Lesson 5. Coal and Petroleum

Basic concepts – A Flow Chart

NATURAL RESOOURCES

Inexhaustible

- There are some resources that are present unlimited in nature and will not be exhausted even if used continuously.
- Example: Sunlight, air.

Exhaustible

- These resources are limited and can soon get exhausted because of their excessive use.
- Example: Forests, Wildlife minerals, coal, petroleum, natural gas, etc.

Coal

- Due to natural calamities like earthquakes and volcanic eruptions , a large number of plants and animals got buried under the surface of the earth millions of years ago.
- Under high pressure and high temperature. Dead plants got slowly converted; dead plants got slowly converted to coal.
- This slow process of conversion of plant remains into coal is called carbonization.

Petroleum

- A dark lily liquid.
- Has an unpleasant odour.
- 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, absence of air. High temperature and high pressure transformed the dead organisms into petroleum and natural gas.

Refining

- Petroleum is a mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax, etc,
- Refining is the process of refracting the various constituents/ fractions of petroleum. It is carried out in a petroleum refinery.

Natural Gas

- A very important fuel as it is easy to transport through pipes and can be compressed and stored under. High pressure as Compressed Natural Gas (CNG),
  Which is a clean fuel.
- It causes no pollution and has high calorific value.

Meeting Energy Crisis

The petroleum conservation Research Association (PCRA) Advices people how to save fuel (petrol and diesel) while driving .

- Drive at moderate speed.
- Ensure correct tyre pressure.
- Switch off the engine at traffic lights.
- Get the vehicle serviced

Coke

- A black, porous and tough substance.
- Burns easily and does not produce smoke like coal.
- Used in the manufacture of steel and extraction of metals it is also used to manufacture artificial graphite and to make certain fuel gases like water gas.

Coke

- A thick, black, oily liquid with unpleasant smell. It is a mixture of 200 substances.
- It is used to make naphthalene balls, which is a moth repellant, in the manufacture of explosives like TNT, drugs, perfumes, plastics, photographic materials, etc.

Coke

- Obtained during the processing of coal to get coke.
- Used as illuminant, a fuel for industries located near coal processing plants

Objective Type Questions

(1 Mark each)

I. Multiple Choice Questions

1. Various materials which are obtained from nature are called natural resources. Which of the following is not a natural resource? **(NCERT Exemplar)**

   (a) Minerals (b) Soil (c) Water (d) Plastic

2. Air is a natural resource and cannot be exhausted by human activities. It is known as inexhaustible natural resource. Which of the following is another inexhaustible natural resource? **(NCERT Exemplar)**

   (a) Coal (b) Sun-light (c) Petroleum (d) Minerals

3. Which of the following is a pair of exhaustible natural resources. **(NCERT Exemplar)**

   (a) Coal and Soil (b) Water and petroleum

   (c) Air and Sun-light (d) Wildlife and minerals

4. Coal is processed in industries to get some useful products. Which of the following is not obtained from coal? **(NCERT Exemplar)**

   (a) Coke (b) Coal gas (c) Coal tar (d) CNG

5. Exhaustible natural resources are : **(NCERT Exemplar)**

   (a) Unlimited in quantity (b) Not dependent on nature

   (c) Limited in quantity (d) Not exhausted by human activities

6. Fossil fuels are obtained from : **(NCERT Exemplar)**

   (a) Remains of non-living materials (b) Dead remains of birds only

   (c) Dead remains of insects only (d) Dead remains of living organisms

7. Coal is formed from the remains of : **(NCERT Exemplar)**

   (a) Vegetation only (b) Both vegetation and animals.

   (c) Animals only (d) Neither vegetation nor animals

8. Which substance is formed by the carbonization of dead vegetation? **(NCERT Exemplar)**

   (a) Coal (b) Coal gas (c) Coke (d) Coal tar

9. Naphthalene balls are obtained from coal tar and are used as : **(NCERT Exemplar)**

   (a) Mosquito repellant (b) Moth repellant

   (c) Honey bee repellant (d) Snake repellant

10. Which of the following is not a constituent of petroleum? **(NCERT Exemplar)**

(a) Paraffin wax (b) Petrol (c) Lubricating Oil (d) Coke

11. Petroleum was formed from organisms : **(NCERT Exemplar)**

(a) Living on the land (b) Living in the sea

(c) Living on the plants (d) Living on the rocks

12. Choose the correct statement from the following: **(NCERT Exemplar)**

(a) It is difficult to transport natural gas through pipes.

(b) The disadvantage of natural gas is that it cannot be used directly for burning in homes.

(c) Natural gas is stored under high pressure as compressed natural gas.

(d) Natural gas cannot be used for power generation.

13. When coal burns in the air :

(a) Carbon dioxide is formed (b) Sulphur dioxide is formed

(c) Carbon monoxide is formed (d) Hydrogen gas is formed

14. PCRA stands for :

(a) Public Conservation Research Association

(b) Petroleum Conservation Research Association

(c) Public Council of Research Association

(d) Partial Counting of Remaining Amendment.

15. Which is not an exhaustible natural resource?

(a) Sunlight (b) Petroleum (c) Natural gas (d) Wildlife

16. A black, tough and porous substance is :

(a) Coal tar (b) Coal Gas (c) Coke (d) Diesel

17. Which is not a constituent of petroleum?

(a) Petrol (b) Diesel (c) Sunlight (d) Bitumen

18. The World's first oil well was drilled in :

(a) USSR (b) USA (c) India (d) UK

19. It was used for street lighting for the first time in London.

(a) Coke (b) Coal-tar (c) Coal gas (d) Petrol

20. Coal-tar contains about substances :

(a) 400 (b) 300 (c) 100 (d) 200

1. d	2. b	3. d	4. d	5. c	6. d	7. a	8. a	9. b	10. d
11. b	12. c	13. a	14. b	15. a	16. c	17. c	18. b	19. c	20. d

II. Multiple Choice Questions

1. Water is a

   a. Natural substance
   b. Man-made substance
   c. Both of these
   d. None of these

2. When coal burns in air, then

   a. Carbon dioxide is formed
   b. Sulphur dioxide is formed
   c. Carbon monoxide is formed
   d. Hydrogen gas is formed

3. The purest form of carbon is

   a. Coal
   b. Charcoal
   c. Coke
   d. All of these

4. Coal tar contains about

   a. 300 substances
   b. 400 substances
   c. 200 substances
   d. 100 substances

5. The first oil well was drilled in

   a. USA
   b. USSR
   c. UK
   d. India

6. PCRA stands for

   a. Public Conservation Research Association
   b. Petroleum Conservation Research Association
   c. Public Council of Research Association
   d. Partial Counting of Remaining Amendment

7. An example of fossil fuel is

   a. Wool
   b. Animal waste
   c. Coal
   d. All of these

1. a	2. a	3. c	4. c	5. a	6. b	7. c

I. Fill in the blanks

1. Coal is one of the _____ used to cook food.
2. When heated in air, coal burns and produces mainly _____.
3. Coal tar is a black, thick_____with an _____smell.
4. Petroleum _____and _____are fossil fuels.
5. Forests and coal are_____ natural resources.
6. The slow process of conversion of dead vegetation into coal is called_____.
7. Coal and petroleum are formed from the dead remains of organisms and are known as_____.
8. The black thick liquid with _____smell is known as coal tar.
9. During the processing of coal to get coke, coal tar and _____are also obtained.
10. The process of separating the various constituents of petroleum is known as_____.
11. Excessive burning of fossils fuels is a major cause of _____.
12. Least polluting fuel for vehicle is_____.
13. Petroleum is also called_____.
14. _____is a petroleum gas in liquid form.
15. Refining of petroleum is carried out in a_____.

