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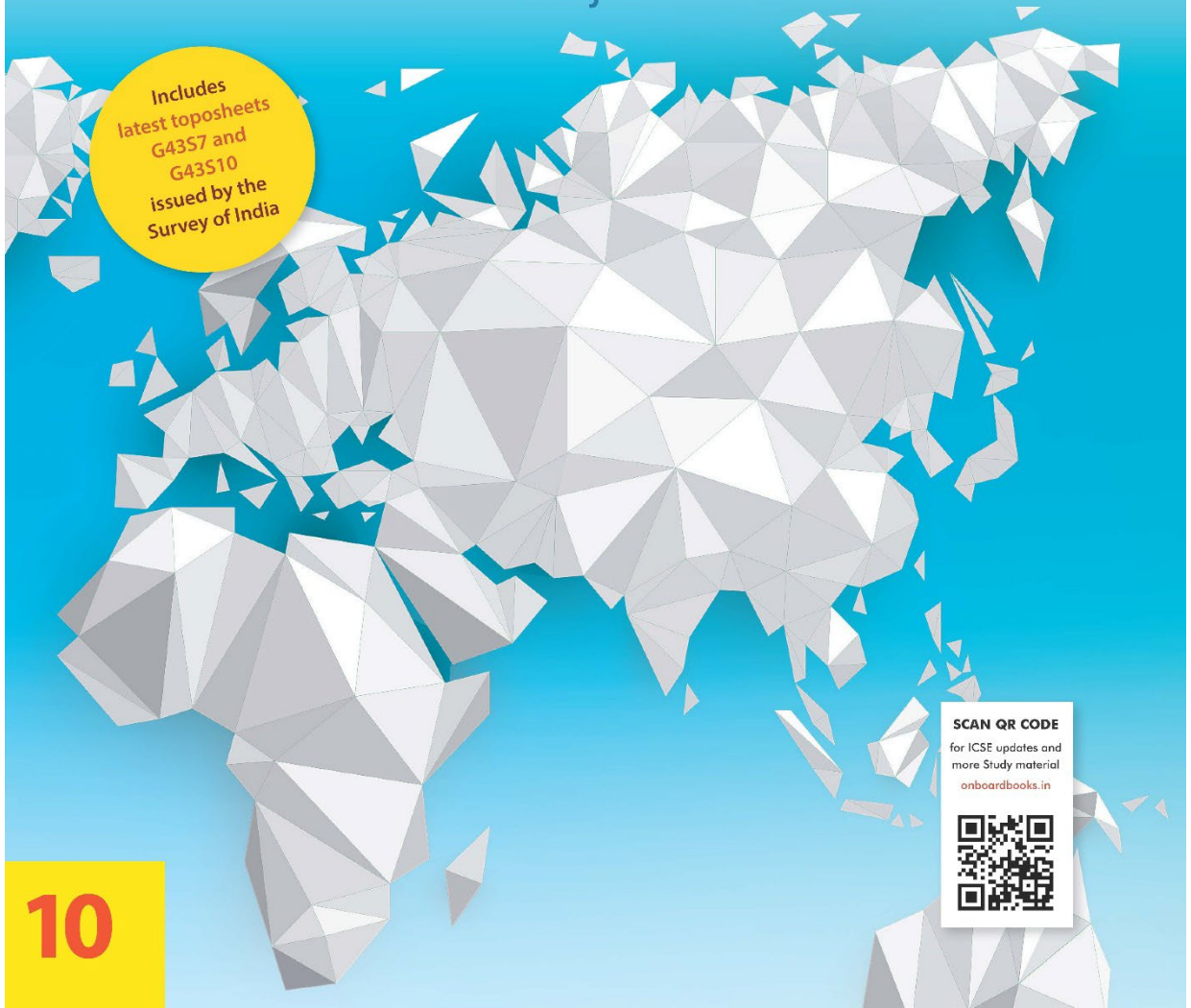
Revised and Updated

ICSE GEOGRAPHY

Based on the latest ICSE syllabus

R K JAIN



Includes latest toposheets G43S7 and G43S10 issued by the Survey of India

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CONTENTS

ICSE GEOGRAPHY

Class 10

Chapter 11: India-Energy Resources (Conventional)

The conventional sources of energy are coal, petroleum, natural gas and electricity.

