

5 MINERALS AND ENERGY RESOURCES

CONCEPT

1. **Minerals** : These are homogeneous naturally occurring substances normally found in solid, liquid and gaseous state.
2. **Types of Minerals** : Metallic and non-metallic.
3. **Metallic Minerals** : further sub-divided into ferrous and non-ferrous.
 - (i) Ferrous (containing iron) are iron ore, manganese ore, chromite, pyrite, nickel and cobalt.
 - (ii) Non-ferrous (containing metals other than iron) — gold, silver, copper, lead, bauxite, tin and magnesium.
4. **Non-metallic Minerals** : They are limestone, nitrate, potash, mica, gypsum, coal, petroleum.
5. **Distribution of Minerals** :
 - (a) **Iron Ore** : Basic mineral, backbone of industrial development. There are four varieties of iron ore :
 - (i) magnetite (contains 70% iron) — Finest quality, with magnetic properties.
 - (ii) haematite (contains 60% to 70% iron) – Most important industrial iron ore.
 - (iii) limonite (contains 40% to 60% iron)
 - (iv) siderite (contains 40% to 50% iron)

Magnetite and Haematite : These are found in Jharkhand, Chhattisgarh, Andhra Pradesh, Goa, Orissa, Karnataka and Maharashtra.

Well-known iron ore mines : Durg and Bastar districts of Chhattisgarh, Paschimi and Purbi Singhbhum districts of Jharkhand, Sundargarh, Keonjhar and Mayurbhanj districts of Orissa, North Goa, Chikmagalur and Bellary districts of Karnataka, Ratnagiri of Maharashtra.
 - (b) **Manganese Ore** :

Use : Manganese ore is used for making iron and steel and preparing alloys. It is used to manufacture bleaching powder, insecticides, paints and batteries.

Reserves : The main reserves of manganese ore are found in Karnataka, Orissa, Madhya Pradesh, Andhra Pradesh, Jharkhand, Maharashtra and Goa. 97% of India's manganese ore is mined in the states of Maharashtra, Madhya Pradesh, Orissa, Karnataka and Andhra Pradesh.
 - (c) **Copper** :

Use — Copper is used for making utensils, electric wires and alloys.

Distribution — 90% of the copper reserves are concentrated in Madhya Pradesh, Rajasthan, Jharkhand, Gujarat, Karnataka and Andhra Pradesh.
 - (d) **Bauxite** : It is an ore from which aluminium is obtained. Aluminium is used in manufacturing of aeroplanes, utensils and other household goods.

Distribution : Jharkhand, Orissa, Gujarat, Maharashtra, Chhattisgarh, Madhya Pradesh and Tamil Nadu. Orissa is the largest producer (45%) Panchpatmali deposits in Koraput, Orissa and Amarkantak, Maikal hills, Bilaspur-Katni plateau regions are important.

(e) **Mica :**

Use — It is used in electrical and electronic industries.

Distribution — Jharkhand, Bihar, Andhra Pradesh and Rajasthan.

(f) **Limestone** is composed of calcium carbonate or calcium and magnesium carbonates.

Use — Limestone is used in the cement industry, smelting of iron and in chemical industries.

Distribution — Madhya Pradesh, Chhattisgarh, Andhra Pradesh, Rajasthan, Gujarat, Karnataka and Himachal Pradesh.

6. Conservation of Minerals : They are non-renewable — should be conserved.

- Wastage in the process of mining and processing has to be reduced to the minimum.
- Export of minerals should be minimised.
- Substitutes should be used in order to save minerals.

7. Energy Resources : The sources of energy are — Coal, Petroleum, Natural Gas, Solar Energy, Wind Energy, Hydel Energy.

Conventional Energy — Coal, petroleum, natural gas and electricity.

Non-Conventional Energy — Solar, wind, tidal, geothermal, atomic energy and biogas.

Commercial Sources of Energy — Coal, petroleum, natural gas, hydroelectricity and nuclear energy.

Non-Commercial Sources of Energy — Firewood, charcoal, cowdung and agricultural wastes.

(a) **Coal :**

Use — Coal is the main source of power generation in India. 67% of the country's requirements of power is met by coal. It is used in the manufacture of iron and steel. It is also used as a raw material for the chemical industry.

Four Types of Coal — Anthracite, bituminous, lignite and peat.

Anthracite : It is found only in Jharia, Jharkhand.

Bituminous : It is found in Jharkhand, Orissa, West Bengal, Chhattisgarh and Madhya Pradesh.

Lignite : It is found in Rajasthan, Tamil Nadu, Assam, Jammu and Kashmir.

Coalfields : These are found in Jharkhand, West Bengal, Madhya Pradesh, Chhattisgarh and Orissa. Famous coal mines : Jharia in Jharkhand, Raniganj in West Bengal, Talcher in Orissa.

(b) **Petroleum :** Second most important energy source, raw materials for a number of industries.

Distribution : 63% of crude petroleum is produced from Mumbai High, 18% from Gujarat and 16% from Assam.

Small quantity of oil is also produced in Tamil Nadu, Andhra Pradesh and Arunachal Pradesh.

Important offshore oilfields — Mumbai High, Bassein and Aliabet.

Important oilfields in Gujarat — Ankleshwar, Lunej, Kalol.

Oil Refineries — Trombay, Koyali, Lunej and Kalol.

Important oilfields in Assam — Digboi, Naharkatiya, Moran, Hygrijan. Oil from these fields is refined at Digboi, Guwahati, Bongaigaon in Assam and Barauni in Bihar.

- (c) **Natural Gas** : Environment friendly fuel, raw material in petrochemical industry.
Distribution — Andhra Pradesh, Maharashtra, Gujarat, Assam and Andaman and Nicobar Islands, Krishna-Godavari Basin.
 Over 3/4th of the production comes from Mumbai High, 10% from Gujarat, 7% from Assam and the rest from Andhra Pradesh, Tamil Nadu, Tripura and Rajasthan.
- (d) **Electricity** :
Installed Capacity of India — 137500 MW. Per capita consumption of electricity — 379 kwh.
Thermal Electricity — It is obtained by using coal, petroleum and natural gas.
Distribution — Assam, Jharkhand, Gujarat, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and West Bengal.
Other Significant Producers — Punjab, Haryana, Rajasthan, Karnataka, Orissa and Delhi.
Hydroelectricity — It is produced from water released at a great force from a high head.
Distribution — Important hydel power-producing states are Andhra Pradesh, Karnataka, Kerala, Orissa, and Punjab.
Nuclear Electricity — It is produced from uranium and thorium.
 There are seven nuclear power stations in the country.
 They are located at — Tarapur (Maharashtra), Kalpakkam (Tamil Nadu), Rawatbhata (Rajasthan), Narora (Uttar Pradesh), Kakrapara (Gujarat), Kaiga (Karnataka).
- (e) **Non-Conventional Sources of Energy** : The potential of non-conventional sources of energy is large. They use renewable resources for energy generation.
Solar Energy — Photovoltaic technology converts sunlight directly into electricity.
Use — Solar energy is used for cooking, pumping, heating of water, refrigerator and street lighting.
Biggest Solar Power House of India : Thar desert.
Largest Solar Plant of India : Madhapur near Bhuj.
Wind Energy — India has a wind power potential of 20,000 MW.
Distribution — Tamil Nadu, Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and Lakshadweep.
Largest Wind Farm Cluster — It is of 150 MW and located in Tamil Nadu. Gujarat is very favourable for wind farm.
Biogas — Shrubs, farm wastes, animal and human wastes are used to produce biogas for domestic consumption in the rural areas.
Improved Chulhas — The *chulhas* used in the rural areas use wood and cow dung which emits smoke. The improved *chulhas* do not emit smoke and use less wood.
- (f) **Other Non-Conventional Sources** : include geo-thermal energy, tidal energy and wave energy.

8. Conservation of Energy Resources :

In order to conserve energy, we must —

- use the public transport system more frequently.
- switch off electricity whenever not required.
- Use power-saving devices.
- Check the power equipments regularly.
- Use non-conventional sources of energy more frequently.

I. SUMMATIVE ASSESSMENT

A. NCERT TEXTBOOK QUESTIONS

Q.1. Choose the right answer from the four alternatives given below :

(i) Minerals are deposited and accumulated in stratas of which of the following rocks?

- (a) Sedimentary rocks (b) Metamorphic rocks
(c) Igneous rocks (d) None of the above

Ans. (a)

(ii) Koderma in Jharkhand is the leading producer of which one of the following minerals?

- (a) Bauxite (b) Mica (c) Iron ore (d) Copper

Ans. (b)

(iii) Which of the following minerals is contained in the Monazite sand?

- (a) Oil (b) Uranium (c) Thorium (d) Coal

Ans. (c)

(iv) Which one of the following mineral ores is formed by decomposition of rocks, leaving a residual mass of weathered materials?