1. fuels	2. carbon dioxide	3. liquid, unpleasant
4. coal, natural gas	5. exhaustible	6. carbonization
7. fossil fuels	8. coal	9. coal gas
10. refining	11. global warming	12. CNG
13. black gold	14. LPG	15. petroleum refinery

II. Fill in the blanks

1. Air is a _____ resource.
2. Coal and natural gas are _____ fuels.
3. _____ is produces when coal burns in air.
4. When coal is heated in a absence of air _____ gas is formed.
5. The substances formed from natural gas and petroleum are called _____.

6. Sunlight is an _____ natural resource.

7. Petroleum is very important so it is called _____.

8. Coal tar is a mixture of about _____ substances.

9. Fossil fuels cause more air _____.

1. Natural	2. Fossil	3. Carbon dioxide	4. Coal	5. Petrochemicals
6. Inexhaustible	7. Black gold	8. 200	9. Pollution	

I. Match the following.

I. Column A		Column B	
(i)	Petroleum	(a)	Makum
(ii)	Carbon dioxide	(b)	Purest form of carbon
(iii)	Air and water	(c)	Fossil fuel
(iv)	Coat tar	(d)	Inexhaustible resource
(v)	Oil well	(e)	Petroleum
(vi)	Coke	(f)	Heating of coal
(vii)	Petrol and diesel	(g)	Natural resource
(viii)	Sunlight	(h)	Fractions of petroleum
(ix)	Black gold	(i)	Burning of coal
(x)	Coal gas	(j)	200 substances

(i). (c)	(ii). (i)	(iii). (g)	(iv). (j)	(v). (a)
(vi). (b)	(vii) . (h)	(viii). (d)	(ix) . (e)	(x) . (f)

II. Match the following.

Column I	Column II
1. Used for road surfacing	i. Black gold
2. Natural gas	ii. vaselineand candles
3. Petroleum	iii. Bitumen
4. Paraffin wax	iv. CNG

1. iii	2. iv	3. i	4. ii

I. True or False

1. Oxygen in air is an exhaustive natural resource.
2. Resources which are present in unlimited quantity in nature are called exhaustible natural resources.
3. Wildlife is an exhaustible natural resources.
4. Under high temperature and pressure, dead plants get slowly converted to coal.
5. CNG is less polluting fuel than petrol and diesel.

1. False	2. False	3. True	4. True	5. True

II. True or False

1. Water is a natural resource.
2. Wood is a fossil fuel.
3. Oxygen gas is produced when coal burns.
4. Coke is almost the purest form of carbon.
5. Coal gas is formed when wood is heated in absence of air.
6. First oil well in India was drilled at Makum.
7. Petroleum is called black gold also.
8. First oil well was drilled in USA.

1. True	2. False	3. False	4. True	5. False	6. True	7. True	8. True

Quiz Time

1. What are the dead remains of living organisms, buried under the rocks, called?
2. When coal is heated in absence of air, then a gas is produced. What is its name?
3. Which substance is called black gold?
4. What is used in place of coal tar for metalling the roads?
5. Name the process of heating wood or coal in absence of air.
6. What process is used in the refining of petroleum?
7. What are petrochemicals?
8. Name the clean fuel used in buses.
9. Write full form of CNG.
10. Where the world's first oil well was drilled?

Answers.

1. Fossils
2. Coal gas
3. Petroleum
4. Bitumen
5. Destructive distillation of wood or coal
6. Fractional distillation
7. The useful substances obtained from petroleum and natural gas
8. CNG
9. Compressed Natural Gas
10. In Pennsylvania, USA, in 1859

NCERT Corner

Intext Questions

1. Boojho: Can we use all our natural resources forever?

No, some natural resources are in unlimited quantity in nature but some resources in nature are limited as forests, wildlife, minerals etc. so, we cannot use all our natural resources forever.

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

We get coal from earth's inner layer. Due to natural disasters, forests got buried under the soil, and excess amount of soil deposited over them, so the forests were compressed. Due to high temperature and oxygen, dead plants inside the earth got slowly converted to coal through the process of carbonization.

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

No, their formation is a very slow process and conditions for their formation cannot be created in the laboratory.

Textbook Questions

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

CNG and LPG are very important fuels because it is easy to transport them through pipes. CNG (Compressed natural gas) and LPG (Liquefied Petroleum gas) are used for power generations and as non-polluting fuels. Its great advantages are that it can be used directly for burning in homes and factories.

2. Name the petroleum product used for surfacing of roads.

The Bitumen, a constituent of petroleum, is used for surfacing of roads.

3. Describe how coal is formed. What is this process called?

About 300 million years ago earth had dense forests in low lying wet land areas. Due to earthquakes and volcanic erruptions, these forests got buried under the soil. As more soil deposited over them, they were compressed. The temperature also rose as they sank deeper and deeper. Due to oxygen and high temperature, dead plants inside the earth got slowly converted to coal. As coal contains mainly carbon, the slow process of conversion of dead vegetation into coal is called carbonization. Since it was formed from the remains of vegetation, coal is called a fossil fuel.

4. Fill in the blanks :

(i) Fossil fuels are _____, _____, and _____.

(ii) Process of separation of different constituents from petroleum is called _____.

(iii) Least polluting fuel for vehicle is _____.

(i) Coal, Petroleum and Natural gas.	(ii) Refining	(iii) CNG (Compressed Natural gas)

5. Write True or False against the following statements :

(i) Fossil fuels can be made in the laboratory.

(ii) CNG is more polluting fuel than petrol.

(iii) Coke is almost pure form of carbon.

(iv) Coal-tar is a mixture of various substances.

(v) Kerosene is not a fossil fuel.

