Education that enlightens!

Coal and Petroleum

Classification of Natural Resources

Natural resources can be classified into two types:

- **Inexhaustible Natural Resources**: The resources which are present in unlimited quantity in nature and are not likely to be exhausted by human activities are called inexhaustible natural resources.
  Examples: Sunlight, air
- **Exhaustible Natural Resources:** The resources which are present in a limited quantity in nature and can be exhausted by human activities are called exhaustible natural resources.
  Examples: Forests, wildlife, minerals, coal, petroleum

Fossil fuels: The natural fuels formed from the remains of living organisms buried under the Earth long, long ago are called fossil fuels.

Coal

- Coal is a hard, black, combustible mineral which consists mainly of carbon.
- It is found in deep coal mines under the surface of the Earth.

Formation of Coal

- Coal was formed by the decomposition of large land plants and trees buried under the Earth about 300 million years ago.
- About 300 million years ago, the Earth had dense forests in the low-lying wet areas.
- Due to natural calamities such as earthquakes, volcanoes and floods, these forests were buried under the surface of the Earth.
- As more soil got deposited on them, they were compressed.
- As a result, the temperature also rose as they sank deeper and deeper.
- Due to high pressure and temperature and the absence of air, the wood of the buried forest plants and trees slowly got converted into coal.
- The slow process by which the dead plants buried under the Earth have become coal is called carbonization.
- Because coal was formed from the remains of the plants, it is called a fossil fuel.
- On heating, coal, which is mainly carbon, produces carbon dioxide gas and a lot of heat energy.
  $C + O_2 \rightarrow CO_2 + \text{Heat}$

Uses of Coal

- As a fuel in homes and industries.
- As a fuel in thermal power plants to generate electricity.
- Earlier, it was used in railway engines to produce steam to run the engine.

Products of Coal

The coal obtained is processed in the industry to obtain useful products such as coke, coal tar and coal gas.

Coke

- It is a tough, porous and black substance.
- It is an almost pure form of carbon.
- It is used in the manufacture of steel and in the extraction of metals.

Coal Tar

- It is a black liquid with an unpleasant smell.
- It is a mixture of approximately 200 substances.
- The products of coal are used to make synthetic fibres, drugs, plastics, synthetic dyes, perfumes, paints, varnishes, pesticides, photographic materials and roofing materials.
- Bitumen, a petroleum product, is used in place of coal tar for metalling roads.

Coal Gas

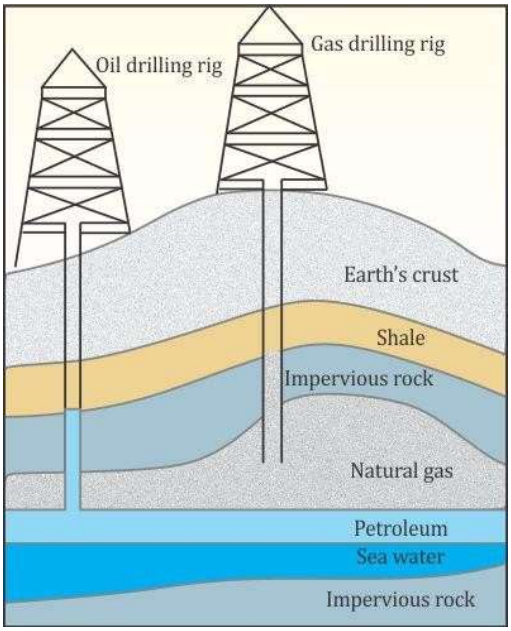
- Coal gas is obtained during the processing of coal to get coke.
- It is used as a fuel in many industries situated near coal processing plants.

Petroleum

- It is a dark-colored, thick crude oil found deep below the ground in certain areas.
- Petroleum means rock oil (petra = rock, oleum = oil).
- Just like coal, petroleum is also a fossil fuel.

Formation of Petroleum

- 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.
- Due to high pressure, heat, action of bacteria and the absence of air, the dead remains of the tiny plants and animals were slowly converted into petroleum.
- The petroleum thus formed got trapped between two layers of impervious rocks, forming an oil deposit.



Refining of Petroleum

- Petroleum is a mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil and paraffin wax.
- The process of separating the various constituents/fractions of petroleum is known as refining.
- Refining is carried out in a petroleum refinery.

Constituents of Petroleum and their Uses

Constituents of Petroleum	Uses
Liquid Petroleum Gas	Fuel for home and industry
Petrol	Motor and aviation fuel, solvent for dry cleaning
Kerosene	Fuel for stoves, lamps and jet aircraft
Diesel	Fuel for heavy motor vehicles, electric generators
Lubricating oil	Lubrication
Paraffin wax	Making ointments, candles, *Vaseline*
Bitumen	In paints and road surfacing

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Natural Gas

- Natural gas mainly consists of methane with small quantities of ethane and propane.
- When natural gas is compressed by applying pressure, it is called compressed natural gas (CNG).
- It is a very important fossil fuel because it is easy to transport through pipes.
- It is a clean fuel.

Uses

- CNG is used for power generation.
- It is used as a fuel for transport vehicles because it is less polluting.
- It is used directly for burning in homes and factories through a network of underground pipes.
- It is also used as a starting material for the manufacture of several chemicals and fertilisers.

Conservation of Natural Resources

- The amount of coal, petroleum and natural gas present in the Earth is limited.
- The burning of fossil fuels is a major source of air pollution and is also linked to global warming.
- So, we should use fossil fuels only when necessary. This will result in a better environment, lesser risk of global warming and fossil fuel availability for a longer period of time.
- Tips from the Petroleum Conservation Research Association to save petrol/diesel:
  - Drive at constant and moderate speed as far as possible
  - Turn off the engine at traffic signals or at places where one has to wait
  - Ensure correct tyre pressure
  - Ensure regular maintenance of vehicles