COAL

Coal, a mineral fuel, is the main source of energy in India. In the 18th century, coal was used to produce steam, thus became the basis for **Industrial Revolution** in Europe. Coal is an organic substance, which is found in the sedimentary rocks.

TYPES OF COAL

Most of the coal deposits in India are about 300 million years old. Depending upon the percentage of carbon content, there are four types of coal, namely, **peat**, **lignite**, **bituminous** and **anthracite**.

Peat

Lignite

Bituminous

Anthracite

Peat represents the first stage of coal formation. The carbon content in peat is less than 40 per cent. It has high percentage of moisture and burns like **wood**. It gives more smoke and less heat. It leaves behind a large amount of ash after burning.

Bituminous is hard and compact variety of coal. The carbon content varies from about 60 to 80 per cent. The moisture and volatile content are also less. It is widely used in the making of **coke**, which is used in iron and steel industry.

Lignite is soft, but more compact than peat. The carbon content varies from 40 to 60 per cent. Lignite has large percentage of moisture. Its value has increased due to its use in **thermal power plants**.

Anthracite is the hardest and the best quality of coal with more than 80 per cent of carbon. It has the highest heating capacity. It burns for a long time and leaves behind little or no ash.

The **coalfields** in India are classified into the following two groups.

The Gondwana Coalfields are about 250 million years old. The coal is free from moisture. Most of the metallurgical coal is found in these coalfields. The Gondwana coalfields constitute 95 per cent of total reserves and 98 per cent of total coal production in India.

The Tertiary Coalfields are about 50 million years old. The coal has low carbon content and high percentage of sulphur and moisture.

COAL RESERVES IN INDIA

The total coal reserves in India have been estimated at about 326.496 billion tonnes. The distribution is highly uneven. Four states, **Jharkhand**, **Odisha**, **Chhattisgarh** and **West Bengal**, have more than 80 per cent of total reserves in India.