- (a) Coal (b) Bauxite (c) Gold (d) Zinc

Ans. (b)

Q.2. Answer the following questions briefly.

(i) Distinguish between ferrous and non-ferrous minerals. Give examples.

Ans. Metallic minerals can be classified into ferrous and non-ferrous minerals.

Ferrous Minerals	Non-Ferrous Minerals
(i) Metallic minerals containing iron are called ferrous minerals.	Metallic minerals that contain metals other than iron are non-ferrous minerals.
(ii) They account for about three-fourths of the total value of production of metallic minerals in India.	India's reserves and production of non-ferrous minerals is not very satisfactory.
(iii) Iron ore, manganese, chromite, tungsten, nickel and cobalt are examples of ferrous minerals.	copper, lead, tin, bauxite, gold are examples of non-ferrous minerals as they do not contain iron.

(ii) What factors make the production of solar energy convenient in India? What are its uses? Name the largest solar plant of India.

OR

Why do you think that solar energy has a bright future in India.

Ans. India is a tropical country and it has enough scope for the production and utilisation of solar energy. Most of the regions of India record high temperatures, especially during the summer months. The scorching heat of the sun is tapped for productive purposes by using photovoltaic technology which converts sunlight directly into electricity.

The western parts of India, especially the Thar deserts region, receive undisturbed sunshine for most parts of the year. This area has great potential for development of energy and can be utilised as the largest solar power house of India.

Solar energy is becoming fast popular in different parts of the country, especially in rural and remote areas. It can be used for cooking, heating of water, pumping, refrigeration, street lighting and room heating in cold areas. The largest solar plant of India is located at Madhapur near Bhuj in Gujarat. The solar energy is used to sterilise milk cans.

(iii) State the facts about coal found in India with reference to the following : Distribution of coal in India.

Ans. The major resources of metallurgical coal belong to the Gondwana age and are located mainly in the north eastern part of the peninsula. Rich reserves of coal are found in the Damodar Valley region in the states of West Bengal and Jharkhand. Raniganj in West Bengal and Jharia and Bokaro in Jharkhand are important coalfields. One third of the total production comes from here.

Coal is also found in the Godavari, Mahanadi, Son and Wardha valleys. Korba in Chhattisgarh, Singrauli and Penah-kanhan valley in Madhya Pradesh, Talcher in Orissa, Kamptee and Chandrapur in Maharashtra and Singareni of Andhra Pradesh are important coal mines.

Tertiary coal occur in the north eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.

Principal lignite reserves are found in Neyveli in Tamil Nadu.

(iv) Differentiate between conventional and non-conventional sources of energy.

OR

Explain four points of distinction between conventional and non-conventional sources of energy.

Ans.

Conventional Sources of Energy	Non-conventional Sources of Energy
1. Conventional sources of energy have been in use since time immemorial.	1. Non-conventional sources have been put to use in the recent past.
2. Most of them, especially the fossil fuels are limited and exhaustible.	2. They are inexhaustible, renewable resources.
3. They emit smoke and ash on burning and cause environmental pollution.	3. They are environment friendly as they do not cause pollution.
4. As the supply fossil fuels are limited they are expensive.	4. As they are flow resources, freely found in nature in abundance, they are less expensive.
5. Simple mining as well as modern technology are involved in their production.	5. Advanced scientific technology is involved in its production.
6. Coal, mineral oil, natural gas, and hydel power are examples of conventional sources of energy.	6. Solar energy, wind energy, tidal energy, geothermal energy, biogas and energy from urban waste are examples of non-conventional sources of energy.

OTHER IMPORTANT QUESTIONS (AS PER CCE PATTERN)

B. MULTIPLE CHOICE QUESTIONS (1 MARK)

Q.1. Study about which of the characteristics of minerals is not a concern of geographers?

- (a) Minerals as part of the earth's crust for better understanding of landforms.
- (b) Distribution of minerals
- (c) Economic activities associated with minerals
- (d) Formation, age and physical and chemical composition of minerals

Ans. (d)

Q.2. Which of the following rocks consists of a single mineral?

- (a) Granite
- (b) Basalt
- (c) Limestone
- (d) Sandstone

Ans. (c)

Q.3. Metals like gold, silver and platinum are known as which of the following?

- (a) Ferrous minerals
- (b) Non-ferrous minerals
- (c) Non-metallic minerals
- (d) Precious minerals

Ans. (d)

Q.4. Minerals formed from solidification of molten matter in the crack, crevices, faults or joints are found in which types of rocks?

- (a) Stratified rocks
- (b) Igneous and metamorphic rocks
- (c) Sedimentary rocks
- (d) None of the above

Ans. (b)

Q.5. Which of the following is a major metallic mineral obtained from veins and lodes?

- (a) Tin
- (b) Iron
- (c) Manganese
- (d) Gold

Ans. (a)

Q.6. Minerals are deposited and accumulated in strata of which of the following rocks?

- (a) Sedimentary rocks
- (b) Metamorphic rocks
- (c) Igneous rocks
- (d) None of the above

Ans. (a)

Q.7. Which of the following sedimentary minerals is formed as a result of evaporation, especially in arid regions?

- (a) Coal
- (b) Potash salt
- (c) Iron ore
- (d) Sulphur

Ans. (b)

Q.8. Which of the following regions of India contain most of the reserves of coal, metallic minerals, mica and many other non-metallic minerals?

- (a) The Himalayas
- (b) Alluvial plains of North India
- (c) Rock system of peninsula in Rajasthan
- (d) Peninsular plateau region

Ans. (d)

Q.9. Which of the following regions of India is almost devoid of economic minerals?

- (a) The Himalayan belt
- (b) The alluvial plains of North India
- (c) The Thar desert
- (d) The Peninsular plateau

Ans. (b)

Q.10. Which of the following is the finest quality of iron ore with magnetic qualities ?

- (a) Magnetite
- (b) Haematite
- (c) Siderite
- (d) Limonite

Ans. (a)

Q.11. Which one of the following mineral ores is formed by decomposition of rocks, leaving a residual mass of weathered material?

- (a) Coal (b) Bauxite
(c) Gold (d) Zinc

Ans. (b)

Q.12. Due to which of the following reasons is the Bailadila range in the Bastar district of Chhattisgarh famous?

- (a) It is the highest range in Central India
(b) Very high grade haematite variety of iron ore is found here
(c) Very high grade coal deposits are found here
(d) It is the largest iron ore deposit in the world

Ans. (b)

Q.13. Which of the following minerals is an important raw material in the iron and steel industry apart from iron ?

- (a) Mica (b) Aluminium
(c) Gypsum (d) Manganese

Ans. (d)

Q.14. India's reserves and production of which of the following types of minerals is not very satisfactory?

- (a) Ferrous Minerals
(b) Non-Ferrous Minerals
(c) Energy Minerals
(d) None of the above

Ans. (b)

Q.15. India is critically deficient in the reserve and production of which of the following minerals?

- (a) Iron ore (b) Manganese
(c) Copper (d) Coal

Ans. (c)

Q.16. Koderma in Jharkhand is the leading producer of which one of the following minerals?

- (a) Bauxite (b) Mica
(c) Iron ore (d) Copper

Ans. (b)

Q.17. Which of the following minerals is indispensable for electric and electronic industries?

- (a) Iron (b) Nickel
(c) Manganese (d) Mica

Ans. (d)

Q.18. To which of the following categories of resources, do minerals belong ?

- (a) Renewable and replenishable
(b) Flow
(c) Non-renewable and finite
(d) None of the above

Ans. (c)

Q.19. Which of the following is a non-commercial source of energy widely used in rural areas?

- (a) Coal (b) Firewood
(c) Natural gas (d) Electricity

Ans. (b)

Q.20. Which of the following energy sources are not the conventional sources of energy?

- (a) Firewood, cattle dung cake
(b) Atomic energy, biogas, solar energy
(c) Coal, petroleum, natural gas
(d) Hydel and thermal electricity

Ans. (b)

Q.21. Which of the following is a fuel mineral?

- (a) Hydro-electricity (b) Solar power
(c) Thorium (d) Biogas

Ans. (c)

Q.22. Which of the following is the most abundantly available fossil fuel in India?

- (a) Petroleum (b) Coal
(c) Firewood (d) Biogas

Ans. (b)

Q.23. Which of the following is the geological age of coal found in north-eastern India?

- (a) Jurassic (b) Gondwana
(c) Tertiary (d) Pre-Cambrian

Ans. (c)

Q.24. Which of the following energy sources is also termed as mineral oil or crude oil?

- (a) Coal (b) Petroleum
(c) Biogas (d) Natural gas

Ans. (b)

Q.25. Petroleum was first drilled in which of the following oilfields of India ?

