

8th Class Science Chapter- 05 - Coal and Petroleum

Q. What are natural and manmade resources?

Answer: We use various materials for our basic needs. Some of them are found in nature like air, water, soil and minerals are called natural resources. The made by human efforts for our basic needs is man-made resources.

Q. Can we use all our natural resources forever?

Answer: No, This is because some of the natural resources like sunlight and air are present in unlimited quantity in nature and are not likely to be exhausted by human activities. But resources like forests, wildlife, minerals, coal, petroleum, natural gas etc are limited and they can be exhausted by human activities.

Q. Why do we call natural resources like coal, petroleum and natural gas, fossil fuel?

Answer: Natural resources like coal, petroleum and natural gas were formed from the dead remains of living organisms (fossils). So, these are all known as *fossil fuels*.

Q. Lists some uses of coal?

Answer: Coal is used as a fuel to cook food. It is also used in thermal power plants to produce electricity. Coal is also used as a fuel in various industries.

Q. Why is a burning candle extinguished when covered by a jar?

Answer: Combustion takes place in the presence of air. When a burning candle is covered by a jar, the air supply is cut off, the burning candle gets extinguished.

Q. What is fuel?

Answer: Substances that burn in air to give heat energy are called fuels e.g. Petrol, Diesel and L.P.G. (Liquified Petroleum Gas)

Q. Define Fossil Fuels?

Answer: Fossil Fuels are naturally occurring substances that are extracted from the earth and also useful as fuels. For example: Coal, crude oil and natural gas.

Q. Where do we get coal from and how is it formed?

Answer: Coal is a fossil fuel derived from organic matter. We get coal deep inside the Earth's crust in coal mines. When dead plants got buried into the bottom of the soil they slowly converted into coal due high pressure and high temperature. As coal contains mainly carbon, the slow process of conversion of dead vegetation into coal is called carbonization.

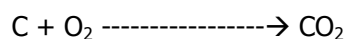
Q. What are the different types of Coal?

Answer: Followings the different types of Coal:

1. Lignite (Brown Coal) contains 25 – 35 % carbon.
2. Bituminous coal (Soft coal) contains 45 – 86 % carbon.
3. Anthracite coal (Hard coal – It has the highest heat energy) contain 87 – 97%carbon.

Q. What happen when coal is heated in presence and absence of air?

Answer: When heated coal is heated in presence of air produces mainly carbon dioxide gas.



When coal is heated in the absence of air is called destructive distillation of coal. We get many useful products like coke, coal tar and coal gas.

Q. Name some coal products obtain by destructive distillation of coal with their uses?

Answer:

S. No	Coal Products	Uses
1.	Coal Gas	As a fuel in cooking food
2.	Liquid Ammonia	To make fertilizers
3.	Gas Carbon	Carbon electrodes in batteries
4.	Coke	As a fuel and as a reducing agent in steel manufacturing
5.	Coal Tar	To make plastics, paints ,dyes, naphthalene balls and explosives

Q. Name the product obtain from Coal tar that are used to repel moths and other insects

Answer: Naphthalene balls obtained from coal tar are used to repel moths and other insects

Q. Name a petroleum product which is used in place of coal-tar for metalling the roads.

Answer: Bitumen

Q. What is petroleum and how it is formed?

Answer: Petroleum is a dark oily liquid having unpleasant odour. It is a mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax, etc.

Dead plants and animals buried at the bottom of the sea millions of years ago. They got covered with layers of sand and clay. Due to high pressure and temperature, they got transformed into petroleum.

Q. What do you mean by refining of crude petroleum?

Answer: The process of separating various constituents / fractions of petroleum by fractional distillation in fractionating columns is known as refining of petroleum. The process of heating a mixture of many liquids having different boiling points and separating them by cooling is called fractional distillation.

Q. Why is petroleum is known as 'black gold'?

Answer: Due to its great commercial importance, petroleum is also called 'black gold'.

Q. What are petrochemicals and where it is used?

Answer: Many useful substances are obtained from petroleum and natural gas. These are termed as 'Petrochemicals. These are used in the manufacture of detergents, fibres, polyethene, and other man-made plastics. Hydrogen gas obtained from natural gas, is used in the production of fertilizers.

Q. List various constituents of petroleum obtain from fractional distillation with their uses .

Answer:

S. No	Petroleum Products	Uses
1.	LPG	As a fuel for Home and industry.
2.	Petrol	Motor fuel, solvent for dry cleaning
3.	Kerosene	Fuel for stoves, lamps

		and for jet aircrafts
4.	Diesel	Fuel for heavy motor vehicles, electric generators
5.	Lubricating oil	Lubrication
6.	Paraffin wax	Ointments, candles, Vaseline etc.
7.	Bitumen	Paints, road surfacing

Q. Why CNG is called a cleaner fuel?

Answer: CNG is now used as a fuel for transport vehicles because it is less polluting. This is why it is called a cleaner fuel.