COAL PRODUCTION IN INDIA

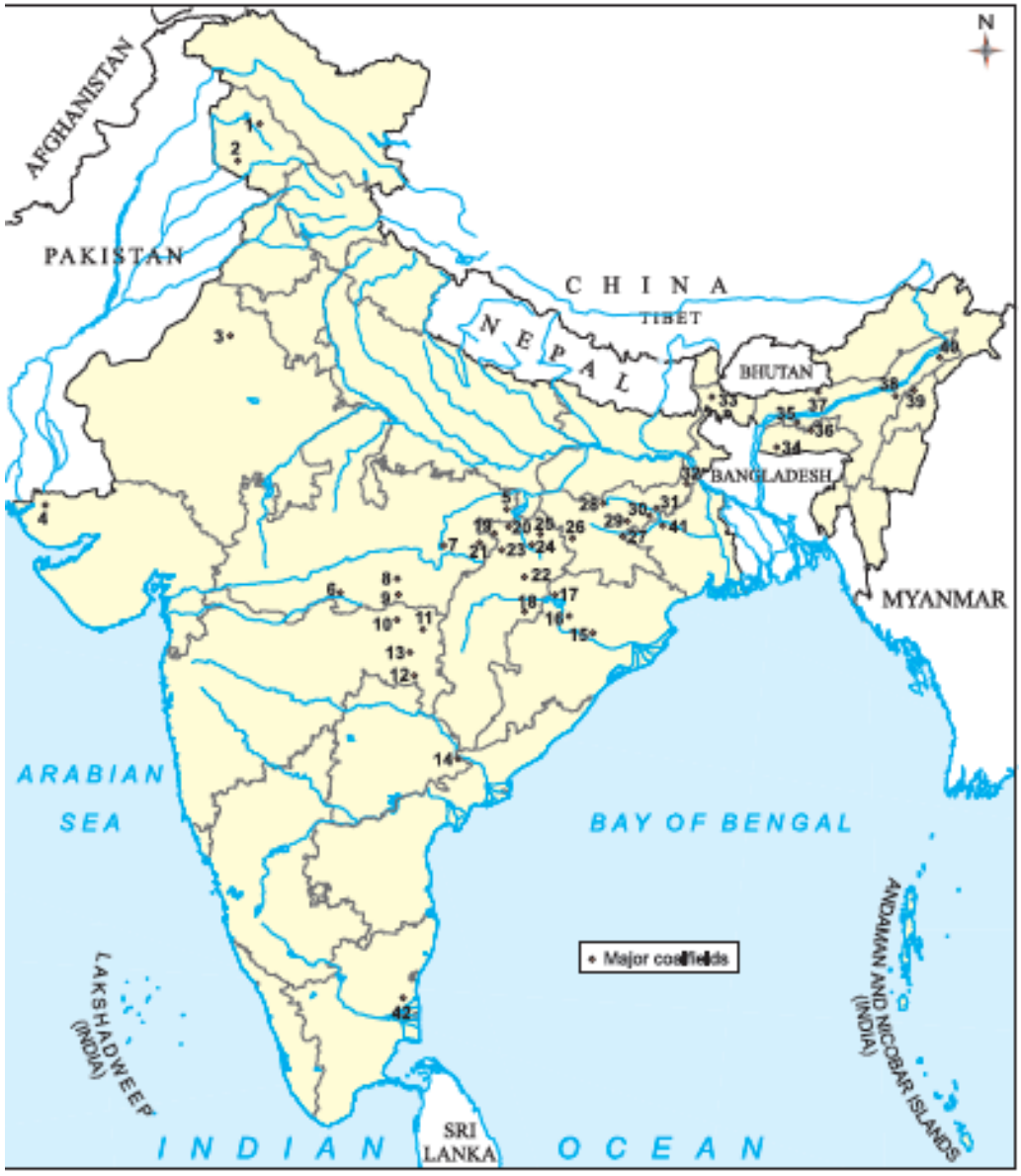
The first coal mine in India was opened in 1774 at **Raniganj** in West Bengal, but the actual coal mining began in 1814. The total production of coal has increased from about 120 million tonnes in 1980–81 to more than 728 million tonnes in 2018–19.

DISTRIBUTION OF COAL IN INDIA

About 90 per cent of the total coal in India is found in the northeastern part of Deccan Peninsula. This region includes Jharkhand, Odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Telangana, Andhra Pradesh, Maharashtra, etc.

PROBLEMS OF COAL MINING IN INDIA

- Most of the coal deposits occur in the northeastern part of the Indian peninsula. Other parts of the country either have no coal deposits or limited reserves of poor quality coal. Coal distribution is highly uneven throughout India.



India – Distribution of major coalfields

- Coal has to bear very high cost of transportation from the mines to the consuming centres.
- Much of the Indian coal is of non-coking grade. This is unsuitable for metallurgical industries. The Gondwana coal has high ash content, while the Tertiary coal has high sulphur content.

Coal mining in India

CONSERVATION OF COAL IN INDIA

Coal is a **non-renewable** energy resource. It needs proper and judicious exploitation. India has been wasting large quantities of good quality coal by burning it for transport and industrial uses. We must conserve the coal resources.

