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INTRODUCTION

About lacs of years ago coal was generated in the earth. Due to natural processes like flooding, storm etc. forest got buried under the soil. Due to more soil deposition and high temperature and pressure, these dead forests (plants) got slowly converted to coal. Petroleum was also generated in the earth crust. Petroleum is found in deeper layers of earth and in seas. Coal and petroleum are basic requirements of human. Their consumption is increasing day by day. Coal mines are found deeper in the earth. Many wells of oil and petrol are found in the earth. On the earth some substances are man made where as some are naturally occurring. Human activities are based on these man made and natural resources.

Air, soil, water and minerals are some natural resources found, on the earth. On the basis of the availability of various resources in nature natural resources are broadly classified into categories :

1. Inexhaustible Natural Resources

By inexhaustible natural resources, we mean such natural resources which are available in unlimited quantity in nature. These resources are supposed to be exhausted never. For example: sunlight and air are available in nature in unlimited quantity. On some part of the earth sunlight is available in small quantity and on some part in large quantity. The time of sunlight on the earth is called day time. Three fourth of the earth surface is covered with water and on the remaining one-fourth part humans, animals, birds, living organisms and natural plants.

2. Exhaustible Natural Resources

The natural resources whose quantity on the earth is limited. They can be exhausted by human activities. For example, forests, wildlife, minerals, coal, petroleum, natural gas etc. are available in the nature in limited quantity so these are called **exhaustible natural resources**. Human consumes

these resources at large scale. He uses coal in trains and domestic purposes. By and by it is being exhausted. Petrol is being used on large scale in vehicles, cars, scooters etc. Various type of animals are found in the forests. Man is decreasing the number of wild animals and aquatic animal by hunting them for his interest. Forests are being cut for residential and commercial purposes. By this pollution is increasing in nature all around. The greenery of forests maintains the balance of climate. Now the quantity of essential gases like oxygen is decreasing in nature due to deforestation.

Eatables, coal, petroleum, natural gas etc. are exhaustible natural resources. Each group may have a different consumption pattern. Scientists are worried about the availability of above exhaustible natural resources in future. If this rate of consumption goes on, what will be the result ? Coal, petroleum and natural gas are obtained from the dead remains of living organisms (i.e., fossils). So these are known as fossil fuels.

- 1. Coal :** About 300 million years ago the earth had dense forests in low lying wetland areas. These forests got buried under the soil due to natural processes such as flooding. By the time more layers of soil deposited over them. Due to sun heat the layer got dried. In the deeper parts of the earth, under high temperature and high pressure the dead remains of plants slowly got converted to coal. Coal is mainly carbon. The slow process of conversion of dead vegetation into coal is called **carbonisation**. Coal is also called a fossil fuel. Coal burns, when heated in air and produces mainly carbon di-oxide gas. By processing coal, many useful products are obtained such as coke, coal tar and coal gas etc.



Uses of Coal : Coal is the most ancient fuel. It has an important position in fuels. Formerly, it was used in rail engines. Steam was produced by coal in the engine. The steam run the engine. It is also used to generate electricity in thermal power plants. Coal is also used as fuel in many industries. Peat, lignite, bituminous, anthracite are the main types of coal. Coal is often called **black diamond**.

- 2. Coke :** It is obtained as residue left behind during the process of destructive distillation of coal. It is black coloured tough, porous substance. It is almost a pure form of carbon. Coke is used in industrial manufacturing of steel and in the extraction of many metals.
- 3. Coal Tar :** It is a blackcoloured, thick liquid with an unpleasant smell. It is a mixture of about 100 substances. The products obtained from coal tar are used as starting materials for manufacturing various substances used in daily life and in industries, such as synthetic dyes, medicines, explosives, perfumes, plastics, paints, photographic materials, roofing materials etc. It is an interesting fact that naphthalene balls used to repel moths and other insects are also obtained from coal tar. Now a days, bitumen a petroleum product is used, for metalling the road, in place of water.