- (a) Ankaleshwar (b) Digboi
(c) Mumbai High (d) Kalol

Ans. (b)

Q.26. Which of the following is not one of the major offshore fields of western India ?

- (a) Mumbai High (b) Bassien
(c) Jwalamukhi (d) Aliabet

Ans. (b)

Q.27. Which of the following is considered to be an environment friendly fuel?

- (a) Peat (b) Coal
(c) Petroleum (d) Natural gas

Ans. (d)

Q.28. Which of the following industries are the key users of natural gas?

- (a) Cotton and jute textiles
(b) The power and fertiliser industries
(c) Iron and steel industry
(d) All the above

Ans. (b)

Q.29. Per capita consumption of which of the following is considered as an index of development?

- (a) Electricity (b) Coal
(c) Petroleum (d) Atomic minerals

Ans. (a)

Q.30. Which of the following uses non-renewable fossil fuels for generation of electricity?

- (a) Hydro-electricity projects
(b) Thermal power stations
(c) Geothermal energy stations
(d) Nuclear power plants

Ans. (b)

PREVIOUS YEARS' QUESTIONS

1. Which is correct about Magnetite iron ore ? [2011(T-2)]

- (a) Magnetite is the most important industrial iron ore in terms of the quantity used.
(b) Magnetite has the inferior magnetic qualities which is not valuable in the electric industry.
(c) It is the finest iron ore with a very high content of iron up to 70%.
(d) It has a slightly lower iron content than haematite (50-60%).

Ans. (c)

2. Which of the following includes non-ferrous metals ? [2011(T-2)]

- (a) Iron and manganese
(b) Steel and iron ore
(c) Haematite and magnetite
(d) Copper and bauxite

Ans. (d)

3. Which one of the following features is not true about copper ? [2011(T-2)]

- (a) India is deficient in the reserve and production of copper.
(b) It is malleable, ductile and a good conductor.
(c) It is a ferrous ore.
(d) It is mainly used in electrical cables and electronic goods.

Ans. (c)

4. Which one of the following is an essential feature of Mica? [2011(T-2)]

- (a) It is a metallic mineral made up of a series of plates
- (b) It can be clear, black, green, red, yellow or brown.
- (c) It is not used in electric and electronic industry.
- (d) It cannot be easily split into thin sheets

Ans. (b)

5. Where is an experimental geo-thermal energy project located in India ?

[2011(T-2)]

- (a) Gulf of Kuchch - Gujarat
- (b) Puga valley - Ladakh
- (c) Ganga valley - Himachal Pradesh
- (d) Nagarcoil - Tamil Nadu

Ans. (b)

6. Which one of the following does not influence the location of industries ?

[2011(T-2)]

- (a) Availability of raw material and electricity.
- (b) Availability of markets and capital.
- (c) Availability of raw material and labour.
- (d) Availability of educational and medical services.

Ans. (d)

7. Which one of the following is not true regarding wind power in India?

[2011(T-2)]

- (a) The largest wind farm cluster is located in Tamil Nadu.
- (b) Jaisalmer is well known for effective use of wind energy in our country.
- (c) Andhra Pradesh and Karnataka have important wind farms.
- (d) Andaman Nicobar islands have important wind farms.

Ans. (d)

8. Which one of the following is not true regarding the importance of manufacturing industries ? [2011(T-2)]

- (a) They generate jobs in the secondary and tertiary sectors.
- (b) Export of manufactured goods brings in foreign exchange.
- (c) Manufacturing industries encourage trade and commerce.
- (d) The economic strength of a country is measured in terms of the raw material it possesses.

Ans. (d)

9. Which one of the following minerals is NOT obtained from the veins and lodes? [2011(T-2)]

- (a) Tin
- (b) Zinc
- (c) Lead
- (d) Gypsum

Ans. (d)

10. Which one of the following non-conventional sources of energy is harnessed in the Parvati Valley near Manikaran in Himachal Pradesh

[2011(T-2)]

- (a) Tidal Energy
- (b) Geothermal Energy
- (c) Wind Energy
- (d) Solar Energy

Ans. (b)

11. Which one of the following factors is responsible for the sugar mills to shift and concentrate in the southern and western states of India ? [2011(T-2)]

- (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.

Ans. (c)

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

[2011(T-2)]

- (a) Veins
- (b) Lodes

- (c) Beds (d) Layers
Ans. (b)
- 13. The largest solar plant of India is located at : [2011(T-2)]**
 (a) Madhapur (b) Nagarcoil
 (c) Madurai (d) Manikaran
Ans. (a)
- 14. Which mineral belongs to the category of non-ferrous minerals? [2011(T-2)]**
 (a) Iron ore (b) Manganese
 (c) Cobalt (d) Copper
Ans. (d)
- 15. Which form of coal has a low carbon and high moisture contents and low heating capacity ? [2011(T-2)]**
 (a) Peat (b) Lignite
 (c) Anthracite (d) Bituminous
Ans. (a)
- 16. The largest manganese producing state of India is - [2010(T-II)]**
 (a) Orissa (b) Madhya Pradesh
 (c) Karnataka (d) Kerala
Ans. (a)
- 17. Which one of the following minerals belongs to a category which is different from others ? [2011(T-2)]**
 (a) Mica (b) Gold
 (c) Copper (d) Iron
Ans. (b)
- 18. The highest quality of hard coal is : [2011(T-2)]**
 (a) Lignite (b) Bituminous
 (c) Peat (d) Anthracite
Ans. (d)
- 19. Which one of the following is largely derived from ocean water? [2011(T-2)]**
 (a) Bauxite (b) Magnesium
 (c) Gold (d) Mica
Ans. (b)
- 20. Which one of the following minerals belongs to the category of ferrous minerals ? [2011(T-2)]**
 (a) Mica (b) Silver

- (c) Bauxite (d) Manganese
Ans. (d)
- 21. The best quality of iron ore is : [2011(T-2)]**
 (a) Magnetite (b) Pyrite
 (c) Hematite (d) Siderite
Ans. (a)
- 22. Minerals are deposited and accumulated in the horizontal strata of which of the following rocks ? [2011(T-2)]**
 (a) Sedimentary rocks
 (b) Igneous rocks
 (c) Metamorphic rocks
 (d) None of the above
Ans. (a)
- 23. Which one of the following minerals is largely derived from Ocean Waters ? [2011(T-2)]**
 (a) Bromine (b) Silver
 (c) Platinum (d) Bauxite
Ans. (a)
- 24. In which state of India are the Khetri Copper mines situated ? [2011(T-2)]**
 (a) Punjab (b) Jharkhand
 (c) Rajasthan (d) Madhya Pradesh
Ans. (c)
- 25. Which one of the following minerals is largely derived from 'placer deposits' ? [2011(T-2)]**
 (a) Magnesium (b) Gold
 (c) Iron ore (d) Bromine
Ans. (b)
- 26. In which state of India the Balaghat Copper Mines are situated? [2011(T-2)]**
 (a) Punjab (b) Kerala
 (c) Madhya Pradesh (d) West Bengal
Ans. (c)
- 27. Which one of the following states, is the largest producer of copper in India ? [2011(T-2)]**
 (a) Orissa (b) Karnataka

- (c) Madhya Pradesh (d) Gujarat
Ans. (c)
- 28. In which one of the following states the largest wind farm cluster is located ?**
 [2011(T-2)]
- (a) Gujarat (b) Kerala
 (c) Rajasthan (d) Tamil Nadu
Ans. (d)
- 29. Which of the following is non-metallic mineral?**
 [2011(T-2)]
- (a) Iron ore (b) Copper
 (c) Bauxite (d) Lime stone
Ans. (d)
- 30. Which of the following is the oldest oil producing state of India ?**
 [2011(T-2)]
- (a) Gujarat
 (b) Madhya Pradesh
 (c) Assam
 (d) Andaman Nicobar island
Ans. (c)
- 31. Which one of the following minerals is contained in the monazite sands ?**
 [2011(T-2)]
- (a) Oil (b) Uranium
 (c) Thorium (d) Coal
Ans. (c)
- 32. Which one of the following minerals is formed by decomposition of rocks, leaving a residual mass of weathered material ?**
 [2011(T-2)]
- (a) Coal (b) Bauxite
 (c) Gold (d) Zinc
Ans. (b)
- 33. India is critically deficient in which of the following minerals reserves ?**
 [2011(T-2)]
- (a) Mica (b) Copper
 (c) Bauxite (d) Manganese
Ans. (b)

- 34. In which of the following iron ore belt Kudremukh mines are located ?**
 [2011(T-2)]
- (a) Orissa-Jharkhand belt
 (b) Maharashtra-Goa belt
 (c) Durg-Baster-Chandrapur belt
 (d) Bellary-Chitradiga-Chikmagalur-Tumkur belt
Ans. (d)
- 35. Electricity generated by burning fossil-fuels is called :**
 [2011(T-2)]
- (a) Hydro-electricity
 (b) Tidal electricity
 (c) Thermal electricity
 (d) Nuclear energy
Ans. (c)
- 36. Koderma - Gaya - Hazaribagh belt is the leading producer of which one of the following minerals ?**
 [2011(T-2)]
- (a) Bauxite (b) Mica
 (c) Iron Ore (d) Copper
Ans. (b)
- 37. Which one of the following types of coal is the most popular for commercial use?**
 [2011(T-2)]
- (a) Bituminous (b) Anthracite
 (c) Lignite (d) None of the above
Ans. (a)
- 38. Which one of the following non-conventional sources of energy is harnessed near Manikarn in Himachal Pradesh ?**
 [2011(T-2)]
- (a) Geothermal Energy
 (b) Wind energy
 (c) Solar energy
 (d) None of the above
Ans. (a)
- 39. Which one of the following states is the largest producer of bauxite?**
 [2011(T-2)]
- (a) Rajasthan (b) Madhya Pradesh
 (c) Orissa (d) Gujarat
Ans. (c)

C. SHORT ANSWER TYPE QUESTIONS (3 MARKS)

Q.1. What are minerals? How are they classified?