PETROLEUM

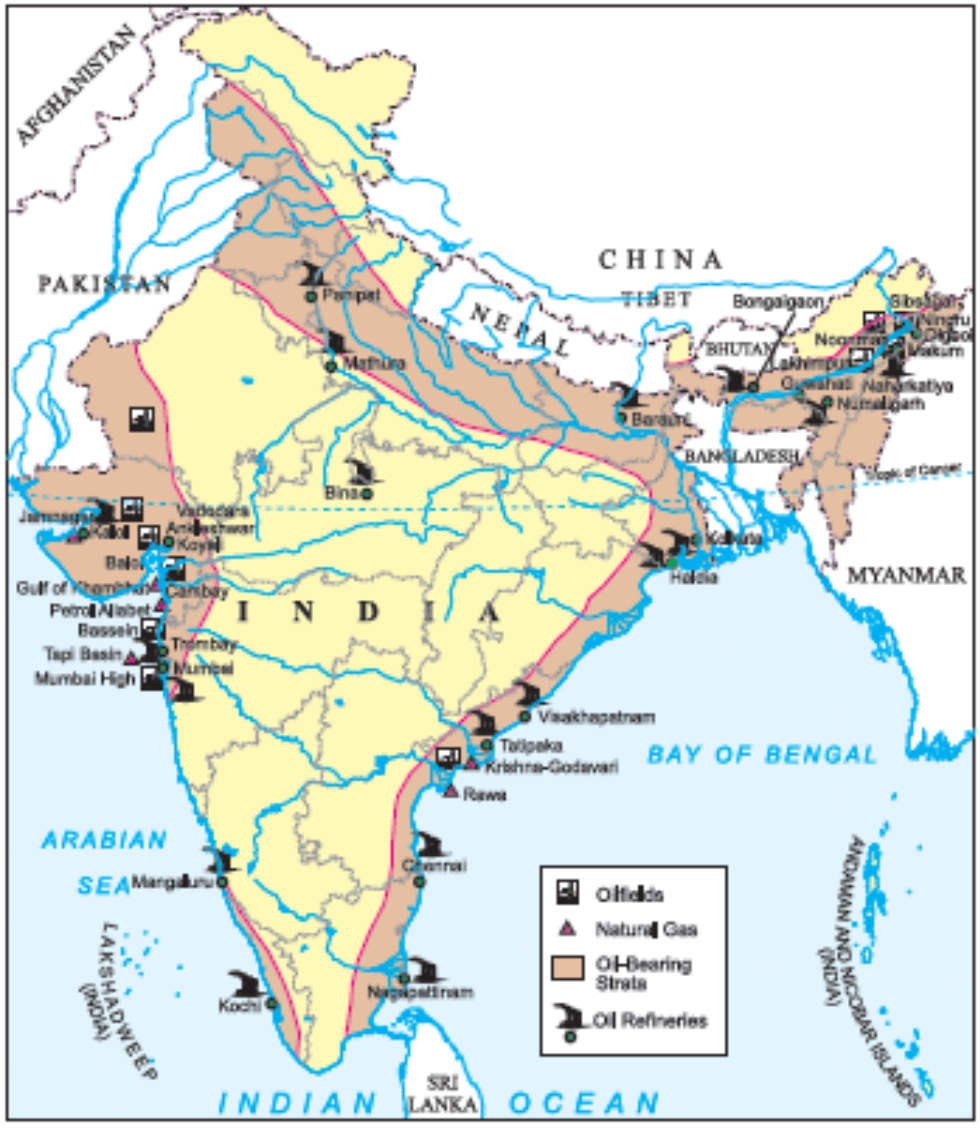
The word **petroleum** has been derived from Latin words, **Petro** (meaning rock) and **oleum** (meaning oil). Thus, petroleum is the oil obtained from rocks and is also called the **mineral oil**. Mineral oil is found in the underground reservoirs associated with sedimentary rocks.

ORIGIN AND OCCURRENCE OF PETROLEUM

The crude petroleum deposits are found only in the sedimentary rock basins of marine origin. But all sedimentary rocks do not contain mineral oil. Petroleum has an organic origin and is formed by the gradual decay and compression of various marine deposits. They remained buried for millions of years and the decomposition of the organic matter led to the formation of mineral oil.