Q. How natural gas formed naturally?

Answer: Natural gas is formed whenever vegetation decomposes in marshes, sewage and in coal or petroleum mines. It contains up of 90 % methane.

Q. What are the main constituents of natural gas?

Answer: Natural gas contains mainly methane up of 90 %.

Can coal, petroleum and natural gas be prepared in the laboratory from dead organisms?

Answer: No. coal, petroleum and natural gas cannot be prepared in laboratory because their formation is a very slow process and conditions for their formation cannot be created in the laboratory.

Q. What are the advantages of using CNG and LPG as fuels?

Answer: The advantages are : (i) they have high calorific value (ii) They can be transported easily through pipelines. (iii) They are clean fuels and do not give smoke when burnt. (iv) they burn without producing any smoke

Q. Explain why fossil fuels are exhaustible natural resources?

Answer: This is because the amount of these resources in nature is limited and takes lot of time to renew. They can be exhausted by human activities as the rate of consumption is more than rate of formation.

Q. We often use LPG in our home for cooking. How you detect the leakage of gas? What substance is added to LPG for this purpose?

Ans: A gas like hydrogen sulphide which smells like rotten eggs is added to natural gas.

Q. What do you mean by PCRA? What are their tips?

Ans: In India, the Petroleum Conservation Research Association (PCRA) advises people how to save petrol/diesel while driving. Their tips 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. and Ensure regular maintenance of the vehicle.

Q. What are the harmful effects of burning fossil fuels? How it affect the environment?

- Ans: (a) The increases in carbon dioxide lead to large scale environmental damage such as acid rain.
(b) Carbon dioxide that remains in the upper atmosphere will tend to trap sun rays, which is called the "greenhouse effect" and leads to global warming.
(c) People can become sick from breathing carbon monoxide emitted from vehicles.
(d) Burning of coal releases sulfur and nitrogen, which help form acid rain

Q. Why do we need to conserve fuel judiciously?

Ans: The consumption of fuel increases rapidly due to growth of population and these fuels cannot replenish easily we feel to conserve it by using economically and wisely.

Q. What are the main uses of Natural gas.

- Ans: (a) it is used for producing H₂ gas by heating 1250 k .
(b) For manufacturing Carbon black that is used in rubber industry as reinforcing agent to make tyre.
(c) For manufacturing Petrochemical and fertilizer

Q. Why natural gas is called an ideal fuel?

Answer: It is an ideal fuel because

- (a) Burn with smoke less flame
- (b) Do not leave ash
- (c) Having high calorific value about 55kgJ/g

Q. Name, constituent of petroleum which is used for following purposes.

- (i) To make candles. (ii) A solvent for dry cleaning
- (iii) For surfacing roads.
- (iv) Jet engine fuel. (v) For lubrication. (vi) Industrial fuel

Ans: (1) Paraffin wax (ii)petrol (iii)Bitumen or asphalt (iv) kerosene (v) Lubricating Oil (vi) Fuel Oil

Q. What are hydrocarbons?

Answer: The compounds of carbon and hydrogen are called hydrocarbon like Methane [CH₄], ethane

Oral Questions

1. Q. The world's first oil well was drilled in India in -----
--

Ans : Makum in Assam in 1867

2. Naphthalene balls are obtained from _____

Ans: Coal Tar

3. A petroleum product known as _____ is used for metalling the roads.

Ans: Bitumen

4. Natural gas is stored under high pressure as _____

Ans: CNG

5. _____ is a cleaner fuel.

Ans: CNG

6. -----is used as a fuel in jet aircraft.

Ans: Kerosene oil

7. ----- is the petroleum gas which has been liquefied under pressure.

Ans: LPG

8. The major constituent of CNG is _____

Ans : methane

8. The major constituent of LPG is _____

Ans : Butane

9. _____ is the best known reinforcing agent in rubber industry

Ans: Carbon black

10. The quality of gasoline is generally expressed in terms of _____

Ans: Calorific value

11. The slow process of conversion of dead vegetation into coal is called _____

Ans: Carbonization

12. Ointments, candles and Vaseline are prepared from --

Ans: paraffin wax

13. The natural resource, which is known as 'Black Gold' is ----

Ans: petroleum.

14. The process of separating the various constituents of petroleum is term as ---

Ans: refining

15. The substances obtained from petroleum and natural gas are termed as---

Ans: petrochemicals.

Check Point-Formative Corner -01

1. What are natural resources? Name any three natural resources?

Ans: The material that are gifted by nature for survival is called natural resources like air ,water, soil, sunlight etc.