Coal Gas

Coal gas was used for street lighting, in New York around 1820, for the first time. Now a days it is used as a source of heat instead of light. This gas is used as a fuel in many industries, situated near the coal processing plants. It is called coal gas as it is obtained during the process of obtained coke from coal.



Do You Know ?

Petrochemicals are useful substances obtained from petroleum and natural gas that are used in the manufacturing of detergents, polythene, polyester, nylon, etc.

Petroleum

The word petroleum is the combination of petra and oleum. Petra means **rocks** and oleum means **oil**. Petroleum is found in the earth at very deep trapped in between rocks. Petroleum is a mixture of solid, liquid and gaseous hydrocarbons; which also mixed state with water, salts and soil particles.

- 1. Origin of Petroleum :** The origin of petroleum is organisms living in the sea. When these organisms died, their dead bodies settled at the bottom of the sea and got covered with the layers of sand and clay. Over millions of years absence of air, high temperature and high pressure converted the dead organisms into petroleum and natural gas. The deposits of petroleum and natural gas shows that the layer containing petroleum oil and natural gas lies above the water layer. It is due to the reason that oil and gas are lighter than water and do not mix with water. The world's first oil well was drilled in Pennsylvania, America in 1867. Eight years after it, in 1967 in India. The oil was detected at Makum in Assam. In India Assam, Gujarat, Bombay high are the main petroleum areas.
- 2. Refining of Petroleum :** Petroleum is a dark coloured oily liquid. Its smell is very unpleasant which is not tolerable by the human. It is a mixture of petrol, diesel, lubricating oils and paraffin wax. The process of separating the various constituents/fractions of petroleum is known as refining. This process is carried out in a **petroleum refinery**. There are about one dozen petrol refineries for petrol refining in India. Mumbai, Chennai, Mathura, Bareilly, Digboi, Guwahati, Cochin and Vishakhapatnam etc. are main places of petroleum refining. Various constituents /fractions of petroleum and their uses are given in the table ahead.



Various Constituents /Fractions of Petroleum and their Uses

S.No.	Constituents of Petroleum	Uses
1.	Petroleum gas in liquid form (LPG)	Fuel in homes and industries.
2.	Petrol	Motor fuel, aviation fuel, solvent for dry cleaning.
3.	Kerosene	Fuel for stoves, lamps.

4.	Diesel	Fuel for heavy motor vehicles and electronic generators.
5.	Lubricating oil	Lubrication.
6.	Paraffin wax	ointments, candles, vaseline, etc.
7.	Bitumen	Paints and road surfacing.

Natural Gas

Natural gas is an important fossil fuel, because it is easily transported through pipes. Natural gas is stored under high pressure as compressed natural gas (CNG). The main constituent of natural gas is methane and in very small quantity of ethane and propane. Up to 95% of natural gas is methane. Natural gas occurs very deep in the earth between rocks alone or in combined state with petroleum. There are great advantages of CNG.

The network of CNG pipe lines exists in Vadodara Gujarat, some parts of Delhi and in some other parts of the country. In our country natural gas is found in Tripura, Rajasthan, Maharashtra and in delta of Krishna and Godavari.

Use of Natural Gas : The consumption of natural gas is increasing day by day. Some of the uses of natural gas are given below :



1. In home as a fuel.
2. Fuel for transport vehicles.
3. It is used as sterling material, chemical and fertilizer industry.
4. It is used for manufacturing hydrogen gas.

Some natural resources are available in limited quantity : Fossil fuels, forests, minerals etc. are exhaustible natural resources. Petroleum is a fossil fuel. It takes a period of lacs of years for transformation of remains of dead organisms into fuel. On the other hand, available quantities of these is to be exhausted by the end of 100 years. The burning of fuels is one of the main cause of pollution.