Ans. Minerals are natural resources which are obtained from rocks. Geologists define a mineral as a “homogeneous, naturally occurring substance with a definable internal structure.” They are normally found in solid, liquid and gaseous states. They have a definite chemical composition and crystalline structure. A particular mineral that will be formed from a single or certain combination of elements depends upon the physical and chemical conditions under which the material forms. Minerals are classified into metallic and non-metallic minerals and energy resources.

- (a) Metals are obtained from metallic minerals. They are further subdivided into (i) ferrous minerals containing iron, i.g. iron-ore manganese, nickel, cobalt, etc.
 - (ii) Non-ferrous minerals, e.g. copper, lead, tin, bauxite, etc. that do not contain iron.
 - (iii) Precious minerals, e.g. gold, silver, platinum.
- (b) Non-metals, e.g. mica, salt, potash, sulphur, granite, limestone, dolomite, gypsum, marble, etc. lack the lustre and hardness of metals.
- (c) Energy minerals are fossil fuels, e.g. coal, petroleum, natural gas used to generate energy.

Q.2. (i) What are ores? Give example.

(ii) What are ‘placer deposits’? Give examples of minerals found in such deposits. (2010)

Ans. (i) The term ore is used to describe an accumulation of any mineral mixed with other elements. Minerals are usually found in ores. Metals are extracted from the ores after removing the impurities. Iron ore, bauxite (ore of aluminium), copper ore are examples of ores, from which iron, aluminium and copper are derived respectively.

(ii) Certain minerals may occur as alluvial deposits in sands of valley floors and base of hills. These deposits are called ‘placer deposits’. They generally contain minerals which are not corroded by water. Gold, silver, tin and platinum are examples of some important minerals found in ‘placer deposits’.

Q.3. What is a mine ? Name the different types of mining prevalent in India. What is rat-hole mining and where in India is this type of mining done?

Ans. When the extraction of a mineral from its deposit or reserve becomes economically viable, that deposit is termed as a mine. The concentration of minerals in the ore, the ease of extraction and closeness to the market are important considerations to select a reserve to be a mine for extraction of the mineral.

The different types of mining prevalent in India are :

- (a) Open-pit mining or open-cast mining.
- (b) Underground mining or deep-shaft mining.
- (c) Rat-hole mining.
- (d) Quarrying.
- (e) Drilling (for obtaining mineral oil or petroleum).

Rat-hole mining is a local form of coal mining prevalent in tribal areas of the north-east where some minerals like coal, iron ore, limestone and dolomite are owned by individuals and

communities. In Jowai and Cherrapunji in Meghalaya, coal mining is done by family members of the tribal community in form of a long narrow tunnel. This is known as rat-hole mining.

Q.4. Mention any four uses of manganese ore. Name three areas where manganese is found.

Ans. Four uses of manganese ore are follows :

- (i) It is an important raw material in the iron and steel industry, used in the manufacturing of steel. Nearly 10 kg of manganese is required to manufacture one tonne of steel.
- (ii) It is used to prepare alloys or mixture of different metals to acquire special properties for the minerals, e.g. ferro-manganese alloys.
- (iii) It is used to make bleaching powder and insecticides.
- (iv) It is used in manufacturing of batteries and for making paints.

Orissa is the largest producer of manganese followed by Madhya Pradesh and Karnataka. Kendughar and Sundergarh of Orissa, Chhindwara and Balaghat in Madhya Pradesh and Shimoga of Karnataka are important areas of manganese mining.

Q.5. Which types of minerals have provided a strong base for development of metallurgical industries in India ? Which particular mineral is termed as the backbone of industrial development and why?

Ans. Ferrous minerals like iron ore, manganese etc., account for about three-fourth of the total value of the production of metallic minerals in India. As such, ferrous minerals provide a strong base for the development of metallurgical industries in India. These industries extract and purify the metals and produce them in usable forms for their application in various other industries.

Iron ore, a ferrous mineral, is the basic mineral and the backbone of industrial development. It is the key to progress in the present mechanical civilisation. Iron and steel made from iron ore and its alloys is used to make machines. Machines determine the development of industries. As the basic tools, implements and machines required in the industries are made of iron, industrial development is determined by iron.

Q.6. Why is mica considered to be an indispensable mineral for the electronics industry? Mention the names of the main mica-producing areas of India.

Ans. Mica is a non-conductor of electricity. Due to its excellent dielectric strength, low power loss factor, insulating properties and resistance to high voltage, mica is an indispensable mineral for the electrical and electronics industries.

Koderma-Gaya-Hazaribagh belt of Jharkhand is the leading mica-producing area of India.

In Rajasthan, the major mica-producing area is around Ajmer.

In Andhra Pradesh, the Nellore mica belt is an important mica-producing area.

Q.7. Why are petroleum refineries termed as 'nodal industries'?

Ans. Petroleum refineries act as a 'nodal industry' for synthetic textile, fertiliser and numerous chemical industries. During fractional distillation of mineral oil, apart from petrol, diesel and kerosene which act as fuel, a number of byproducts like naphtha, phyneyl, paraffin wax, asphalt or tar and a number of petrochemicals are obtained. Chemical fertilisers, insecticides and chemicals, artificial fibres and artificial rubber are products of petrochemicals. Thus, petrochemicals, provide raw materials for fertilisers, numerous chemicals, synthetic textiles, synthetic rubber and plastic industries.

PREVIOUS YEARS' QUESTIONS

1. Describe the qualities of four different types of coal found in India. How is coal formed?

[2011(T-2)]

- Ans.** (i) **Peat** is a low carbon and high in moisture
(ii) **Lignite** is a low grade brown coal, soft and high moisture content.
(iii) **Bituminous** coal content high carbon and low moisture most popular coal in commercial use.
(iv) **Anthracite** is the highest quality hard coal. Coal is formed due to the compression of plant material over million years. Most coal is formed during carboniferous periods.

2. What are renewable resources ? Why has it become necessary to use renewable energy resources?

[2011(T-2)]

Ans. The resources which can be renewed or reproduced by physical, chemical or mechanical processes are known as renewable resources.

Dependence on fossil fuels i.e., coal, oil and gas and rising prices of oil and gas and their potential shortages have raised uncertainties about security of energy supply in future, which affect the growth of national economy. Besides, the use of fossil fuels also causes serious environmental problems. Hence, there is a need for use of renewable energy resources.

3. What is mineral ? Mention two types of formations in which they occur.

[2011(T-2)]

Ans. Rocks are combinations of homogeneous substances called **minerals**.

- (i) It occurs in cracks, crevices, faults and joints, particularly Igneous and metamorphic rocks.
- (ii) It also occurs in beds and layers particularly in sedimentary rocks.

4. In what ways are some manufacturing industries dependent on mineral resources ? Explain.

[2011(T-2)]

Ans. Some manufacturing industries based on minerals resources transform raw materials into valuable industrial products. Iron and steel, cement, aluminium, petrochemical are mineral-based industry. They use raw materials into finished products.

5. Explain why the use of non-conventional sources of energy is becoming necessary in our country? Give three reasons.

[2011(T-2)]

Ans. The use of non-conventional sources of energy is becoming necessary in our country for the following reasons.

- (i) Rising prices of oil and gas.
- (ii) To Save environmental pollution.
- (iii) As a renewable source of energy.

6. Describe any three factors which play a very important role in turning a mineral reserve into a mine.

[2011(T-2)]

- Ans.** (i) The concentration of mineral in the ore.
(ii) The ease of extraction of minerals.
(iii) Closeness to the market.