2. Name an important fossils fuel?

Answer: The remain of plants and animals that are died millions of year ago are called fossils. The fuel obtain from fossils of plants and animals are called fossils fuel like Coal, petroleum and natural gas.

3. Name one important use of fossils fuel?

Answer: Fossils fuel are main source of getting energy.

4. Is coke better than coal?

Ans; yes, this is because coke does not produce smoke but produce more heat than coal on burning.

5. What do you mean by destructive distillation of coal?

Or, what happen when coal is heated in absence of oxygen?

Answer: The process of heating coal in absence of oxygen at 1000⁰ C to 14000⁰ C is called destructive distillation. We get coke, coal gas coal tar and ammoniacal liquor by destructive distillation of coal.

6. What is the composition of coal?

Answer: Coal is a mixture of carbon, hydrogen, oxygen, nitrogen and sulphur.

7. Write some uses of coal?

Answer: Coal is used (a) As fuel to coke food (b) To generate energy in thermal power plant (c) as a source of

8. Distinguish between inexhaustible and exhaustible natural resources?

Answer:

inexhaustible natural resources	exhaustible natural resources
Present in unlimited amount in nature	Present in limited amount in nature
Can be continuously replenished naturally	Cannot be continuously replenished naturally
E.g. Air ,sunlight ,water and soil	E.g. Mineral ,petroleum, natural gas and forest

9. What is carbonization?

Answer: The slow conversion of fossils into coal due to heat and pressure under soil is called carbonization.

10. What re the three main type of coal?

Ans: Anthracites (90% carbon); Bituminous (60% carbon) and Lignite (40% carbon)

11. Write some uses of coke?

Answer: Coke is smoke less fuel that is used

(a) In extraction of metal and

(b) In the preparation of fuel gas like producer gas [CO+ N₂] and water gas [CO + H₂]

(c) In the preparation of carbides like calcium carbide (CaC₂) , Alluminium carbide (Al₄C₃) used in petrochemical industries and silicon carbide (SiC) which is used as abrasive.

Check Point-Formative Corner -02

1. Give any two uses of the following: (a) petroleum gas (b) Fuel oil (c) diesel oil

Answer: (a) petroleum gas –

(i) as a portable fuel in home and industries

(ii) In the production of carbon black

(b) Fuel oil

(i) To produce electricity in power plants

(ii) As a industrial fuel for boiler and furnace

(c) Diesel oil

(i) As a fuel for vehicles

(ii) To run generators and water pump

2. What is petroleum?

Answer: Petroleum is a natural occurring black , smelly liquid which mainly mixture of hydrocarbon and small amount of impurities like sulphur.

3. What do you understand by petroleum refining?

Answer: The process used to obtain various constituents of petroleum is called petroleum refining.

4. Oral questions

(i) The gas formed when coal is heated in absence of air:

Coal gs

(ii)The solid residue left behind when coal is heated in absence of air : Coke

(iii) An oily liquid formed when coal is heated in absence of air: Coal tar

5. State true and false.

(a) Coke has rough texture: true

(b) Scientist are trying to make use of hydrogen gas as a fuel: True

(c) Burning of fissile may lead to acid rain and global warming: True

(d) Coal gas consist of methane: false [natural gas]

(e) Layer of sand and silt turn into sedimentary rock: True

Think Zone and HOTS ZONE:

1. Which of these is better way to save fuel – using a public transport or an individual petrol/CNG driven vehicle?

Answer: using a public transport is better way to save fuel

2. Planting more and trees can help reduce pollution caused due to fossil fuel. How?

Answer: Trees use CO_2 during photosynthesis produced by burning of fossil fuel and help reduce pollution caused due to fossil fuel

3. Do you think using a bicycle is an efficient way of reducing the consumption of petrol or CNG?

Answer: Yes, using a bicycle is an efficient way of reducing the consumption of petrol or CNG

4. Give reason:

(a)Coal gas is used as an industrial fuel

Answer: As it produced large amount of heat on burning

(b)Burning of coal is a serious problem

Answer: On burning coal produce carbon dioxide, nitrogen dioxide and smoke that are the major cause of air pollution. Production of carbon dioxide led to global warming and where as sulphur dioxide and nitrogen dioxide led to acid rain this is why burning of coal is a serious problem.

(c) Fossil fuels are considered as exhaustible fuel.

Answer: Fossil fuels are likely to be exhausted by human activities therefore Fossil fuels are considered as exhaustible fuel.

(d) Why petroleum is known as black gold.

Answer: Due to its great commercial importance, petroleum is also called 'black gold'.

6. How does burning of petroleum or its refining cause harm to our refining?

Answer: Burning of petroleum give off pollutant like CO , CO_2 , NO_2 that result in air pollution. Refining of petroleum produce various product which cause water and air pollution.