Some measures to minimise the consumption of petrol and diesel : In India the Petroleum Conservation Research Association (PCRA) advises people, how to save the petrol or diesel while driving. As far as possible do not keep the vehicle in starting state where ever you have to stop or wait for some time because petrol or diesel is consumed in vain. Ensure correct type of pressure. Switch off the engine at a traffic light or at a place where you have to wait. Drive at a uniform and moderate speed, it would save the unnecessary consumption of fuel. Ensure regular maintenance of the vehicles. If the people will take the precaution while driving then the natural resources will be available for a longer time.

Know the Keywords :

- Inexhaustible natural resources : By inexhaustible natural resources, we mean such natural resources which are available in unlimited quantity in nature.
- Exhaustible natural resources : The natural resources whose quantity on the earth is limited are called exhaustible natural resources.
- Petroleum : Petroleum is a mixture of solid, liquid and gaseous hydro-carbons.

Point to Remember

- Germs which can not seen.
- Sun is a natural resource.
- Fossil fuel is an exhaustible natural resource.
- The fossil fuels were formed from the remains of dead/living organism lacs of years ago.
- Coal, petroleum, LPG etc. are natural resources.
- Coal and petroleum are limited or exhaustible natural resources. We should consume these wisely.
- Petroleum gas, petrol, diesel, kerosene, paraffin wax, lubricating oil etc. are obtained by the refining of petroleum.

EXERCISE TIME

A. Answer the following questions :

1. What is refining of petroleum ? Give the names of any four places where the refining of petroleum is done.
2. Why the fossil fuel are exhaustible natural resources ?
3. "Natural resources are limited". Comment upon it.
4. What measure can be taken to save petrol?
5. Give the names of main types of coal.
6. Write the origin and uses of coal.
7. Describe coke and coal tar in brief.
8. What is natural gas? Give its uses.
9. How coal gas is prepared ? Give the uses of coal gas.
10. Give the names and uses of main constituents/fractions of petroleum.

B. Fill in the blanks :

1. Fossil fuel is _____.
2. Coke and _____ are natural resources.
3. The first oil well was drilled in _____ in America.
4. Petroleum is a dark coloured _____.
5. The minimum pollution producing fuel is _____.

C. Write 'T' for true and 'F' for false statement :

1. Sun is the main source of energy.
2. Coal and methane are fossil fuels.



3. Environment is not polluted in generating electric energy from water energy.
4. Gobar gas is an oxidisable source of energy.
5. Bio gas has very low calorific value.

C. Match the following :

Column 'A'

Column 'B'

- | | |
|---|-----------------------|
| 1. By the carbonisation of solid fuel wood is formed | (i) Petrol |
| 2. A constituent of petroleum which is used in light engine | (ii) setting of curd |
| 3. Waste material of agriculture | (iii) baking of bread |
| 4. The process in which aerobic bacteria convert animal dung into bio gas | (iv) causes cholera |
| 5. A compressed gas, used as fuel in buses | (v) causes Aids |
| 6. A nuclear reaction in which energy is liberated due to breaking of heavy nucleus | (vi) causes Aids |

D. Tick (✓) the correct option :

1. Coal was originated :

(i) 100 years ago	<input type="radio"/>	(ii) 50 years ago	<input type="radio"/>
(iii) 100 crore years ago	<input type="radio"/>	(iv) 300 million years ago	<input type="radio"/>

2. Fossils are :

(i) natural resources	<input type="radio"/>
(ii) resources obtained from living organisms	<input type="radio"/>
(iii) the substance obtained from the remains of dead organisms	<input type="radio"/>
(iv) dead remain's of living organisms	<input type="radio"/>

3. Natural resource is /are :

(i) sun light and air	<input type="radio"/>	(ii) water	<input type="radio"/>
(iii) diesel	<input type="radio"/>	(iv) none of these	<input type="radio"/>

4. When coal is burnt in air we get :

(i) oxygen	<input type="radio"/>	(ii) carbon di-oxide	<input type="radio"/>
(iii) hydrogen	<input type="radio"/>	(iv) nitrogen	<input type="radio"/>