7. 'Energy saved is energy produced'. Justify the statement by giving any six measures to conserve the energy resources. [2011(T-2)]

- Ans.** (i) use public transport systems instead of individual vehicles.
(ii) switching off electricity when it is not in use.
(iii) using power saving devices.
(iv) using non-conventional sources of energy.
(v) use of power saving electrical appliances.
(vi) Minimum use of high power consuming electrical gadgets ie, Air conditioner, room heaters etc.

8. What is a mineral ? Distinguish between ferrous and non-ferrous minerals. [2011(T-2)]

- Ans.** **Mineral** is a homogeneous naturally occurring substance with a definable internal structure. Ferrous minerals are composed of iron matters ie iron, Nickel, Manganese while non-ferrous minerals do not have iron content example gold, copper etc.

9. "India is highly dependent on coal for meeting its commercial energy requirement." Support the statement with three arguments. [2011(T-2)]

- Ans.** (i) Coal provides a substantial part of nation's energy needs.
(ii) It is used for power generation.
(iii) It supplies energy to industry as well as for domestic needs.

10. State the importance of petroleum as an energy resource. Mention any four oil fields of India. [2011(T-2)]

- Ans.** Petroleum is the next major energy source in India after coal. Petroleum provides fuel for heat and lighting, lubricants for machinery and raw materials for number of manufacturing industries – synthetic textiles, fertiliser and numerous chemical industries.
(i) Mumbai High.
(ii) Ankeleshwar, Gujarat.
(iii) Digboi, Assam.
(iv) Bassien, Arabina Sea.

11. Why do we need to conserve energy resources ? Write two ways to conserve energy resources ? [2011(T-2)]

- Ans.** Energy needs of the country is tremendously increasing with the growth of economy. It is therefore needed to conserve energy resources. The two ways of conserve energy resources are as follows :
(i) promotion of energy conservation
(ii) increased use of renewable energy sources.

12. Explain the importance, occurrence and distribution of petroleum in India. [2011(T-2)]

- Ans.** (i) Petroleum is the next major energy source in India after coal.
(ii) Petroleum occurrence in India are associated with anticlines and fault traps in the rock formations of the tertiary age.
(iii) About 63 percent of India's petroleum production is from Mumbai High, 18 percent from Gujarat and 16 percent from Assam. Ankeleswar is the most important oil field of Gujarat while Assam is the oldest oil producing state in India.

13. Explain three factors that make minerals extraction commercially viable. [2011(T-2)]

- Ans.** (i) The mineral content of the ore must be in sufficient quantity.
(ii) The type of formation or structure determine the relative ease with which minerals ores are extracted.
(iii) The cost of extraction of the minerals.

14. Explain any three measures for the conservation of minerals. [2011(T-2)]

- Ans.** (i) Improved technologies to be adopted to use low grade ores at low costs.
(ii) Recycling of metals using scrap metals.
(iii) Use of other substitutes such as aluminium instead of copper etc.

15. "Mineral resources in India are unevenly distributed." Support the statement with three suitable examples. [2011(T-2)]

- Ans.** (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) The vast alluvial plains of North India are almost devoid of minerals. These variations exist largely due to differences in the geological structure processes and time involved in the formation of minerals.

16. Explain any three types of formations in which minerals occur. [2011(T-2)]

- Ans.** (i) In igneous and metamorphic rocks minerals may occur in the cracks, crevices, faults or joints.
(ii) In sedimentary rocks a number of minerals occur in beds or layers.
(iii) Another mode of formation involves the decomposition of surface rocks and the removal of soluble constituents, leaving a residual mass of weather material containing ore. Example Bauxite ore.

17. Which is the next major source of energy after coal in India ? Mention any four points of its importance. [2010(T-II)]

- Ans.** Petroleum is the next major energy source in India after coal.
(i) It provides fuel for heat and lighting.
(ii) Lubricants for machinery.
(iii) Raw materials for number of manufacturing industries such as synthetic fibres, plastics, detergents, chemicals etc.
(iv) It can be easily handled and carried through pipelines.

18. How is mica one of the most indispensable minerals ? Explain any three points.

[2011(T-2)]

- Ans.** In electric and electronic industries it is an indispensable minerals.
(i) It has excellent di-electric strength.
(ii) Low power loss factors.
(iii) Insulating properties and resistance to high voltage.

19. State the facts about the coal found in India with reference to the following :

- (a) Name its four varieties.
- (b) Name the geological ages in which it is found in India.
- (c) Mention its two main uses.

[2011(T-2)]

Ans. (a) Peat, Lignite, Bituminous and Anthracite coal.

- (b) **Gondwana** some 200 million years in age and **Tertiary** deposits only about 55 million years old.
- (c) It is used for power generation and to supply energy to industry as well as for domestic needs.

20. Define minerals. How are minerals formed in igneous and metamorphic rocks ?

[2011(T-2)]

Ans. (i) Minerals are a homogeneous naturally occurring substance with a definable internal structure.

- (ii) In igneous and metamorphic rocks minerals may occur in the cracks, crevices, faults and Joints. The smaller occurrences are called **veins** and the larger are called **lodes**.

21. Name any three major iron ore belts found in India. Write main feature of each.

[2011(T-2)]

Ans. (i) Orissa – Jharkhand belt with sufficient (25%) deposits of high grade haematite ore.

- (ii) Bellary – Chitraduraga – Chikmagalur – Tumkur belt possess 26 percent of the total iron ore of India.

- (iii) Durg – Baster – Chandrapur belt lies in Chhatisgarh and Maharashtra, consisting of very high grade haematite ore.

22. “Solar energy has a bright future in India” Support the statements with three facts.

[2011(T-2)]

Ans. (i) Solar energy will be able to minimise the dependence of rural households on firewood and dung cakes.

- (ii) Contribute to environmental conservation.
- (iii) Supply adequate manure in agriculture.

23. What are the uses of copper ? Name the two leading copper producing states of India.

[2011(T-2)]

Ans. Copper is mainly used in electrical cables, electronics and chemical industries.

- (i) **Madhya Pradesh** produces 52 percent of India’s copper.
- (ii) Rajasthan produces 42 percent of copper in India.

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

[2011(T-2)]

Ans. (i) Limestone is the basic raw material for the cement industry and essential elements for smelting iron ore in the blast furnace.

- (ii) Andhra Pradesh and Madhya Pradesh.

25. Identify the most abundantly available fossil fuel in India. Explain any two types with its characteristics.

[2011(T-2)]

Ans. Coal is the most abundantly available fossil fuel in India.

- (i) **Lignite** is a low grade brown coal which is soft with high moisture content.
- (ii) Anthracite is the highest quality hard coal.

26. Explain three phases by which treatment of industrial effluents can be done? [2011(T-2)]

- Ans.** (i) Primary treatment by mechanical means. This involves screening, grinding flocculation and sedimentation.
- (ii) Secondary treatment by biological process.
- (iii) Tertiary treatment by biological chemical and physical processes. This involves recycling of waste water.

D. LONG ANSWER TYPE QUESTIONS (4 MARKS)

Q.1. Name the two varieties of iron ore in India having high content of iron. Mention the names of places in India which have the richest iron ore deposits. Explain two effects on our economy due to export of good quality ores in large quantities.

- Ans.** The two varieties of iron ore of India having high iron content are magnetite and hematite. Magnetite is the finest quality iron ore with very high iron content upto 70 per cent. Hematite has an iron content of 50 to 60 per cent but is the most important industrial iron ore in terms of the quantity used.

Rich iron-ore deposits are found in the following regions of India :

- (i) Orissa-Jharkhand belt with high grade haematite iron ore in Badampahar mines in the Mayurbhanj and Keonjhar districts of Orissa, and Gua and Noamundi in the Singhbhum district of Jharkhand.
- (ii) Durg-Bastar-Chandrapur belt in Chhattisgarh and Maharashtra with super-high grade hematite iron ore, in the famous Bailadila range of hills in the Bastar district of Chhattisgarh.
- (iii) Bellary-Chitradurga-Chikmagalur-Tumkur belt in Karnataka has large reserves of iron ore. The Kudremukh mines located in the Western Ghats are known to be one of the largest deposits in the world.
- (iv) Maharashtra-Goa belt includes Ratnagiri and Chandrapur in Maharashtra and Bicholiam and Pali in Goa.

About half of the iron-ore produced in the country is exported primarily to Japan, Korea, European countries and Gulf countries. Paradip, Vishakhapatnam, Mangalore and Marmagao are the main iron exporting ports.

Export of good quality ores in large quantities have positive as well as negative effects.

The export of the ore earns huge quantities of foreign exchange which is imperative for development activities.

The export of good quality ores has a negative effect on industrial production within the country which lags in production of iron and steel in spite of having good reserves of iron ore.

Q.2. What are the differences between hydro-electricity and thermal electricity? What is nuclear electricity?

