ANSWERS TO TEXTBOOK QUESTIONS

Objective Questions

A. Multiple choice questions.

1. b **2.** d **3.** a **4.** a **5.** b
6. c **7.** a **8.** d

B. Give one word answers.

1. Fossils **2.** Coke **3.** Coal tar **4.** Bitumen
5. Coal **6.** Carbonization **7.** Fossil fuels
8. Fractional distillation

Theoretical Questions

A. Short answer type questions.

1. For extracting petroleum from identified places 'holes' are dug deep into the rocks under the soil with the help of drilling machines called 'Drilling rigs'.
2. Petroleum can be extracted from under the sea bed. It can be extracted with giant and floating drilling machines.
3. Gasoline is a mixture of highly volatile gases like propane, butane, aviation petrol and ordinary petrol. (Gasoline is the British name for petrol).
4. Petrol is normally used as a fuel in cars and light vehicles.
5. Aviation fuel is a type of petroleum-based fuel used in aircrafts. It is generally of a higher purification.
6. LPG and CNG are non-polluting fuels.
7. Coal tar and bitumen are used in surfacing the road.
8. Exhaustible resources are those resources which are present in limited quantity and can be completely used up by human activities are called exhaustible resources. Petroleum and coal are such resources.
9. Some of the exhaustible resources are renewable. It means that when a part or whole of the resource is used up, it can be replaced or regenerated. For example, trees in a forest are a renewable natural resource.
10. Some useful products obtained from coal are (a) Coal gas, (b) Coal tar, (c) Coke.
11. Petroleum Conservation Research Association (PCRA) in India is a non-profit social organization under the Ministry of petroleum, Government of India, and it advises people to save petrol/diesel while driving by taking certain preventive steps.
12. Coal gas is a mixture of mainly hydrogen, methane, carbon monoxide and a small part of carbon dioxide gas.

B. Long answer type questions.

1. Exhaustible resources are those which are limited and a time may come when we may not be left with these resources. Examples of exhaustible natural resources are wild life, coal, petroleum, natural gas and minerals.

Exhaustible natural resources are further classified as following.

Renewable resources: Some of the exhaustible resources are renewable. It means that when a part or whole of the resource is used up, it can be replaced or regenerated. For example, trees in a forest are a renewable natural resource because more trees can be grown in place of those which have been chopped down.

Non-renewable resources: Some of the exhaustible resources are non-renewable. Coal, petroleum and natural gas are non-renewable natural resources because the amount of these resources is so much that when they are fully consumed, they will not be available any more.

2. An example of inexhaustible resource of energy is sunlight. Inexhaustible resources are those which remain available forever and cannot be used up completely.

3. Fuel is used as a source of energy. Fossil fuels are carbon rich fuels which come from deep under the earth crust. Fossils are the remains of plants and animals which existed upon the earth at one time and got buried under the soil millions of year ago. Coal, petroleum and natural gas are fossil fuels which were formed deep under the crust of the earth on the decomposition of plants and animals in the absence of air, which got buried under the soil.
4. At community level, recycling of biodegradable waste to obtain biogas fuel is good since it will reduce pressure on the use of petroleum fuel, help us in keeping the environment clean and give sludge as organic manure to improve the quality of agricultural produce.
5. For extracting petroleum from identified places 'holes' are dug deep into the rocks under the soil with the help of drilling machines called 'Drilling rigs'. Drilling rig is a huge structure with a heavy rotating shaft with sharp 'bits' at the end of the shaft. The bit cuts into the rock material and may reach a deeply placed reservoir of oil and gas. The crude oil has to be refined in 'oil refinery' for separating the different compounds from the crude oil mixture.
6. Petroleum is a mixture of different compounds of hydrocarbon such as gasoline (a mixture of highly vaporizing petrol and naphtha), kerosene, diesel, lubricating oil, asphalt (bitumen), paraffin wax and others. Crude oil is refined in oil refinery by the process called 'fractional distillation'. Components (fractions) of crude oil have different boiling points (volatilities) and their vapour cool into liquid at different temperatures. Hence, fractional distillation is the process in which steam is passed through heated (to 300°C) vaporizing crude and its fractions are steamed to cool and separate out at different temperatures.
7. Coke is a solid grey substance formed when coal is heated in the absence of air. While heating coal, volatile substances get evaporated leaving behind coke with pores in it, through which the gases might have escaped. Coke is more than 90% carbon and is a very good fuel with a high calorific value. Coke is used as a reducing agent in refining the iron ore, many other metals and in the manufacture of steel. Coke is a better fuel since it gives out more heat and less of gases. Hence it is non-polluting.
8. The Fractions of Petroleum Obtained on Fractional Distillation Are:
   - **(i) Gasoline:** Gasoline is a mixture of highly volatile gases like propane, butane, aviation petrol and ordinary petrol. (Gasoline is the British name for petrol).
   - **(ii) Petroleum gas** is liquefied under pressure and is called Liquefied Petroleum Gas (LPG). LPG is filled in strong steel cylinders and is used as a fuel. LPG is highly volatile and it turns into gas as soon as pressure is released on turning the knob. LPG is 95% butane C_4H_{10} and partly propane and is without any smell, hence a smelling gas amyl mercaptan is added to it so that leakage of gas from a cylinder can be easily detected.
   - **(iii) Naphthalene:** It is a polymer of Butane. It forms white crystalline solid at below 80°C. Naphthalene vaporizes in open air at room temperature. Naphthalene balls are used to keep woollens and cupboards free of moths. Naphthalene is used to make dyes and plastics.
   - **(iv) Light oil** is highly inflammable, a good solvent for fats used in dry cleaning. It includes xylol (xylenes) used in scientific laboratories for dehydration of plant and animal material under study.
   - **(v) Kerosene** is used as fuel in stoves and for lighting lanterns. It gives out smoke on burning hence, it is a pollutant.
   - **(vi) Diesel oil** is used as fuel to run heavy trucks and engines.
   - **(vii) Heavy oil** or lubricating oil is used as a lubricant to lubricate engines, motors and machines.

Naphthalene balls

a. A lighted lantern *b. Kerosene Stove*