Bituminous: Coal that has been buried deep and subjected to increased temperature is bituminous coal. It is the most popular coal in commercial use. Metallurgical coal is high**

grade bituminous coal which has a special value for smelting iron in blast furnace.

- Anthracite: It is highest quality hard coal.

10. Describe the importance of minerals in human life.

Ans. Minerals are indispensable part of our life. Almost everything we use, from a tiny pin to a towering building or a big ship, all are made from minerals.

- The railway lines and the tarmac of the roads, our implements and machinery too are made from minerals.
- Cars, buses, trains, aeroplanes are manufactured from minerals and run on power resources derived from the earth.
- In all stages of development, human beings have used minerals for their livelihood, decoration, festivities, religious and ceremonial rites.
- Availability of the minerals helps in the economic development of the country.
- Our food too contains minerals.

11. Can you explain the different types of iron ores?

Ans. Following are the different types of Iron ores:

- Magnetite: it is the finest iron ore with a very high content of iron up to 70 percent. It has excellent magnetic qualities, especially valuable in the electrical industry.
- Hematite: Hematite is the most important industrial iron ore in terms of the quantity used, but has slightly lower iron content than magnetite. (50-60 percent).
- Limonite: It has iron content of about 40-60 percent.
- Siderite: It has content of iron between 40-50 percent.

12. Explain any five types of non conventional sources of energy developed in India.

Ans. Five types of non conventional sources of energy

- 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 sterilize milk cans.

- **Wind power:** India now ranks as a wind super power in the world. The largest wind farm cluster is located in Tamil Nadu from Nagarcoil to Madurai.
- **Bio Gas:** Shrubs, farm waste, animal and human waste are used to produce bio gas for domestic purpose in rural area. Decomposition of organic matter yields gas, which has higher thermal efficiency in comparison to kerosene, dung cake and charcoal.
- **Tidal energy:** Oceanic tides can be used to generate electricity. Floodgate dams are built across inlet. During high tide water flows into the inlet and gets trapped when the gate is closed. From that stored water electricity is generated.
- **Geo thermal Energy:** Geothermal energy refers to the heat and electricity produced by using the heat from the interior of the earth





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CASE BASED QUESTIONS



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1. Read the case/source given and answer the following questions.

Source A Biogas

Shrubs, farm waste, animal and human waste are used to produce biogas for domestic consumption in rural areas. Decomposition of organic matter yields gas, which has higher thermal efficiency in comparison to kerosene, dung cake and charcoal.

(i) To what extent do you think biogas is better than dung cake for fuel?

ANS :Biogas is much better than dung cakes as it produces no smoke and has more efficiency.

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.

(ii) Why solar energy has more potential to be developed as major fuel in rural areas?

ANS :There is more potential of developing solar energy in rural areas as there are relatively more open spaces. This will reduce the dependence on firewood and dung cakes fuel.

Source C Wind Energy

India has great potential for wind power. The largest wind farm cluster is located in Tamil Nadu from Nagercoil to Madurai. Apart from these, Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and Lakshadweep have important wind farms.

(iii) What similarity or trait can be seen in the places ideally suited for setting up wind farms?

ANS :The similarities identified are that the areas should be close to sea where there is a lot of potential for blowing of wind or other windy areas.

2. Read the case/source given and answer the following questions.

Decaying plants in swamps produce peat which has a low carbon and high moisture content and low heating capacity. Lignite is low grade brown coal, which is soft with high moisture content.

The principal lignite reserves are in Neyveli in Tamil Nadu and is used for generation of electricity. Coal that has been buried deep and subjected to increased temperatures is bituminous coal.

It is the most popular coal in commercial use. Metallurgical coal is high grade bituminous coal which has a special value for smelting iron in blast furnaces. Anthracite is the highest quality hard coal.

In India coal occurs in rock series of two main geological ages, namely Gondwana, a little over 200 million years in age and in tertiary deposits which are only about 55 million years old.

The major resources of Gondwana coal, which are metallurgical coal, are located in Damodar valley (West Bengal, Jharkhand). Jharia, Raniganj, Bokaro are important coalfields.

The Godavari, Mahanadi, Son and Vardha valleys also contain coal deposits. Tertiary coals occur in the North-Eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.

(i) Which reserves are important for lignite in India?

ANS :Neyveli reserves in Tamil Nadu are important lignite reserves in India.

(ii) In what extent do you agree that bituminous coal is metallurgical coal? State its one property.

ANS :Bituminous coal is a high grade coal and thus, is a metallurgical coal. This type of coal has a special value for smelting iron in blast furnaces.