(i) False	(ii) False	(iii) True	(iv) True	(v) False

6. Explain, why fossil fuels are exhaustible natural resources.

Fossil fuels are exhaustible natural resources because they are made by the decomposition of the dead remains of living organisms. These are present in limited quantity beneath the earth. Thus, it will come to an end by human usage.

7. Describe characteristics and uses of coke.

Characteristics of Coke :

(i) Coke is tough, porous and black in colour.

(ii) It is almost the purest form of carbon.

Uses : Coke is used in the manufacture of steel and in the extraction of many metals.

8. Explain the process of formation of petroleum.

or

How Petroleum was formed?

Petroleum is believed to be 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 dead organisms were transformed into petroleum oil and natural gas and other fossil fuels under the conditions of the absence of air, high temperature and high pressure. Like coal, petroleum and natural gas are also fossil fuels.

Since oil and gas are lighter than water and do not mix with it, they move upward. They are stopped by the overlying rocks which they cannot break through.

9. The following table shows the total power shortage in India from 1991 to 1997. Show these data in the form of a graph. Plot shortage % on the Y-axis and the year on the X-axis.

S.No	Year	Shortage%
1	1991	7.9
2	1992	7.8
3	1993	8.3
4	1994	7.4
5	1995	7.1
6	1996	9.2
7	1997	11.5

I. Very Short Answer Type Questions.

1. Write the name of any two natural substances.

(i) Air (ii) Water

2. Name two man-made substances.

(ii) Car (ii) Bus

3. Write two exhaustible substances.

(i) Coal (ii) Natural gas

4. Why are air, water and soil called natural resources?

Air, water and soil are provided by nature so they are called natural resources.

5. Name any two inexhaustible natural resources.

(i) Air (ii) Sunlight

6. Why are Coal, Petroleum and Natural gas called fossil fuels?

Coal, Petroleum and Natural gas are formed by fossils, so they are called fossil fuels.

7. Which gas is produced when coal burns in air?

Carbon dioxide

8. Name the gas which is formed, when coal is heated in the absence of air.

Coal gas

9. What is the purest form of carbon?

Coke

10. What is the main use of coke?

It is used in the extraction of metals.

11. How many substances are found in coal tar?

About 200 substances.

12. Name the substance obtained from the coal tar and used to repel moths and insects.

Naphthalene balls

13. Which substance is used for road surfacing these days?

Bitumen

14. Where was the first oil well drilled?

The first oil well was drilled at Pennsylvania, USA , in 1859.

15. Where and when was the first oil well drilled in India?

In 1887, at Mukum in Assam.

16. Name two fractions of petroleum which are used as fuel.

(i) Petrol (ii) Diesel

17. What are Petrochemicals?

The useful substances formed from natural gas and petroleum are called petro-chemicals.

18. Why is petroleum called black gold?

Due to its great commercial importance petroleum is also called black gas.

19. Name the places where natural gas is found in our country.

Tripura, Rajasthan, Maharashtra and in the Krishna Godavari delta.

20. Expand PCRA.

Petroleum Conversation Research Association

21. Can we use all our natural resources forever?

No, we cannot use all our natural resources forever, because these are going to exhaust one day.

22. Can air , water and soil be exhausted by human activities?

No, these cannot be exhausted at all.

23. Is water, a limitless source?

Yes, water is a limitless source , but by unwise use and cutting of trees, sources of water are depleting.

24. Expand LPG.

Liquefied Petroleum Gas.

25. Write full form of CNG.

Compressed Natural Gas.

26. Expand PNG.

Petroleum Natural Gas

27. Name the places where the net work of pipelines found in India.

Network of pipelines exists in Vadodara in Gujrat and some parts of Delhi.

28. Name various fossil fuels.

Coal , Petroleum , Natural gas.

29. Which fuel is known as black gold?

Petroleum

II. Very Short Answer Type Questions.

1. What does CNG stand for and why is it considered to be a better fuel than petrol?

(NCERT Exemplar)

CNG stands for compressed natural gas. It is considered to be a better fuel because it is less polluting.

2. Name the petroleum product used as fuel for stoves, lamps and jet aircrafts.

(NCERT Exemplar)

Kerosene is used as fuel for stoves, lamps and jet aircrafts.

3. Write two uses of coke. **(NCERT Exemplar)**

It is used for extraction of many metals and also for the manufacture of steel.

4. What are the substances produced by destructive distillation of coal?

The substances produced by destructive distillation of coal are coke, coal-tar and coal gas.

5. What are fossil fuels?

Some exhaustible natural resources are formed from the dead remains of living organisms. Hence, these are all known as fossil fuels.

6. What happens when coal is heated in air?

When coal gets heated in air, it burns and produces mainly carbon dioxide gas.

7. Name some useful products obtained from coal when it is processed in industry.

Coal is processed in industry to get some useful products such as coke, coal-tar and coal gas.

8. Write one use of coal.

Coal is used in thermal power plants to produce electricity.

9. When was coal gas first used for street lighting in London?

Coal gas was used for street lightning for the first time in London in 1810 and in New York around 1820.

10. Where is oil found in India? (NCERT Exemplar)

Oil is found in India in Assam, Gujarat, and Mumbai High and in the river basin of Godavari and Krishna.

11. Why is petroleum also called black gold? (NCERT Exemplar)

Due to its great commercial importance, petroleum is also called 'Black gold'.

12. What are the uses of diesel?

Diesel is used as fuel for heavy motor vehicles, electric generators etc.

III. Very Short Answer Type Questions.

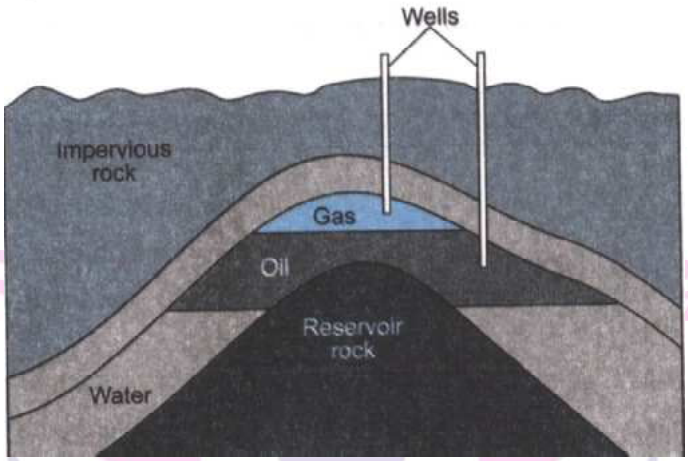
1. You are provided with a mixture of petroleum and water. Can you suggest a method to separate the two?

Decantation.

2. What does CNG stand for and why is it considered to be a better fuel than petrol?

CNG stands for compressed Natural Gas. It is considered to be a better fuel because it is less polluting.