- Ans.** Hydro-electricity and thermal electricity are two main forms of commercial conventional sources of energy. The main points of difference between these two types of energy sources are as follows :

Hydro-Electricity	Thermal Electricity
<ol style="list-style-type: none"> 1. Hydro-electricity is generated by fast-flowing water which turns turbines to produce electricity. 2. It uses renewable water resources for generating electricity. 3. It is a pollution free form of energy. 4. It is a permanent source of electricity. 5. Hydro-electricity accounts for 25 per cent of the total electricity produced in India. 	<ol style="list-style-type: none"> 1. Thermal electricity is generated by using coal, petroleum and natural gas. 2. It uses non-renewable fossil fuels for generating electricity. 3. It causes pollution due to burning of fossil fuels. 4. It is not a permanent source of electricity. 5. Thermal electricity accounts for about 70 percent of the total production of electricity in India.

Nuclear electricity or atomic energy is obtained by altering the structure of atoms of minerals like uranium and thorium. When such atomic alteration is made, much energy is released in the form of heat and this is used to generate electric power.

Q.3. Name the ore from which aluminium is obtained. Why is aluminium considered to be an important metal? Name the areas which have rich deposits of the ore of aluminium.

Ans. Aluminium is obtained mainly from bauxite. Though several ores contain aluminium, it is from bauxite, a reddish-brown, residual 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 considered to be an important metal because of its properties and wide variety of uses.

- (i) It combines the strength of metals such as iron with extreme lightness. So it is used for manufacturing of aircrafts and transport vehicles.
- (ii) It has great malleability. It is used for construction purposes to make door, windows, rods and for making utensils.
- (iii) It also has quality of good conductivity and is used in electrical conductors.

Rich deposits of bauxite, the ore of aluminium, are found mainly in the Amarkantak plateau, Maikal hills and the plateau region of Bilaspur-Katni in Madhya Pradesh and Chhattisgarh. Orissa is the leading producer accounting for about 45 per cent of the total bauxite production in the country.

Panchpatnali deposits in Koraput are an important bauxite reserve in Orissa.

Q.4. State the facts about coal found in India with reference to the following :

- (a) their total reserves
- (b) its importance as a source of energy and as a source of raw material
- (c) its main varieties
- (d) distribution of coal in India

Ans. Coal is the most abundantly available and important fossil fuel in India.

- (a) **Total reserves of coal :** India has coal reserve of about 2,14,000 million tonnes. They

occur in the rock series of two main geological ages, the Gondwana, a little over 200 million years in age, and in Tertiary deposits which are about 55 million years old.

(b) It is important as a source of energy and as a source of raw material.

Coal is the main source of power generation in India. It provides a substantial part of the nation's energy needs for both industries and domestic purposes. It is the prime source of energy in the manufacturing of iron and steel.

Coal is also used as raw material for the chemical industry.

(c) Its main varieties are :

(i) Anthracite — highest quality hard coal with more than 80 percent carbon content.

(ii) Bituminous — most popular coal for commercial use with 60 to 80 percent carbon content.

(iii) Lignite — low grade brown coal with high moisture content and lesser combustible matter with about 60 percent content.

(iv) Peat – produced from decaying plants in swamps with low carbon content of less than 50 percent, high moisture content and low heating capacity.

(d) Distribution of coal in India.

Ans. [See NCERT Question No. 2(III)].

Q.5. How is petroleum an important source of both energy and raw material? Mention the names of the areas which have rich petroleum deposits.

Ans. Petroleum or mineral oil is a major energy source in India. It provides fuel for heating and lighting. It is used as a fuel for running automobiles, trains, aeroplanes and ships. Petroleum is used for generation of thermal electricity which is a major source of power for commercial purposes.

A number of byproducts are obtained from fractional distillation of petroleum which are used as raw materials for various industries. Chemical fertilisers, insecticides and chemicals and plastics are manufactured from petrochemicals. It also provides raw materials for synthetic textile and synthetic rubber industries.

About 63 percent of India's petroleum production comes from the drilling areas of Mumbai High and Bassien in the Arabian Sea. Aliabet is another oilfield off-shore the coast of Gujarat. 18 percent of petroleum production comes from Gujarat. Ankaleshwar and Kalol are important oilfields in this region.

16 percent of the production comes from Assam. Assam is the oldest oil-producing state. Oil was first discovered in Makum in Assam in 1867 and the first oilfield was drilled at Digboi. Digboi, Naharkatiya, Moran-Hugrijan, Sibsagar are important oilfields of Assam.

Oil has also been discovered in Kaveri, Krishna and Godavari basins and at Jwalamukhi in Himachal Pradesh.

Q.6. Why do we need to conserve our mineral resources? Explain any three methods of conservation of minerals.

Ans. Minerals are required in all spheres of our life—for agriculture, industries and domestic purposes. We are rapidly consuming the 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. They are finite resources that are non-renewable, yet are getting exhausted due to rapid exploitation. Continued extraction bring down their quality as well as increases costs of extraction. To save these valuable resources from exhaustion and to preserve them for future generations as well, we should conserve our mineral resources.

Three methods of conserving minerals are :

- (i) Causing Minimum wastage of minerals during the process of mining and processing of minerals.
- (ii) Improved technologies to utilise low-grade ores at low cost.
- (iii) Using minerals in a planned manner by adopting the policy of recycle and reuse. Recycling of metals, using scrap metals and other substitutes to reduce exploitation of present deposits.

Q.7. In recent years, use of which fuel for transport vehicles is gaining popularity? What development has provided impetus to India's gas production?

- Ans.** (i) In recent years, use of Compressed Natural Gas (CNG) for transport vehicles is gaining popularity. It is replacing liquid fuels like petrol and diesel. The liquid fuels obtained from petroleum are exhausting rapidly and are costlier. They cause enormous pollution. Hence, the use of Compressed Natural Gas is encouraged to control pollution, protect the environment and the conserve petroleum which is exhausting rapidly. In Delhi CNG has already gained wide popularity. CNG is being encouraged with the motto of cleaner city, with government initiative.
- (ii) The 1700 km long Hazira-Bijapur-Jagdishpur cross-country gas pipeline links Mumbai High and Bassein with the fertiliser, power and industrial complexes in western and northern India.

This artery has provided impetus to India's gas production by linking gas-producing areas to their market. As gas can easily be transported via pipelines, the natural gas can be taken from source areas directly to their demand areas.

PREVIOUS YEARS' QUESTIONS

Q.1. Which is the most abundantly available fossil fuel in India? What are its three major forms? Write main features of each form. (2008)

Ans. Coal is the most abundantly available fossil fuel in India. It provides a substantial part of the nation's energy requirement. India has vast and rich reserves of coal, distributed in different regions of India.

The Peninsular Plateau region, especially the Damodar Valley Region of Jharkhand and West Bengal, the Son, Mahanadi, Godavari and Wardha Valleys of Madhya Pradesh, Chhattisgarh, Orissa, Maharashtra and Andhra Pradesh have rich deposits of Gondwana coal.

In the north-eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland, tertiary coal is found.

In Tamil Nadu, lignite deposits are found.

The three major forms of coal are anthracite, bituminous and lignite.

Anthracite is the highest quality coal with more than 80 percent carbon content and very low moisture content. It is hard, compact and deep-black in colour. It is found in the Jharia coalfields of Jharkhand in small quantities. Bituminous is the most widely used coal. High grade bituminous coal is used in metallurgical industries, especially for melting iron in blast furnaces. So it is also known as metallurgical coal. Bituminous coal contains 60 to 80 percent carbon, low moisture, and has high heating capacity. It is formed when coal has been buried deep and subjected to increased temperatures. It is found in large quantities in Jharia coalfield of Jharkhand and Raniganj coalfields of West Bengal.

Lignite contains about 60 percent carbon and has high moisture content. It is low grade brown coal which is soft and has low heating capacity. It is used in thermal power stations. Principal reserves are found in Neyveli in Tamil Nadu.

Q.2. Explain four points of distinction between conventional and non-conventional sources of energy. [2008]

Ans. Conventional Sources of Energy

- (i) This sources of energy is used for quite a **long time**.
- (ii) It's use is **expensive** in the long run.
- (iii) It is now **extensively** used.
- (iv) Coal, petroleum Natural gas etc, are mostly **fund** energy sources.

Non-Conventional sources of Energy

- (i) It is **recently** used as a source of energy.
- (ii) It's use is **cheaper** in the long run.
- (iii) It is used in a **limited** manner.
- (iv) Wind, solar, Tidal, Biogas etc are **Flow** energy sources.

Q.3. Classify resources into two groups on the basis of exhaustibility. Mention three characteristics of each. (2009)

Ans. Renewable Resources

- (i) It's flow is **unlimited**
- (ii) It is **environment friendly**
- (iii) It's initial installation cost is high but **economic** in the long run.

