

Chapter 5

Coal and Petroleum

Natural Resources

- The resources that are obtained from nature are called natural resources. For example, sunlight, air, water, minerals, and soil.
- Natural resources are broadly classified into two kinds on the basis of their availability in nature.

(a) Inexhaustible Natural Resources:

The resources that are present in unlimited quantity in nature and cannot be exhausted by human activities are called inexhaustible natural resources. For example, sunlight and air.

(b) Exhaustible Natural Resources:

The resources that are present in limited quantity in nature and can be exhausted by human activities are called exhaustible natural resources. For example, Forests, wildlife, minerals, coal, petroleum, natural gas, etc.

- Fossil fuels are the exhaustible resources that are formed from the decomposition of dead organic matter. These were formed from the dead remains of living organisms. Eg: Coal, Natural gas
- A fuel is any substance that reacts with other substances so as to release large amounts of energy in the form of heat and light. For example, coal and petroleum are fuels.
- Coal, petroleum, and natural gas are fossil fuels that are formed under the earth's crust by the decomposition of dead plant and animal remain

Coal

- Coal is a fossil fuel, that was formed by the decay of vegetation, which existed millions of years ago.



- Coal is a non-crystalline form of carbon.
- Coal is a black-colored fossil fuel, which is extracted from the ground and is used as a fuel for different purposes.
- Coal mining is the process of extracting coal from the ground.



- Over millions of years, coal is formed through different biological and geological processes on dead and decaying plant matter.

⇒ The slow process of conversion of dead vegetation into coal is called Carbonisation.

◆ Coke:

Coke is the purest form of carbon, which is used as a fuel. It is harder and denser than charcoal. It is obtained by heating soft coal in the absence or little supply of air. It is black in color. It is used in the manufacturing of steel and in the extraction of many metals. It is a tough, porous, and the purest form of carbon.

◆ Coal Tar:

Coal Tar is a black thick liquid that has an unpleasant odor. It is used to manufacture certain materials like; drugs, dyes, plastics, perfumes, paints,

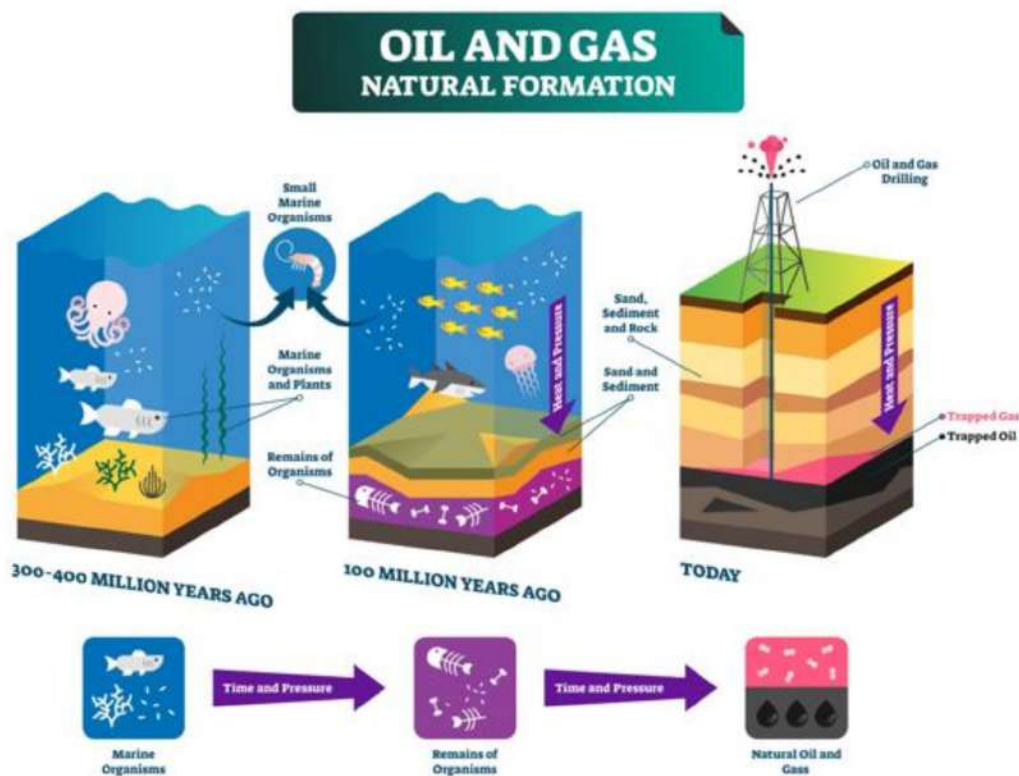
naphthalene balls, etc. Earlier, coal tar is used for metalling roads but nowadays, is used which is a petroleum product.

