

NCERT SOLUTIONS

CLASS X SCIENCE

CHAPTER 14 - SOURCES OF ENERGY

Question 1

What is a good source of energy?

Answer:

A good source of energy would be one,

1. Which would do a large amount of work per unit volume or per unit mass
2. Which would be easily accessible.
3. Which would be easy to store and transport, and
4. Perhaps most importantly, be economical.

Question 2:

What is a good fuel?

Answer:

A good fuel would be one that,

1. Is easily available
2. should not produce too much of smoke.
3. On burning should release more amount of heat.

Question 3:

If you could use any source of energy for heating your food, which one would you use and why?

Answer:

Solar energy can be used for heating food because it is easily available, it will not produce smoke and it will not release any amount of heat.

Question 4:

What are the disadvantages of fossil fuels?

Answer:

Fossil fuels are nonrenewable. Burning of coal or petroleum products cause the air pollution. The oxides of carbon, nitrogen and sulphur that are released on burning fossil fuels are acid oxides. These lead to acid rain, which affects water and soil resources

Question 5:

Why are we looking at alternate source of energy?

Answer:

The fossil fuels are nonrenewable sources of energy. So we need to conserve them. If we were to continue consuming these sources at such alarming rates, we would soon run out of energy. In order to avoid this, alternate sources of energy are being explored.

Question 6:

How had the traditional use of wind and water energy been modified for our convenience?

Answer:

The wind possesses kinetic energy. This energy was harnessed by windmills in the past to do mechanical work. Today, wind energy is also used to generate electricity.

Another traditional source of energy was the kinetic energy of flowing water or the potential energy of water at a height. Hydropower plants convert the potential energy of falling water into electricity.

Question 7:

What kind of mirror -- concave, convex or plane -- would be best suited for use in a solar cooker? Why?

Answer:

Plane mirror would be best suited for use in a solar cooker. A plane mirror is used as a reflector. The reflector is used to increase the area over which the solar energy is collected so that more and more heat rays of the sun may enter the solar cooker.

Question 8:

What are the limitations of the energy that can be obtained from the oceans?

Answer:

The energy from the oceans can be obtained mainly in three forms,

1. Tidal energy
2. Ocean waves energy
3. Ocean thermal energy

The energy potential from the sea is quite large, but efficient commercial exploitation is difficult.

Question 9:

What is geothermal energy?

Answer:

'Geo' means 'Earth' and 'thermal' means 'heat'. Thus the geothermal energy is the heat energy from the hot rock present inside the earth. This heat can be used as a source of energy to produce electricity.

Question 10:

What are the advantages of nuclear energy?

Answer:

The advantages of nuclear energy is as follows,

1. It generates electricity.
2. Diseases like cancer can be treated.
3. It helps in the improvement of agriculture and industry.

Question 11:

Can any source of energy be pollution-free? Why or why not?

Answer:

Yes, Solar energy does not cause any pollution. Solar cells make use of the 'everlasting solar energy' and their use does not produce any environmental pollution.

Question 12:

Hydrogen has been used as a rocket fuel. Do you consider it as a cleaner fuel than CNG? Why or why not?

Answer:

Yes, hydrogen is a cleaner fuel than CNG because it doesn't produce any waste. Hydrogen is an extremely good fuel because of its high calorific value.

Question 13:

Name two energy sources that you would consider to be renewable. Give reasons for your choices.

Answer:

Hydro Energy and Solar Energy

Hydro energy or water energy is a renewable source of electric energy, which will never get exhausted since water is available in plenty.

Solar energy is also known as light energy, which is obtained from the sun and it will never get exhausted.

Question 14:

Give the names of two energy sources that you would consider to be exhaustible. Give reasons for your choices.

Answer:

Coal and petroleum are the two energy sources that are considered to be exhaustible. They are nonrenewable sources of energy and are present in a limited amount in the earth. Once exhausted, they will not be available to us again.

Question 15:

A solar water heater can be used to get hot water on

1. A snowy day
2. A rainy day
3. A sunny day

Answer:

(3) a sunny day.

Question 16:

Which of the following is not an example of a biomass energy source?

1. Steel
2. Wood
3. Gobar-gas
4. Nuclear energy

Answer:

(4) Nuclear energy

Question 17:

Most of the sources of energy we use represent stored solar energy.