(iii) Why is coal associated with geological ages? State where it is found?

ANS :Coal is associated with geological ages because coal is formed due to compression of plant material and takes millions of years to come into existence.

In India, coal occurs in rock series of two Indian geological ages, namely Gondwana rock series which is a little over 200 million years in age and in tertiary deposits rock series which are only about 55 million years old.

Distribution of Coal Gondwana coal deposits are found in Damodar valley (West Bengal, Jharkhand), Jharia, Raniganj, Bokaro, coalfields. The Godavari, Mahanadi, Son and Vardha valleys also contain coal deposits.

Tertiary coal deposits are found in the North-Eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.



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MAP based Questions

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Question 1.

Locate and label the following items on the given map with appropriate symbols

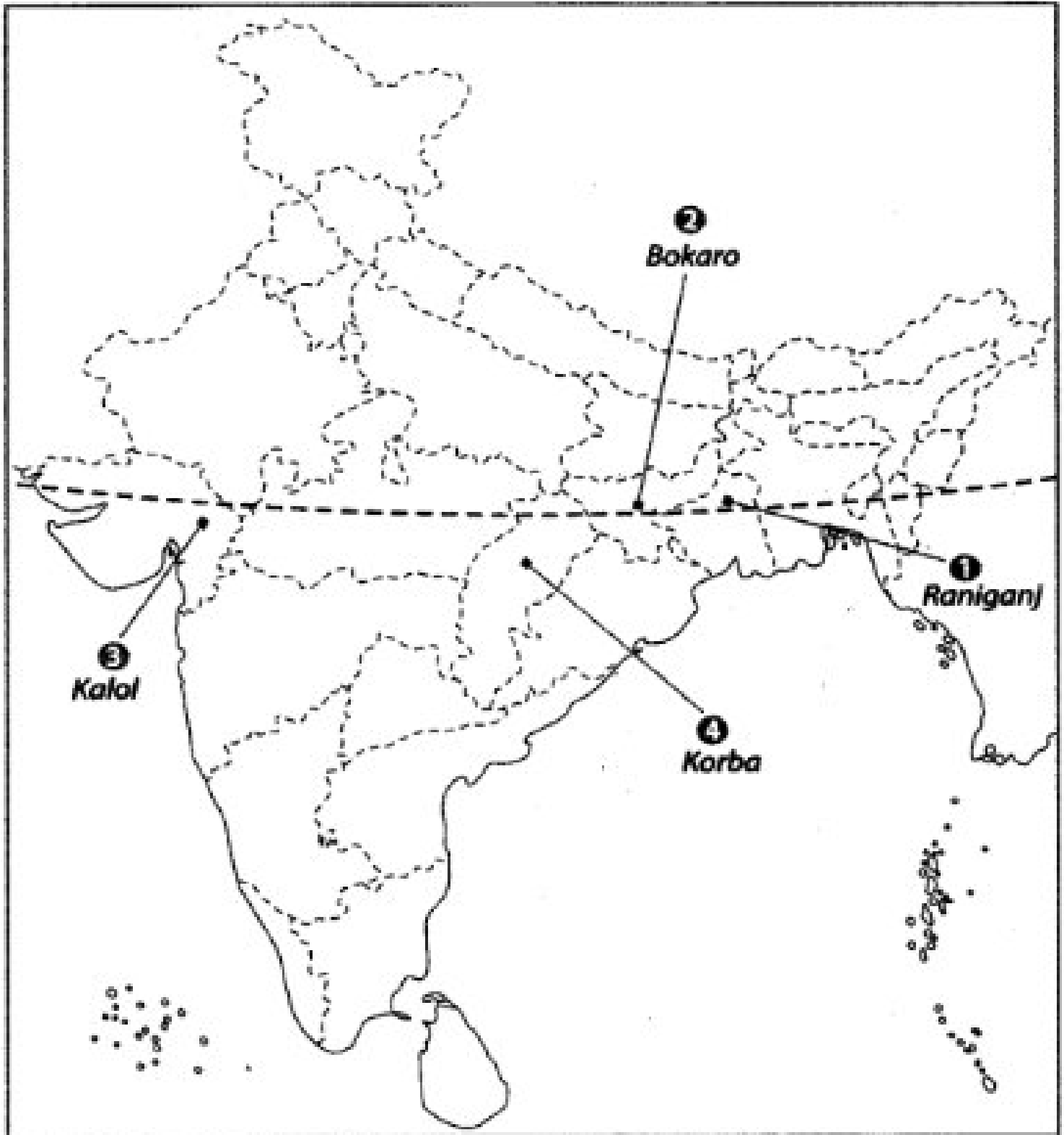
1. Raniganj

2 Bokaro

3. Kalol

4. Korba

Answer

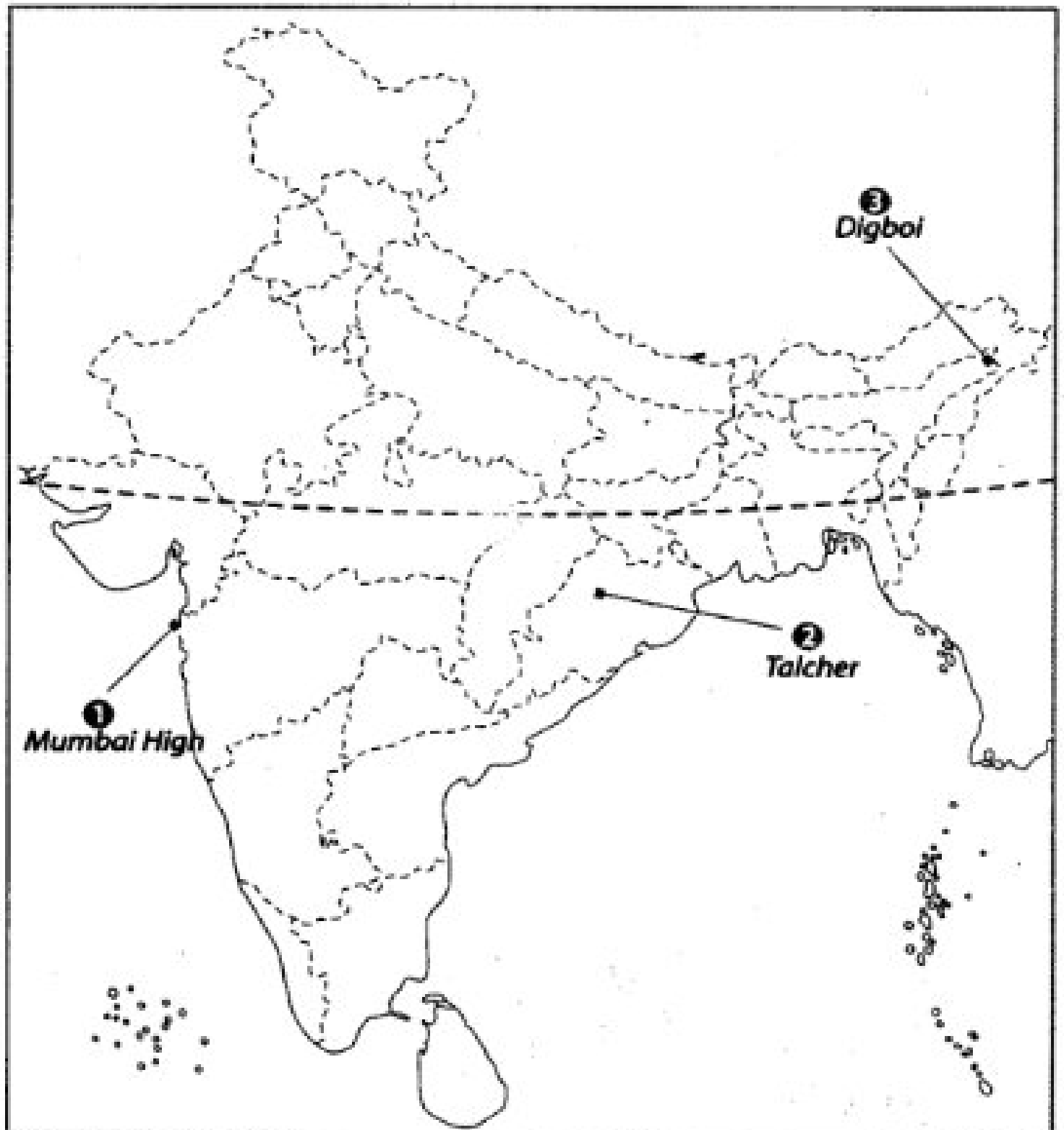


Question 2.

Features are marked by numbers in the given political map of India to identify these features with the help of the following information and write their correct names on the lines marked in the map.