3. Look at the figure given below where petroleum and natural gas deposits are shown why do we find oil layer above water layer?



Oil is lighter than water hence floats over it.

4. Name the petroleum product used as fuel for stoves, lamps and jet aircrafts.

Kerosene is used as fuel for stoves, lamps and jet aircrafts.

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

No, their formation is a very slow process and conditions for their formation cannot be created in the laboratory.

6. Define carbonization.

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

I. Short Answer Type Questions.

1. Sunlight and air are inexhaustible natural resources. Comment.

Theses resources are present in unlimited quantity in nature and are not likely to be exhausted by human activities.

2. Some natural resources are given in a box. Classify them into the exhaustible and inexhaustible natural resources.

Air, coal, Natural gas, sunlight, petroleum, minerals, forests, oxygen

Exhaustible natural resources: Coal, natural gas, petroleum minerals, forests

Inexhaustible natural resources: Air, sunlight, oxygen.

3. Write two important uses of coke.

It is used for extraction of many metals and also for the manufacture of steel.

4. Write the characteristics and some important uses of coal.

Coal is black in colour and hard as stone. It is one of the fuels use to cook food. Earlier it was used in railway engines to produces steam to run the engine. It is used as fuel in thermal power plants to produce electricity and in various other industries.

5. What do you mean by refining of petroleum?

Petroleum is a dark oily liquid and have unpleasant smell. It is a mixture of various constituents.

The process of separating various constituents like petroleum gas, petrol, diesel, lubricating oil, paraffin wax, etc. as fractions of petroleum is known as refining.

6. What do you mean by fossil fuels?

Exhaustible natural resources like coal, petroleum and natural gas were formed form the dead remains of living organisms. So these are called fossil fuels.

7. We say fossil fuels will last only for a few hundred years, comment.

It takes a very long time for the formation of fossil fuels, it also requires specific conditions and it doesn't happen quite often, therefore, their limited stock will last only for few hundred years.

8. Name different varieties of coal.

Different varieties of coal are peat, lignite, bituminous and Anthracite.

II. Short Answer Type Questions.

1. What are natural resources? Explain with examples.

The resources provided by nature or obtained from the nature are called natural resources. For example : air , water, soil and sunlight etc.

2. Classify the natural resources on the basis of their availability.

On the basis of the availability various, natural resources in nature can be classified in the following two groups;

(i) Inexhaustible natural resources : Air , Water , Soil , Sunlight etc.

(ii) Exhaustible natural resources : Forests , Wildlife , Minerals and Coal etc.

3. What are inexhaustible natural resources? Explain with example.

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. For example : air , sunlight etc.

4. What are exhaustible natural resources? Explain with example.

The resources which are present in limited quantity in nature and can be exhausted by human activities are called exhaustible natural resources. For example : forests, wildlife and minerals etc.

5. What are fossil fuels? Name the main fossil fuels.

The remains of dead plants and animals are called fossils. The fuels formed by the remains of dead plants and animals are called fossil fuels. Main fossil fuels are : coal petroleum and natural gas.

6. What is cola? Write its uses.

Coal is a fossil fuel and is hard as stone.

Uses:

(i) Coal is used to cook food.

(ii) It is used in thermal power plants to produce electricity.

(iii) It is also used as an industrial fuel.

7. What is coke? Write its uses.

Coke is a tough porous and black substance. It is almost the purest form of carbon. It is formed by heating coal in the absence of air.

Uses:

(i) It is used in manufacture of steel.

(ii) It is used in the extraction of metals.

8. What is coal tar? What are its uses?

Coal tar is a black thick liquid. It is a mixture of about 200 substances.

Uses:

(i) It is used as a source of various useful substances.

(ii) It is used to get naphthalene, which is used to repel moths and other insects.

(iii) It is used to make road surface.

9. What is coal gas? Write the uses of coal gas.

Coal gas is a by-product formed, when coal is heated in absence of air.

Uses:

(i) It is used as fuel in many industries.

(ii) Previously it was used for street lighting in London in 1810.

10. What is petroleum? Why is it called black gold?

Petroleum is a dark oily liquid. It is a mixture of various constituents. Its constituents are very useful. Due to its great commercial importance petroleum, is also called black gold.

11. Where and when was the first oil well drilled? (i) in world and (ii) in India.

(i) The world's first oil well was drilled in Pennsylvania, (USA), in 1859.

(ii) In India, the first oil well was drilled at Makum (Assam) in 1867.

12. What do you mean by refining and petroleum refinery?

The process of separating various components or fraction of petroleum is called refining. This process is carried out in petroleum refinery.

13. Why is natural gas called a very important fossil fuel in these days?

Natural gas is a very important fossil fuel because it is easy to transport through pipes. It is used in the form of CNG as fuel and generation of power.

14. Why is CNF called a clean fuel?

CNG is called a clean fuel because;

(i) It does not produce any pollution.

(ii) No residue is left after burning of CNG.

(iii) It burns completely in the air.

15. What are the harmful effects of using fossil fuels?

Harmful effects of burning fossil fuels are as following:

(i) Burning of fossil fuels cause air pollution.

(ii) They also cause global warming because they produce greenhouse gas like carbon dioxide on burning.

16. What are petrochemicals? What are their uses?

Many useful substances are obtained from petroleum and natural gas. These are called petrochemicals.

Petrochemicals are used in the manufacture of detergents, fibres, polythene and other plastics and fertilizers.

17. Make a list of various materials used by us in daily life and classify them as natural and man-made materials (Refer to Activity 5.1)

S.No	Natural Material	Man-made Material
1	Air	Table
2	Soil	Chair
3	Water	Car
4	Sunlight	Bus
5	CNG	TV
6	LPG	Plastic
7	Coal	Rubber
8	Petrol	Food
9	Fruits	Bed
10	Minerals	Blackboard

III. Short Answer Type Questions-I

1. Sunlight and air are inexhaustible natural resources. Comment. (NCERT Exemplar)

These resources are present in an unlimited quantity in nature and are not likely to be exhausted by human activities.

2. Some natural resources are given below. Classify them into the exhaustible and inexhaustible natural resources. (NCERT Exemplar)

Air, coal, natural gas, sunlight, petroleum, minerals, forests, oxygen.

Exhaustible Natural Resources	Inexhaustible Natural Resources
(i) Coal	(i) Air
(ii) Natural gas	(ii) Sunlight
(iii) Petroleum	(iii) Oxygen
(iv) Minerals	
(v) Forests	

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

About 300 million years ago, the earth had dense forests in low lying wetland areas. Due to natural processes like flooding, these forests got buried under the soil and deposited. Due to high temperature and pressure, dead plants got slowly converted into coal.

4. What is carbonization?

As coal contains mainly carbon, the slow process of conversion of dead vegetation into coal is called carbonization.