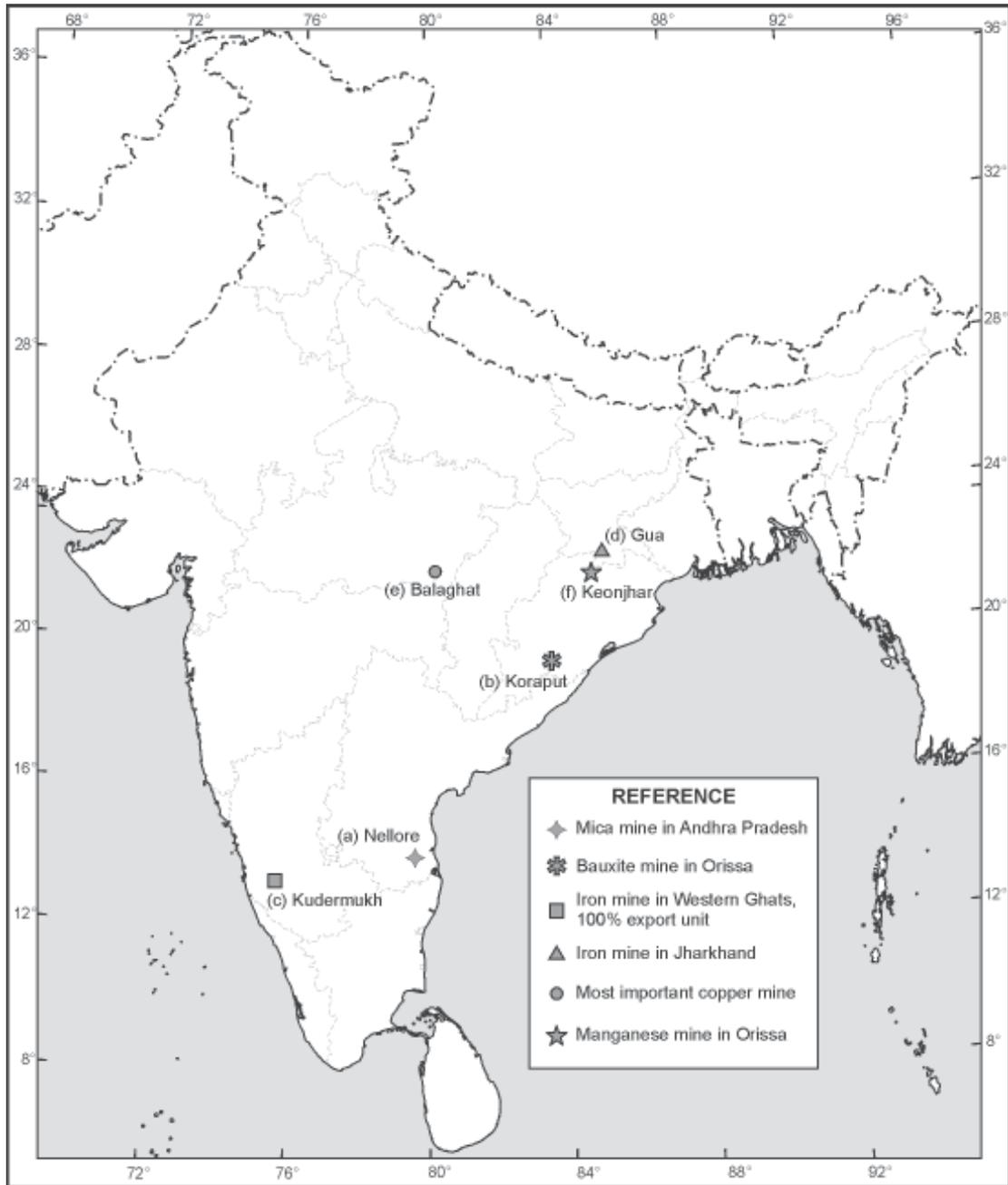
Non-renewable Resources

- It's supply is **limited**.
- It is **not environment friendly** causes many enviromental problems.
- It's installation cost is compartively low but **expensive** in the long run.

E. MAP WORK (4 MARKS)

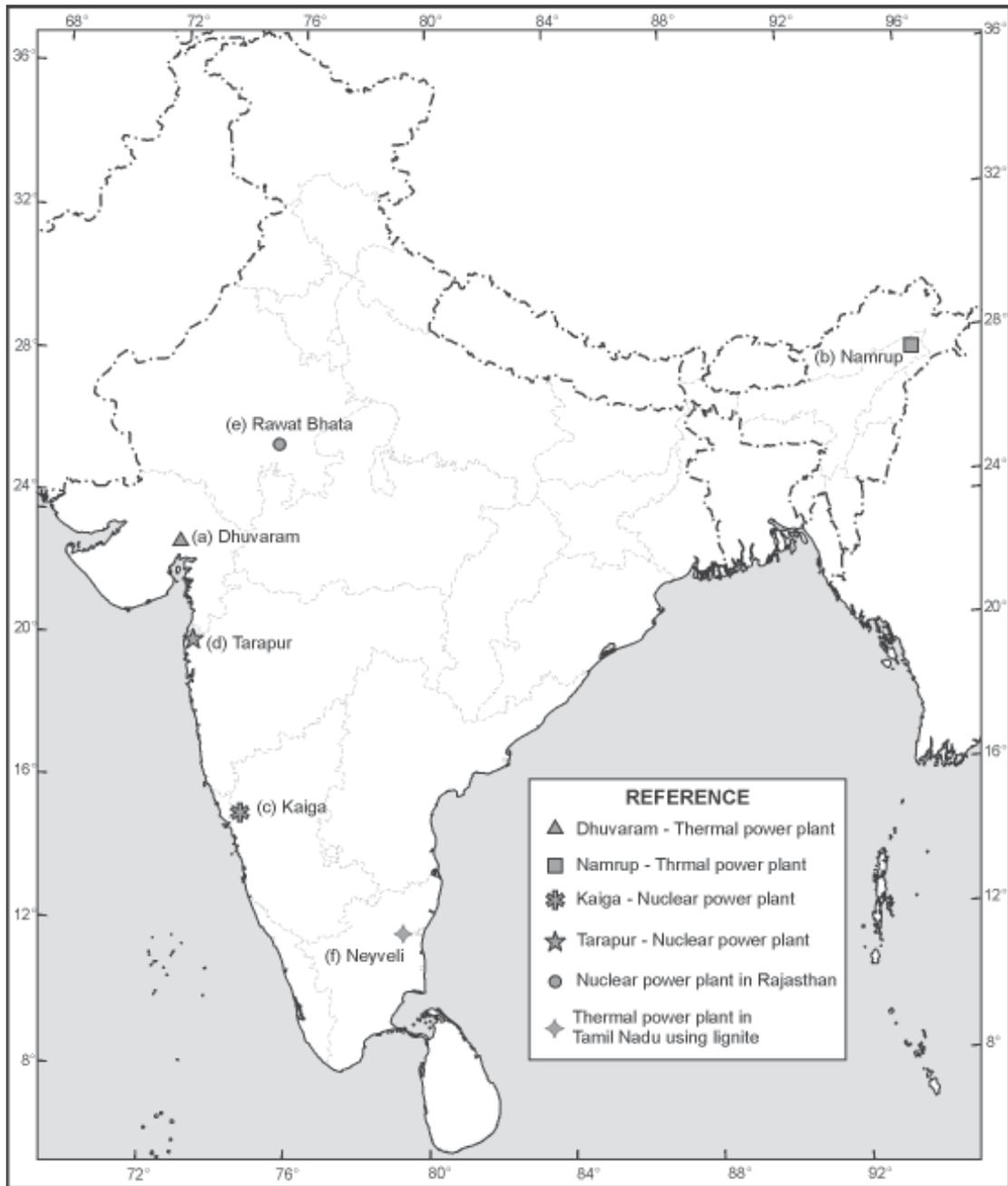
Q.1. On an outline map of India mark and label the following :

- (a) Mica mine in Andhra Pradesh.
- (b) Bauxite mine in Orissa.
- (c) An iron ore mine in Western Ghats which is 100 percent export unit.
- (d) An iron ore mine in Jharkhand.
- (e) Most important copper mine.
- (f) A manganese mine in Orissa.