RESERVES OF PETROLEUM IN INDIA

About 40 per cent of India has sedimentary rocks. These are in (i) the Ganga-Brahmaputra basin, (ii) the coastal strip along the continental shelf, (iii) the Thar desert, and (iv) the Andaman and Nicobar islands.



India – Petroleum resources and major oil refineries

PRODUCTION OF PETROLEUM IN INDIA

In India, petroleum was discovered in 1860, when Assam Railway was laying the railway track. Petroleum was struck at **Makum** in 1867, and another discovery was at Digboi in 1889.

Until 1953, **Digboi** area was the only petroleum producing region in India. The production in **Naharkatiya** region started in 1954.
The situation remained so till **Mumbai High** started the production on a large scale.
Up to 2010, about two-thirds of crude petroleum production came from offshore sources. The crude oil production from **Rajasthan** increased the onshore production. The main onshore producing states are **Rajasthan**, **Gujarat** and **Assam**. Other states with small production are Andhra Pradesh, Tamil Nadu and Arunachal Pradesh.

PETROLEUM PRODUCING AREAS IN INDIA

The main petroleum producing areas in India are

1. the Brahmaputra valley,
2. the Gujarat coast in western India,
3. Barmer district in Rajasthan, and
4. Offshore region.

Mumbai High

IMPORT OF PETROLEUM

India is not self-sufficient in respect of crude oil and has to import huge quantities from abroad. At present, India has to import about 55 per cent of its needs of petroleum and its products. The imports are mainly from Iraq, Saudi Arabia, Iran, UAE, Venezuela, Nigeria, Kuwait, Mexico, USA and Angola.

FUTURE PROSPECTS

Efforts are being made by the Oil and Natural Gas Commission and many other private agencies to conduct extensive surveys in the belt of sedimentary rocks. Some of the regions, where there is a greater possibility for the occurrence of petroleum and natural gas are as follows:

- Gulf of Mannar, off the Tirunelvelli coast
- Offshore area between Pt. Calimere and Karaikudi coast
- Offshore area in the Bay of Bengal between 12°–16° N and 84°–86° E.
- The marine delta regions of Mahanadi, Godavari, Krishna and Kaveri rivers
- Offshore area between South Bengal and Baleshwar coast

OIL REFINERIES

The crude petroleum has to be refined in oil refineries. The crude petroleum yields various products, such as **petrol**, **diesel**, **kerosene**, **oil**, **bitumen**, **lubricants**, **aviation fuel**, **wax**, etc. The first oil refinery was set-up at Digboi (Assam) in 1901, with a capacity 2 lakh tonnes per year.

NATURAL GAS

Natural gas is generally associated with petroleum fields. The oil is lighter than water, thus it collects above the surface of water. Gas is still lighter and thus occurs above oil. Thus, on drilling an oil well, one finds natural gas followed by oil, although gas is not always an indication of an oil reservoir.

Natural gas is fast becoming an important source of energy in our country. India produced about 32057 million metric standard cubic metres of gas per day in 2018–19. Most of it came from **Assam**, **Tripura, Gujarat**, **Rajasthan** and **Tamil Nadu**.