5. What is the full form of CNG and LPG?

CNG : Compressed Natural Gas.

LPG : Liquefied Petroleum Gas.

6. Write different uses of coal-tar.

Coal-tar is used as starting material for manufacturing various substances used in everyday life and in industry, like synthetic dyes, drugs, explosives, perfumes, plastics, paints, photographic materials etc.

III. Short Answer Type Questions-II

1. Fill in the blanks and complete the story.

About 300 million years ago the earth had dense (i) _____ in low lying wetland areas. Due to natural processes, like (ii) _____ , these forests got buried under the (iii) _____ As more (iv) _____ deposited over them, they were compressed. The (v) _____ also rose as they sank deeper and deeper. Under high (vi) _____ and high (vii) _____dead plants got slowly converted into coal.

(i) Dense	(ii) Flooding	(iii) Soil	(iv) Soil
(v) Temperature	(vi) Temperature	(vii) Pressure	

2. Write the characteristics and some important uses of coal. (NCERT Exemplar)

Characteristics of coal :

(i) Coal is a hard, black, combustible fossil fuel.

(ii) It mainly contains carbon and is a good source of energy.

(iii) When heated in air, coal burns and produces mainly carbon dioxide gas.

Uses of coal :

(i) It is used in thermal power plants to produce electricity.

(ii) It is used as a fuel in various industries.

(iii) It is used for the manufacture of coke, coal-tar and coal gas.

3. You are provided with a mixture of petroleum and water. Can you suggest a method to separate the two? (NCERT Exemplar)

Decantation can be used to separate a mixture of petroleum and water. The mixture is allowed to stand. Carefully, lighter layer can be poured and separated without disturbing the heavier one.

4. List various constituents of petroleum and their uses.

Various constituents of petroleum and their uses :

(i) LPG : Fuel for home and industry.

(ii) Petrol : Motor fuel, aviation fuel, solvent for dry cleaning.

(iii) Kerosene : Fuel for stoves, lamps and for jet aircraft.

(iv) Diesel : Fuel for heavy motor vehicles and electric generators.

(v) Lubricating Oil : Lubrication Paraffin wax : Ointments, candles, Vaseline etc.

(vi) Bitumen : Paints and road surfacing.

5. What is refining of petroleum? Give different constituents of petroleum.

Refining of Petroleum : Petroleum is a dark oily liquid. It has an unpleasant odour. It is a mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax etc. The process of separating the various constituents of petroleum is known as refining. Different constituents of petroleum are LPG, petrol, kerosene, diesel, lubricating oil, paraffin wax, bitumen etc.

6. What is natural gas? What are the advantages of using CNG?

Natural gas is a very important fossil fuel. It is stored under high pressure as compressed natural gas (CNG).

Advantage of CNG :

(i) It is easy to transport.

(ii) It does not produce any pollution.

(iii) No residue is left after burning of CNG.

(iv) It burns completely in the air.

I. Long Answer Type Questions.

1. What do you understand by the statement that "the known reserves of these will last only few hundred years"?

The known reserves of these will last only a few hundred years is true, as we know that coal and petroleum are fossil fuels. It requires the dead organisms millions of years to get converted into these fuels. Excessive and injudicious use of these fuels leads to shortage of these fuels and their use is also linked to global warming. It is therefore necessary that we use these fuels only when absolutely necessary.

2. What is PCRA? What are their tips?

PCRA is the petroleum conservation research association. They advise people how to save petrol/ diesel while driving. Their tips are :

(i) Drive at a constant and moderate speed.

(ii) Switch off the engine at traffic lights, or at places where you have to wait.

(iii) Ensure correct tyre of pressure.

(iv) Ensure regular maintenance of the vehicle.

3. We read in newspapers that burning of fuels is a major cause of global warming. Explain why? (NCERT Exemplar)

Burning of fuels is a major cause of global warming because they produce a lot of greenhouse gas 'carbon dioxide' on burning. The earth's atmosphere allows most of the sunlight that falls on it to pass through and heat the surface. But greenhouse gases such as carbon dioxide, methane, water vapours traps the heat radiated from earth. This leads to an increase in earth's average temperature. This is known as green house effect. When concentration of greenhouse gases such as carbon dioxide increases, greenhouse effect also increases. This is known as global warming. It may cause melting of ice caps and glaciers resulting in the rise in sea levels.

4. Name the products obtained and their uses when coal is processed in industry. (NCERT Exemplar)

When coal is strongly heated in the absence of air in closed retorts, various useful products are obtained. These are coke, coal-tar and coal gas.

Uses of coke : Coke is used in the manufacture of steel and in the extraction of many metals. It acts as a fuel and it is a better fuel than coal.

Uses of coal-tar : The various compounds obtained from coal tar are used as starting materials for manufacturing a large number of substances used in everyday life and in industry like synthetic dyes, drugs, explosives,, perfumes, plastics, paints, photographic materials, roofing materials, etc. Naphthalene balls used to repel moths and other insects are also obtained from coal-tar.

Uses of coal gas : It is used as a fuel in many industries situated near the coal processing plants.

5. Why is petrol exhaustible natural resource whereas sunlight is not? Explain.

(NCERT Exemplar)

The natural resources which are present in a limited quantity in nature and can be exhausted (used up) by human activities are called exhaustible natural resources, e.g., Coal, petroleum, natural gas, minerals, forest, wildlife, etc.

It requires millions of years for the conversion of the dead organisms into petroleum from which petrol is separated. So, once the present stock of it gets exhausted, no new supplies of it will be available to us in the near future, whereas sunlight is present in an unlimited quantity in nature, so it is inexhaustible natural resource. It is not likely to be exhausted by human activities.

II. Long Answer Type Questions.

1. Describe the process of formation of coal in the nature.

About 300 million years ago, the earth had dense forests in low-lying wetland areas. Due to natural processes like flood, earthquakes and volcanic eruptions, these forests got buried under the soil. As more soil deposited over them, they were compressed. The temperature also rose as they sank deeper and deeper. Under high plants got slowly converted to coal. The coal contains mainly carbon. The slow into coal is called carbonisation. It was formed from the remains of vegetation. Coal is called fossil fuel.

2. Describe the process of formation of petroleum.

Petroleum is a dark oily liquid. It is a mixture of various fractions. 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, absence of air, high temperature and high pressure and action of microorganisms, transformed the dead organisms

into petroleum and natural gases. They layer containing petroleum and natural gas is above that of water. Oil and gas are lighter than water and do not mix with it.

3. Write the names of various components of petroleum and write their uses.

The petroleum is the mixture of various fractions. These fractions are separated by the process of refining;

We get following fractions by the process of refining;

(1) LPG (Liquefied Petroleum Gas) :

Uses : It is used as domestic and industrial fuel

(2) Petrol

Uses: It is used as motor fuel, aviation fuel and solvent for drycleaning.