1. An Oil fields
2. A Coal Mines
3. An Oil fields

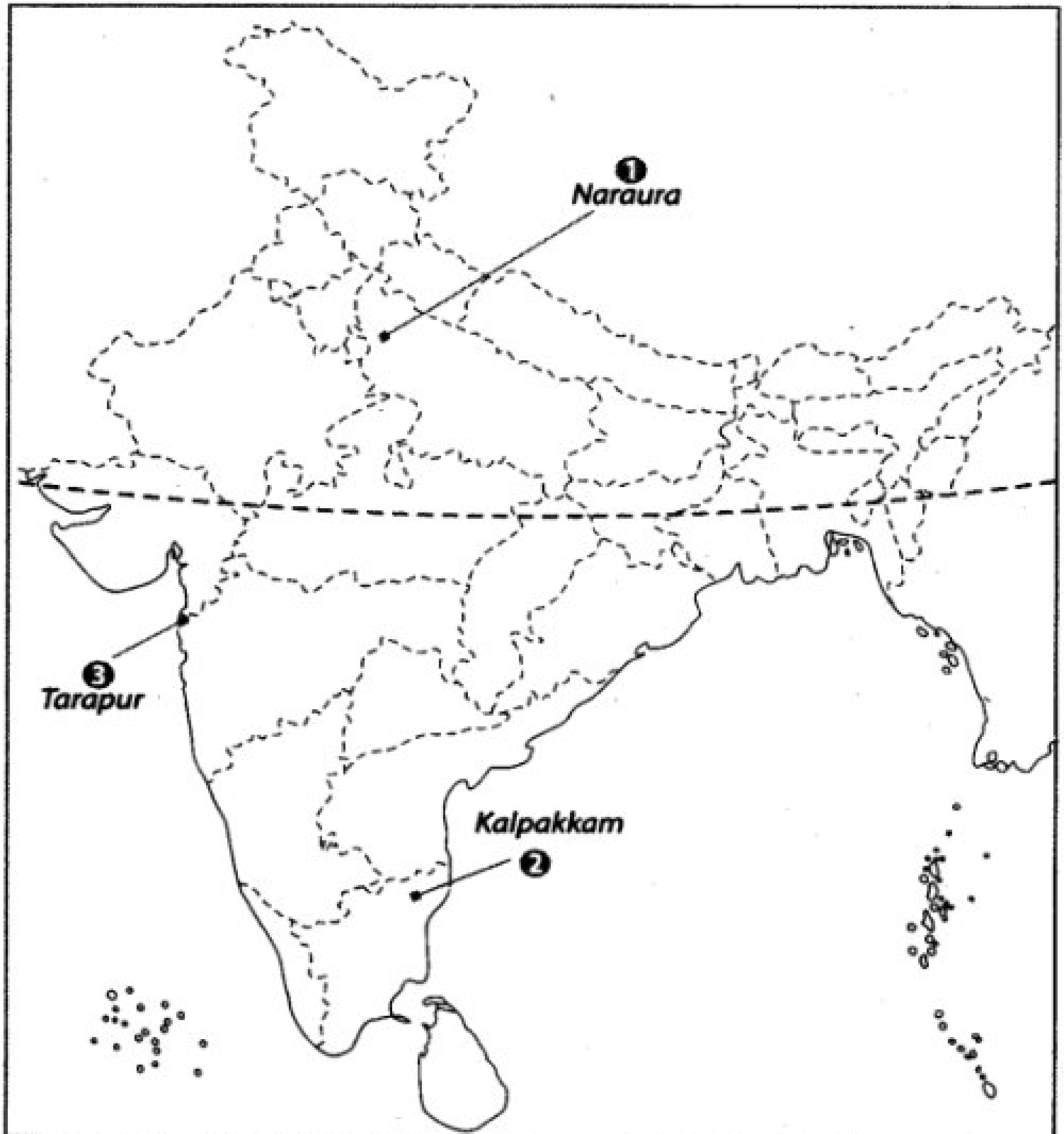
Answer



Question 3. Locate and label the following items on the given map with appropriate symbols.

1. Naraura nuclear power plant
2. Kalpakkam nuclear power plant
3. Tarapur nuclear power plant [CBSE 2016]

Answer



Question 4

Locate and label the following items on the given map with appropriate symbols:

1. Kakrapar nuclear power plan
2. Vishakhapatnam iron ore exporting port
3. Belagavi silk industry
4. Bhilai iron and steel industry

Answer



Question 5.

Features are marked by numbers in the given political map of India. Identify these features with the help of the following information and write their correct names on the lines marked in the map.

1. An oil field
2. A thermal power plant
3. Smallest national highway

Answer