CONSERVATION OF PETROLEUM PRODUCTS

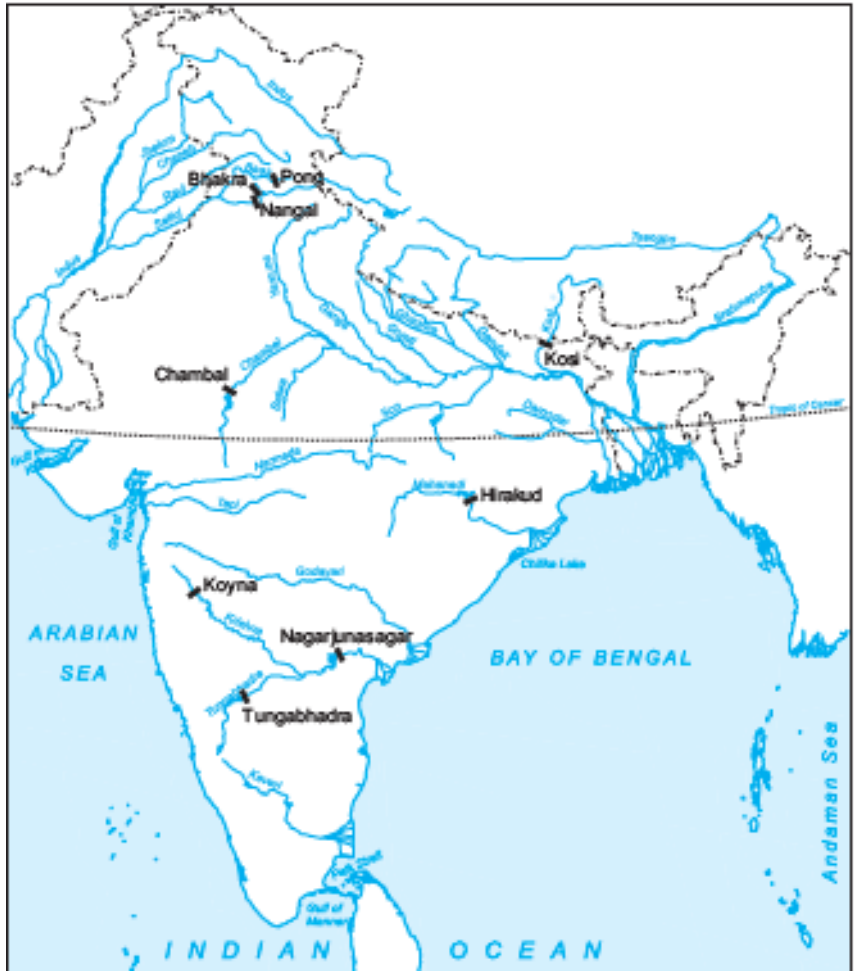
India is fast becoming an important producer, consumer and importer of petroleum products. At the current rate of consumption, our known oil reserves will last only for about 40 to 50 years. This calls for an urgent need to conserve petroleum products.

The **bulk consumers** are transport, industry, household and agriculture sectors. The transport sector is the largest consumer and road transport alone accounts for more than one-third of the total oil consumption in India.

HYDEL POWER

Electricity plays an important role in the progress and prosperity of any country. Availability of enough electricity means unrestricted growth of industries, transport and agriculture, which means freedom from hunger and poverty.

The future of India depends on our ability to produce and use hydroelectricity. The other two sources of energy, coal and petroleum, are exhaustible and will not be available to us in future. At present hydro-electricity accounts for about 16 per cent of the total installed capacity.



India – Hydel power stations

BHAKRA NANGAL PROJECT

It is the largest project in India and is named after two dams built at Bhakra and Nangal on the Satluj river. It is a joint venture of Punjab, Haryana and Rajasthan states. This project has

1. two dams at Bhakra and Nangal,
2. Nangal Hydel Channel,
3. Power houses,
4. Electric transmission lines, and
5. Bhakra canal system for irrigation.

Bhakra dam on Satluj river

Bhakra dam is one of the highest straight gravity dam in the world. Bhakra dam is built across a gorge on Satluj river near Rupnagar. The dam is 226 metres high and 518 metres long. It has developed a huge reservoir at its back, called **Gobind Sagar**.

THE HIRAKUD DAM PROJECT

The Hirakud dam, about 61 metres high and about 4800 metres long, is one of the longest dams in the world. This dam has been built across **Mahanadi river** at Hirakud, about 15 km upstream off the city of Sambalpur in Odisha. The reservoir at the back of the dam has a capacity of about 8000 million cubic metres over an area of 630 sq km.


Hirakud dam on Mahanadi river

THANK YOU