(3) Kerosene

Uses: It is used as fuel for stoves, lamps and for jet aircraft.

(4) Diesel

Uses : It is used as fuel for heavy motor vehicles and electric generators.

(5) Lubricating Oil

Uses : It is used as a lubricant.

(6) Paraffin Wax

Uses : It is used in making ointments, candles and Vaseline etc.

(7) Bitumen

Uses : It is used in making paints and road surfacing.

4. What advise is given by PCRA for saving petrol and diesel?

The advise given by PCRA area s following;

(i) Drive at a constant and moderate speed, as far as possible.

(ii) Switch off the engine at traffic lights or at a place, where you have to wait.

(iii) Ensure correct tyre pressure.

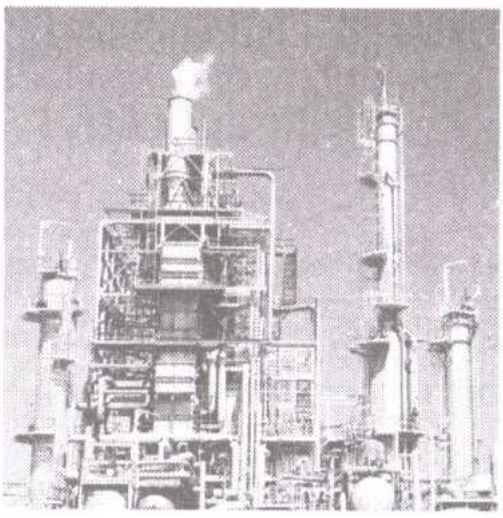
(iv) Ensure regular maintenance of the vehicle.

If we follow the tips given by PCRA, then we can save more and more petrol or diesel. In this way we can save money and energy of the nation.

5. Explain the process of refining of Petroleum with the help of diagram of refinery.

Petroleum is a dark liquid. It has an unpleasant colour. It is a mixture of various constituents like petroleum gas petrol, diesel, kerosene, lubricating oil paraffin wax etc. The process of separating the various constituents or fractions of petroleum is called fractional

distillation or refining of petroleum. In this process the various fractions are separated on the basis of difference in boiling points.



III. Long Answer Type Questions.

1. Name the products obtained and their uses when coal is processed in industry.

Coal when processed in industry gives coke, coal tar and coal gas.

Coke is used in the manufacture of steel and in extraction of many metals. Coal tar is used as starting material for manufacturing various substances such as coal gas is used as a fuel.

2. We read in newspapers that burning of fuels is a major cause of global warming. Explain why.

Fossil fuels are generally the mixtures of carbon based compounds. On burning fossil fuels such as coal, petroleum and natural gas, they produce carbon dioxide gas which is a green house gas. The increase in levels of carbon dioxide in the atmosphere cause global warming.

3. Why petrol is exhaustible natural resource, whereas sunlight is not? Explain.

Sunlight is present in unlimited quantity in nature and is not likely to be exhausted by human activities. So, it is an inexhaustible natural resource. Whereas petrol takes millions of years to form. It is called exhaustible natural resource because it is formed at extremely slow rate in the earth's crust and once depleted , take a long time to replenish.

4. Write some important use of the various constituents of petroleum.

Petrol – Used as fuel for automobile and aviation.

Kerosene – Used as fuel for stoves, lamps and for jet aircrafts.

Diesel – used as fuel for heavy motor vehicles, electric generators.

Lubricating oil- Used for lubrication.

Paraffin wax – Used in ointment, candles, Vaseline, etc.

Bitumen – Used in paints and road surfacing.

5. While driving what are the tips we must follow to save petrol/diesel / natural gas?

a. Ensure correct tyre pressure

b. Ensure regular maintenance of the vehicle.

c. Drive at a constant and moderate speed.

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

6. a. What will happen if all coal and petroleum reserves are depleted?

b. What can be done by you to prevent depletion of coal and petroleum?

a. If all the coal and petroleum reserve are depleted, we will not have fuels for our vehicles, factories and house as they take a very long time to replenish.

b. In following ways we can prevent the depletion of coal and petroleum:

i. Use alternative fuels

ii. Use public transport and by cycles for short distances

iii. Use car pools to go for work or to school.

I. High Order Thinking Skills (HOTS) Questions.

1. Coal, petroleum and natural gas are called fossil fuels. Why?

Coal, petroleum and natural gas are called fossil fuels because they are formed by the decomposition of the remains of pre-historic plants and animals (fossils) buried under the earth long ago.

2. How CNG is a better fuel than petrol and diesel in vehicles?

CNG is a good alternative to petrol and diesel in vehicles because it is a clean fuel and does not cause air pollution. It is filled in cylinders.

3. Which gas is used as a starting material for the manufacture of a number of chemicals and fertilizers and why?

Natural gas is used as a starting material for the manufacture of a number of chemicals (petrochemicals) and fertilizers as it is a source of hydrogen gas needed to manufacture the fertilizers.

4. Why should we use petrol/diesel only when absolutely necessary?

We should use these fuels only when absolutely necessary because :

(i) It will reduce air pollution and thus lead to better environment.

(ii) It will reduce the risk of global warming.

(iii) it will ensure their availability for a longer period of time.

5. What are the harmful effects of using fossil fuels?

Harmful effects of burning fossil fuels are as follows:

(i) Burning of fossil fuels causes air pollution.

(ii) They also cause global warming because they produce greenhouse gases like carbon dioxide on burning.

6. We say fossil fuels will last only for a few hundred years. Comment.

Fossil fuels will fast only for a few hundred years because they are exhaustible natural resources. If consumed at a rate faster than the rate at which these are formed in nature, they will get exhausted very soon. Once the present stock of these gets exhausted, no new supplies of these fossil fuels will be available to us in the near future because it requires millions of years for the conversion of dead organisms into these fuels.

7. The material X is a fossil fuel. It is formed from the buried large land plants (vegetation) by a very slow process Y. When X is heated in the absence of air, i.e., in the process called Z, it gives three products A, B and C. A is used as a reducing agent in the extraction of metals, B is used as an industrial fuel, whereas the product C has been traditionally used for metalling the roads. It is now replaced by a petroleum product, bitumen. Now give the answer of the following questions :

(i) What is the material X?

(ii) What is the physical state and colour of X?

(iii) Name the processes Y and Z. What are the products A, B and C?

(i) Coal.

(ii) It is a solid of black colour.

(iii) Y is carbonization and Z is destructive distillation.

(iv) A is coke, B is coal gas while C is coal tar.

II. High Order Thinking Skills (HOTS) Questions.

1. Is walking short distances rather than going in a car, an effective way of saving fossil fuels?

Yes, walking short distances is an effective way of saving fossil. This is because walking short distance is feasible as well as convenient than using car.