◆ Coal Gas:

Coal Gas is a by-product, that is obtained during the processing of coal to form coke, and is used as a fuel in many industries. It is mainly used as a heat source and not as a light source.

Petroleum

- Petroleum (also known as crude oil) is a fossil fuel formed from the remains of ancient marine organisms.
- It is mined from the rocks under the Earth.
- Petroleum was formed from organisms living in the sea. As these organisms died, their bodies settled at the bottom of the sea and got covered with layers of sand and clay. Over millions of years, the absence of air, high temperature and high pressure.



- It is a dark oily liquid with an unpleasant odour.
- It is a source of petrol and diesel. It is a mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax etc.

◆ Refining of Petroleum:

- Petroleum is an exhaustible natural resource that is formed from the living organisms that live in the sea.
- It is a mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax, etc which are separated by the process call refining.
- The refining is carried out in the petroleum refinery.



- The list of various constituents of petroleum and their uses are mentioned in the table given below:

Constituents of Petroleum	Uses
Liquid Petroleum Gas (LPG)	a. Fuel for home b. Fuel for industry
Petrol	a. Aviation fuel b. Motor fuel c. Solvent for dry cleaning
Diesel	a. Fuel for heavy motor vehicles b. Fuel for electric generators
Paraffin wax	a. Making of ointments, candles, Vaseline etc.
Bitumen	a. Making of paints b. In road surfacing
Lubricating oil	a. For lubrication
Kerosene	a. Fuel for stoves, lamps. b. Fuel for jet aircrafts

⇒ Useful substances are obtained from petroleum and natural gas are termed petrochemicals.

⇒ These are used in the manufacture of detergents, synthetic fibres (such as polyester, nylon, acrylic etc.), polythene and other man-made plastics.

⇒ Hydrogen gas is the production of fertilisers that is obtained from natural gas.

⇒ Petroleum is called 'black gold' because it has great commercial importance.

Natural Gas

- Natural gas is a mixture of hydrocarbon gas that is stored at high pressure.
- Its main component is methane but it may also contain varying amounts of other higher alkanes (a group of elements).
- Gases like carbon dioxide, helium, nitrogen, and hydrogen sulphide are also found in natural gas in small percentages.

◆ Compressed Natural Gas (CNG):

Compressed Natural Gas (CNG) is the natural gas stored under high pressure. CNG is used as:

- (i) It is used for power generation.
- (ii) Cleaner fuel for transport vehicles (less polluting than petrol and diesel)
- (iii) Fuel is supplied through pipes in homes and industries.
- (iv) CNG pipeline network already exists in Vadodara in Gujarat, some parts of Delhi and some other places.



Question: Why is Natural Gas important as a fossil fuel ?

Answer: Natural gas is considered important as this fossil fuel can easily be transported through pipes. It is stored as CNG that is used as fuel and is also used as a starting material for manufacturing many chemicals and fertilisers. Natural Gas does not cause pollution and has high calorific value.

Why has CNG been considered a cleaner fuel?

- Natural gas is cleaner than coal so, it is considered a better fuel than coal.
- Natural gas emits 50% less carbon dioxide, sulphur and nitrogen oxides in the air.
- However, it is not the best solution as there are better sources of energy present nowadays like solar energy.

Some Natural Resources are Limited

- Fossil fuels, such as coal, petroleum, and natural gas cannot be created in the laboratory. So, it is not possible to create the natural conditions under which they are formed as it takes thousands of years for them to be formed. That is why some natural resources are limited.

- The burning of fossil fuels releases certain poisonous gases (like carbon monoxide, sulphur dioxide) along with the release of unburnt carbon particles in the air.

- This causes an increase in the temperature of the earth, which results in global warming.

- So, we should use them judiciously. One should follow the following advises by Petroleum Conservation Research Association (PCRA) to save petrol or diesel while driving. These are:

⇒ Drive at a constant and moderate speed as far as possible.

⇒ Switch off the engine at traffic lights or at a place where you have to wait.

⇒ Ensure correct tyre pressure,

⇒ Take care of the regular maintenance of the vehicle.