Which of the following is not ultimately derived from the Sun's energy?

1. Gobar- gas
2. Nuclear energy
3. Geothermal energy
4. Wind energy

Answer:

(2) Nuclear Energy

Question 18:

Compare and contrast fossil fuels and the Sun as direct sources of energy.

Answer:

Fossil fuels are nonrenewable sources of energy. These nonrenewable sources of energy (like coal, petroleum, natural gas) are present in a limited amount in the earth. Once exhausted, they will not be available to us again.

The sun is the source of all energy. The sun is a renewable source of energy. It provides us heat and light energy free of cost. The energy obtained from the sun is called solar energy. The energy coming from the sun contains heat rays, visible light, ultraviolet (UV) rays and some gamma rays.

Question 19:

Compare and contrast biomass and hydroelectricity as sources of energy.

Answer:

The waste material of living things and the dead parts of living things is called biomass. Biomass contains carbon compounds and it is the oldest source of heat energy for domestic purposes. The important examples of biomass being used as a fuel are wood, cattle, dung, and agricultural wastes like bagasse.

Hydro power plants convert the potential energy of falling water into electricity. Water energy is a renewable source of electric energy, which will never get exhausted. The construction of dams on rivers helps in controlling floods and in irrigation.

Question 20:

What are the limitations of extracting energy from

1. **The winds?**
2. **The waves?**
3. **And the Tides?**

Answer:

1. There are many limitations in harnessing wind energy. Wind energy farms can be established only at those places where wind blows for the greater part of a year. The wind speed should also be higher than 15 kmph to maintain the required speed of the turbine. There should be some back-up facilities to take care of the energy needs during a period when there is no wind.
2. The waves are generated by strong winds blowing across the sea. Wave energy would be a viable proposition only where waves are very strong.
3. Tidal energy is harnessed by constructing a dam across a narrow opening, the location where such dams can be built are limited.

Question 21:

On what basis would you classify energy sources as

1. **Renewable and nonrenewable?**
2. **Exhaustible and inexhaustible?**

Are the options in (1) and (2) the same?

Answer:

The options given in (1) and (2) are the same.

Those sources of energy, which are being produced continuously in nature are inexhaustible and are called renewable sources of energy.

Those sources of energy which get accumulated in nature over a very, very long time and cannot be quickly replaced when exhausted are called nonrenewable sources of energy.

Question 22:

What are the qualities of an ideal source of energy?

Answer:

The important qualities of an ideal source of energy is,

1. It should be a renewable source of energy.
2. It should be pollution free.
3. It should be economical.
4. It should be easily accessible.

Question 23:

What are the advantages and disadvantages of using a solar cooker? Are there places where solar cookers would have limited utility?

Answer:

The advantages of a solar cooker

1. Usage of solar cooker for cooking food saves fuel.
2. The use of solar cooker does not produce smoke due to which the environment also does not get polluted.
3. When food is cooked in a solar cooker, its nutrients do not get destroyed. This is because, in a solar cooker, food is cooked at a comparatively lower temperature.
4. In a solar cooker, up to four food items can be cooked at the same time.

The Disadvantages of a Solar cooker are:

1. The box-type solar cooker cannot make chapatis.
2. The box-type cooker cannot be used for 'frying'

The limited utility of a solar cooker is:

1. The Solar cooker cannot be used to cook the food during night hours.
2. If the day-sky is covered with clouds, even then the solar cooker cannot be used to cook food.
3. The direction of the reflector of a solar cooker has to be changed from time to time to keep facing the sun.

Question 24:

What are the environmental consequences of the increasing demand for energy? What steps would you suggest to reduce energy consumption?

Answers:

Exploiting any source of energy disturbs the environment in some way or the other. The source we would choose depends on factors such as the ease of extracting energy from that source, the economics of extracting energy from the source, the efficiency of technology available and the environmental damage that will be caused by using that source.

We cannot depend on the fossil fuels for much longer. If we manage biomass by replacing the trees we cut down for firewood, we can be assured of a constant supply of energy at a particular rate. Renewable energy is available in our natural environment, in the form of some continuing or repetitive current of energy, or is stored in such large underground reservoirs that the rate of depletion of reservoirs because of extraction of usable energy is practically negligible.