2. Expand PCRA.

Petroleum conservation Research Association (PCRA)

Value Based Questions

1. In a village people burn wood and cow dung as a fuel for basic necessity. In other nearby village they have a big biogas plant in which bio-waste is used to prepare biogas. If we compare the situation of both villages, which practice will you prefer as the best and why?

In a village people burn wood and cow dung as a fuel for basic necessity. In other nearby village, they have a big biogas plant in which biowaste is used to prepare biogas. If we compare the situation of both villages, I will prefer to have biogas plant as it cleans the surroundings of biowaste. It is environment friendly, no pollution, produces electricity and cooking gas and at last waste can be used as manure.

2. Conserving energy has become the need of the society and nature, be it in the transport, house-hold or industries. Energy conservation has been recognized as a national issue for a long time. As a responsible citizen of India, what steps would you take to conserve energy?

Conserving energy has become need of the society and nature. As a responsible citizen of India I should follow the following steps for conservation of energy :

(i) Use energy wisely.

(ii) Practice three R's : Reduce, recycle and reuse.

(iii) Follow all the instructions including Do's and Don'ts, e.g., switch off the light when not in use. Use cycle for short distances. Avoid excess use of plastic or non bio-degradable substances etc.

3. Ravi uses a diesel car which causes a lot of pollution. But his friend Aman has an electric car which does not use fossil fuel and does not cause air pollution. Aman told his friend that major pollution of air is caused by industries and combustion of fossil fuels by vehicles. Sulphur dioxide and nitrogen dioxide are released into air by burning coal and petroleum. Air is precious for our life, but air pollution causes many diseases like asthma, bronchitis etc. Read the given passage and answer the following questions.

(a) What are the formulae of sulphur dioxide and nitrogen dioxide?

(b) What is the effect of increase in carbon dioxide in the atmosphere?

(c) What values are possessed by Aman?

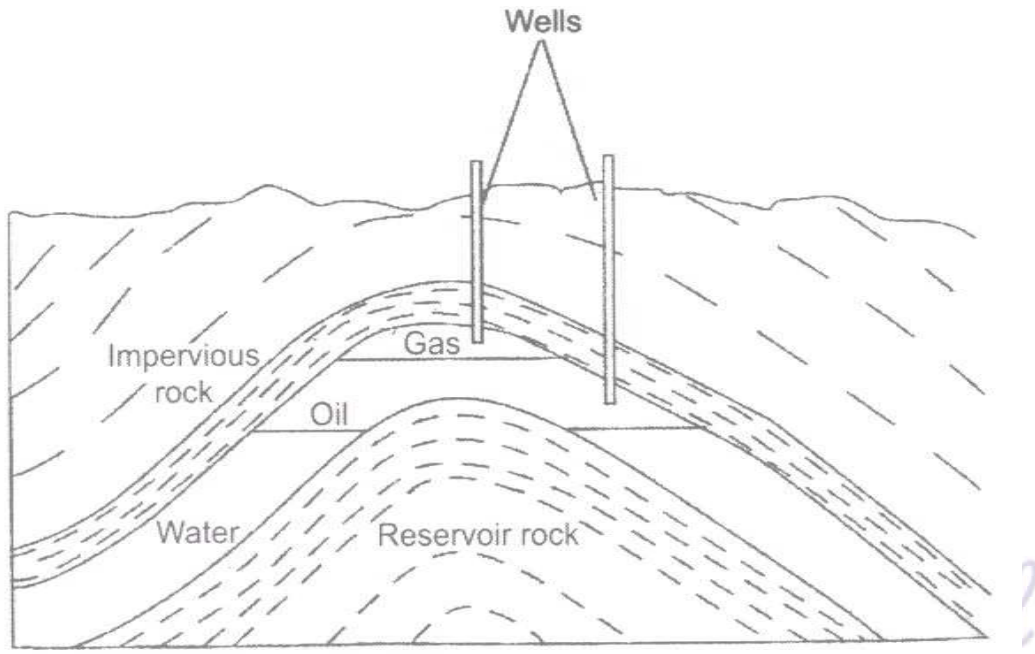
(a) Formula of sulphur dioxide is SO_2,. Formula of nitrogen dioxide is NO_2.

(b) Increase in concentration of carbon dioxide in the atmosphere will increase the temperature of earth's atmosphere.

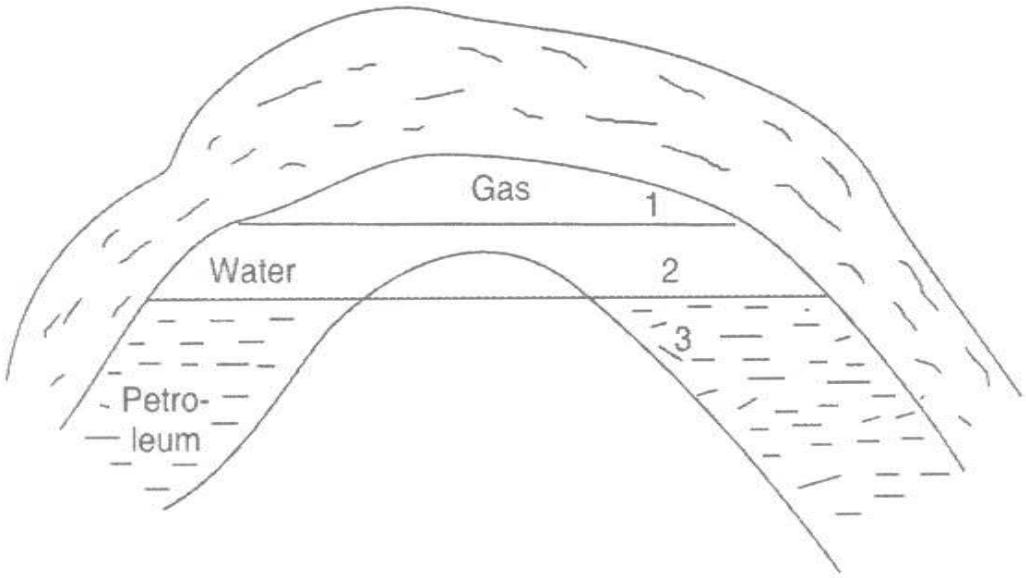
(c) Aman is aware about the safety of environment from air pollution.

Skill Based Questions

1. Draw a line diagram to show position of layers of natural gas, petroleum and sater deposits.



2. A student has wrongly labelled petroleum, gas and water layers in the following diagram of petroleum and natural gas deposits. Correct the labelling of layers.



Correct labelling : 1. Gas 2. Petroleum 3. Water

3. Observe the following figure and answer the following questions.

(i) Identify the figure.