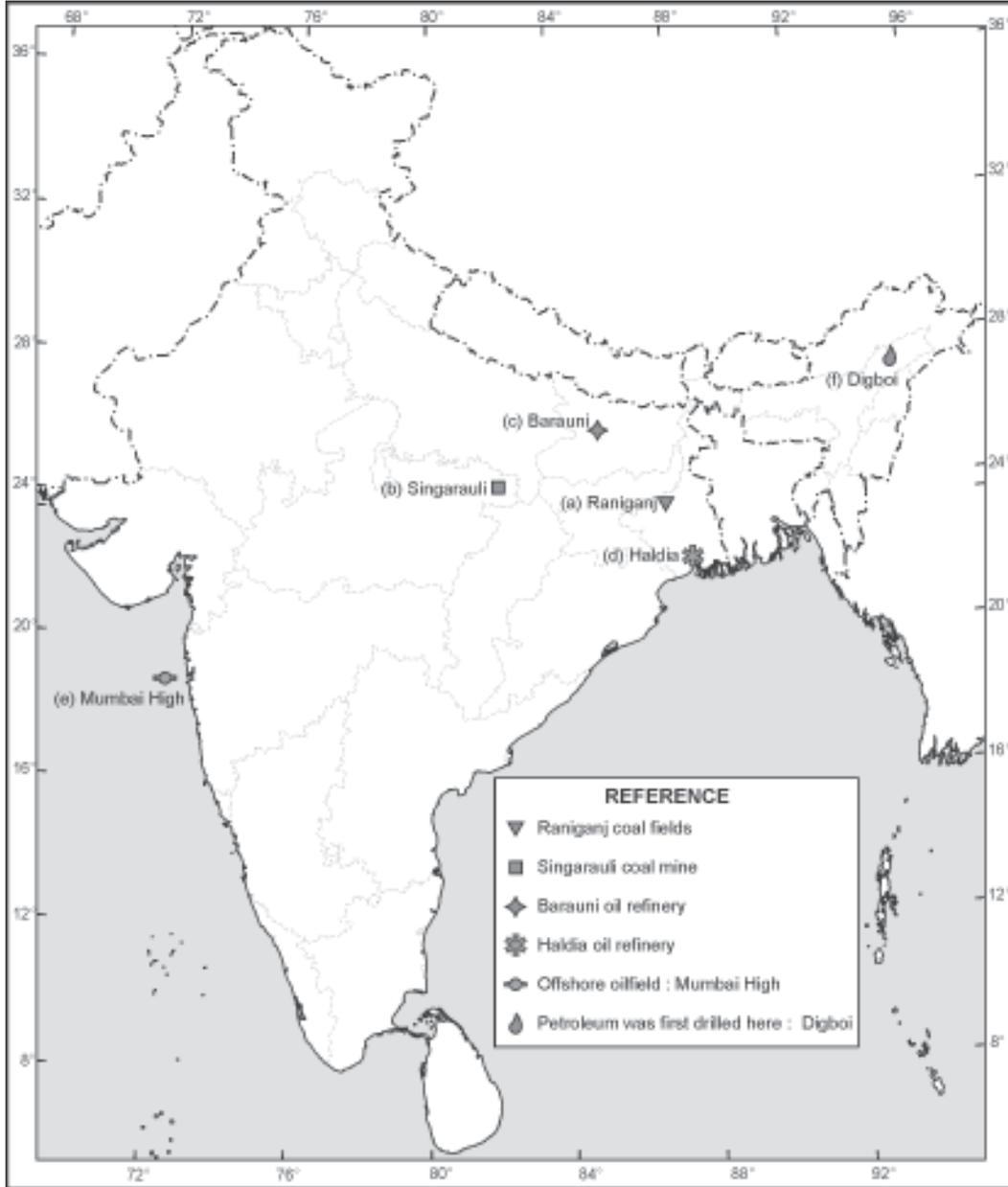
Q.2. On an outline map of India mark and label the following power plants.

- | | |
|---|------------------------------------|
| (a) Dhuvarm – Thermal power plant. | (b) Namrup – Thermal power plant. |
| (c) Kaiga – Nuclear power plant. | (d) Tarapur – Nuclear power plant. |
| (e) A nuclear power plant in Rajasthan. | |
| (f) A thermal power plant in Tamil Nadu using lignite coal. | |



Q.3. On an outline map of India mark and label the following :

- | | |
|--|---------------------------|
| (a) Raniganj coal fields. | (b) Singarauli coal mine. |
| (c) Barauni oil refinery | (d) Haldia oil refinery |
| (e) An offshore oilfield | |
| (f) Place where petroleum oil was first drilled. | |



II. FORMATIVE ASSESSMENT

A. PROJECT WORK

Q.1. You must have read in newspapers about accidents occurring in mines. Collect newspaper cuttings on the topic.

Find out about the diseases and risks faced by the miners. Suggest measures to prevent mining from becoming a 'killer industry'. Prepare a report on the topic 'Hazards of Mining'.

Q.2. Make a list of items we use everyday. Tick the ones made from minerals. Write down the names of the mineral used for each. Which mineral do we use most often? Also find out the names of minerals included in your health drink, noodles, etc., that you consume. You can find information about this from the chart of nutritional value given at the back of the packs.

Make a chart providing the above information. Fix pictures or labels of packs to supplement your information. You can also display small items made of minerals which you use everyday at your school.

B. ACTIVITIES

Q.1. Where do I belong?

Given below are names of some places with mineral deposits. Match them with the minerals found there.

Khetri mines, Badampahar in Mayurbhanj, Panchpatmali deposits, Jharia, Ratnagiri, Ajmer, Raniganj, Kudremukh mines, Amarkantak plateau, Nellore, Balaghat, Singhbhum, Bilaspur-Katni, Bokaro.

MINERALS	AREAS WITH DEPOSITS
Iron ore	Badampahar in Mayurbhanj, Kudremukh mines, Ratnagiri.
Bauxite	Bilaspur-Katni, Amarkantak plateau, Panchpatmali deposits.
Copper	Khetri mines, Balaghat, Singhbhum.
Mica	Ajmer, Nellore.
Coal	Raniganj, Jharia, Bokaro.

Q.2. Find the group leader.

Classify the given minerals under their respective types.

Sulphur, Coal, Copper, Iron ore, Lead, Petroleum, Thorium, Salt, Potash, Manganese, Mica, Bauxite, Gold, Nickel, Tin, Limestone, Cobalt, Uranium.

MINERALS			
METALLIC		NON - METALLIC	ENERGY MINERALS
FERROUS	NON - FERROUS		
Iron ore, Nickel, Manganese, Cobalt	Bauxite, Copper, Lead, Tin, Gold	Sulphur, Limestone, Salt, Potash, Mica	Petroleum, Thorium, Coal, Uranium.

C. ASSIGNMENTS

Q.1. Power Game

Given below are names of some electricity generating power plants. Place them under their respective categories.

Trombay, Tarapur, Talcher, Narora, Damodar Valley Corporation, Loktak, Rawat Bhata, Hirakud, Kakrapara, Koyna, Kaiga, Korba, Kalpakkam, Mettur, Neyveli, Durgapur, Delhi, Singrauli, Barauni, Bhakra Nangal.

HYDRO-ELECTRICITY	THERMAL POWER	NUCLEAR POWER
Damodar Valley Corporation, Bhakra Nangal, Mettur	Talcher, Barauni, Singrauli, Loktak, Korba, Durgapur, Neyveli,	Kaiga, Kakrapara, Tarapur, Narora, Kalpakkam, Rawat Bhata

Q.2. Observe the picture given on the next page and answer the following questions.

- (a) What does the picture depict?
- (b) What form of energy source is it?
- (c) What materials are used in this plant?
- (d) What are they also known as in rural India?
- (e) What are the twin benefits to the farmers from these plants?



D. QUIZZES

Q.1. Word Jumble.

- (a) MIRUHOT _____ (The Monazite sands of Kerala are rich in this)
- (b) RUPHADAM _____ (Largest solar plant of India is located here)
- (c) LRGANOCIA _____ (Well known for effective use of wind energy)
- (d) RNMKAAIN _____ (Geothermal energy project is located here)
- (e) NLEWAAHKSRA _____ (Most important oilfield of Gujarat)

Ans. (a) THORIUM (b) MADHAPUR (c) NAGARCOIL (d) MANIKARN

Q.2. Solve the puzzle by following your search horizontally and vertically to find the hidden answers.

- (a) Mineral found in 'placer deposit'.
- (b) A mineral mined in Jowai and Cherrapunji by 'rat-hole' mining.
- (c) Highest quality hard coal.
- (d) Most important industrial iron ore.
- (e) Raw material for cement industry.
- (f) A malleable, ductile mineral used in electrical cables and electronics.
- (g) Metallic mineral obtained from veins and lodes.
- (h) Mineral derived from ocean water.
- (i) Mineral mined in Gua and Noamundi.
- (j) An iron exporting port.

A	N	T	H	R	A	C	I	T	E
B	R	O	M	I	N	E	R	X	Y
A	C	O	A	L	B	Z	O	C	Z
D	J	G	N	H	I	K	N	O	I
E	L	F	G	O	L	D	M	Q	N
H	E	M	A	T	I	T	E	P	C
Z	Y	T	L	R	S	W	X	D	L
A	B	C	O	P	P	E	R	F	I
K	O	U	R	V	M	P	S	J	T
L	I	M	E	S	T	O	N	E	B