(ii) What is its colour?

(iii) How many substances make it.

(iv) Write its use.

Answer:

(i) This figure is of Coal Tar.

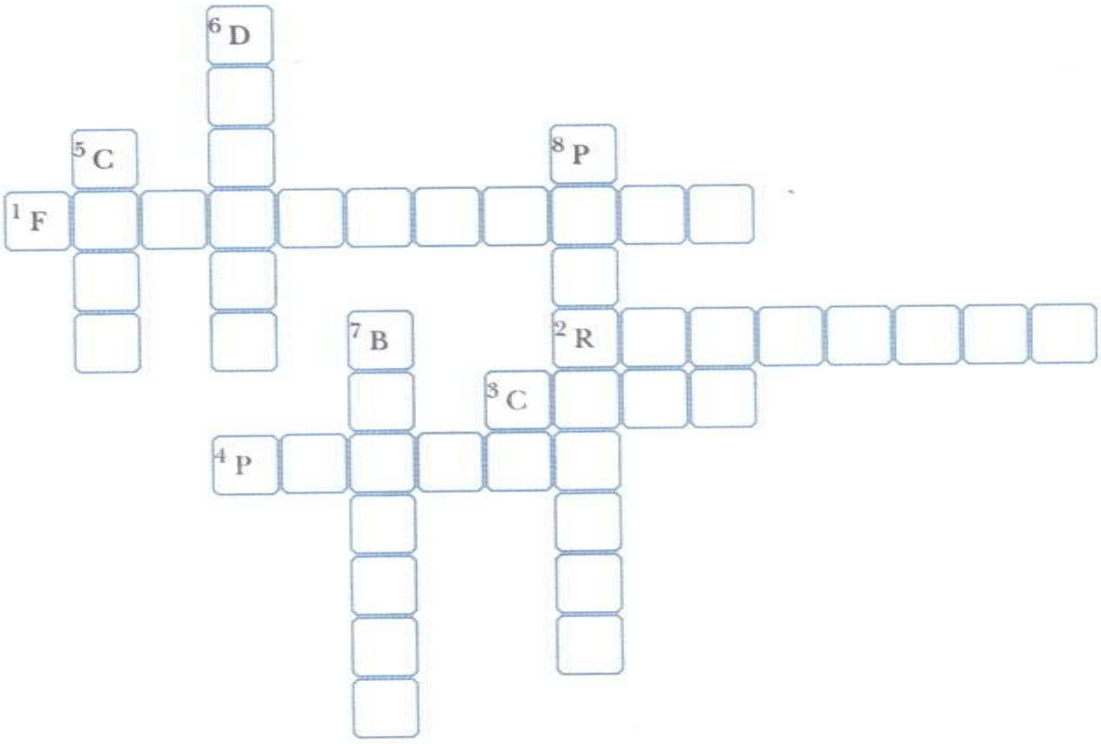
(ii) It is black

(iii) It is a mixture of about 200 substances.

(iv) It is used to make road surface and to obtained about 200 substances.

Skill Based Questions

1.



Across

1. Fuels obtained from dead remains of living organisms
2. A process by which the various constituents of petroleum are separated
3. A Porous black substance obtained from coal
4. Another name for motor fuel

Down

5. The substance obtained by carbonization
6. Fuel for heavy motor vehicles
7. A petroleum product used for road surfacing
8. Dead remains of sea animals got converted into it

Across

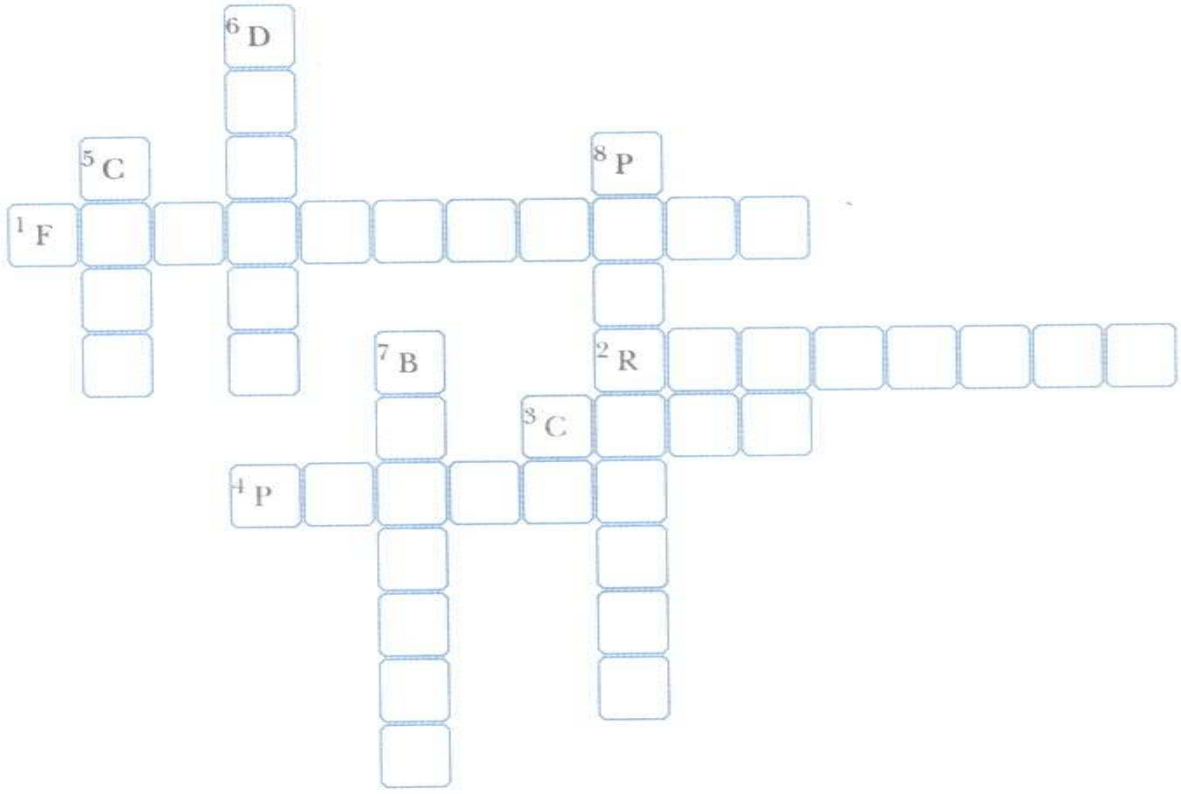
1. Fossil fuels
2. Refining
3. Coke
4. Petrol

Down

5. Coal
6. Diesel
7. Bitumen
8. Petroleum

Cross word Puzzle

1.



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5. Coal 6. Diesel 7. Bitumen 8. Petroleum