

CHAPTER - 14

SOURCES OF ENERGY

Question 1:

What is a good source of energy?

Answer 1:

A good source of energy should have the following qualities:

- It should be easily available.
- It should do a large amount of work (or produce large amount of heat) per unit volume/mass.
- It should be easy to store and transport.
- It should be economical.
- It should cause less environmental pollution.

Question 2:

What is a good fuel?

Answer 2:

A good fuel produces a large amount of heat on burning, does not produce a lot of smoke and is easily available.

Question 3:

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

Answer 3:

We shall use LPG/CNG gas or electricity for heating our food because these are efficient ways of supplying energy. Thermal efficiency of the energy source is large, there is less pollution and the source can be used easily.

Question 1:

What are the disadvantages of fossil fuels?

Answer 1:

There are following disadvantages of fossil fuels like coal and petroleum:

- Burning of coal or petroleum causes air pollution.
- Acidic oxides like oxides of carbon, nitrogen and sulphur are released on burning fossil fuels. These oxides lead to acid rains, which affect our water and soil resources.
- Carbon dioxide gas also causes greenhouse effect in atmosphere.
- Fossil fuels are non-renewable sources of energy.

Question 2:

Why are we looking at alternate sources of energy?

Answer 2:

Fossil fuels, which have been traditionally used by human beings as an energy sources, are non-renewable sources of energy. These sources of energy are limited and cannot replenish on their own. They are being consumed at a large rate. If this rate of consumption continues, then the fossil fuels would be exhausted from the Earth. Therefore, we should look for alternate sources of energy.

Question 3:

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

Answer 3:

To use energy of flowing water large dams are built in hilly regions to store huge amount of water at a height. The stored water from high level in dam is carried through pipes to the turbine at the bottom of the dam and runs hydropower plant. Similarly, the wind energy is used to generate electricity. For the same purpose, the rotatory motion of windmill is used to turn the turbine of the electric generator.

Question 1:

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

Answer 1:

A solar cooker uses heat of the sunlight to cook the food. A concave mirror is used in order to reflect and focus sunlight at a particular area. The mirror focuses all the incident sunlight at a point. The temperature at that point increases, thereby cooking and heating the food placed at that particular area.

Question 2:

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

Answer 2:

Energy from the oceans can be obtained in the form of tidal energy, wave energy and ocean thermal energy. But these energy sources suffer from the following limitations:

- There are very few locations where dams to utilise tidal energy can be built.
- Cost of installation of power houses is extremely high and efficiency of plants is comparatively small.
- Power plants built in oceans or at sea-shores will need high continuous maintenance as chances of corrosion are extremely high.

Question 3:

What is geothermal energy?

Answer 3:

Geothermal energy is the heat energy present inside earth in certain regions called *hot spots*. Due to geological changes, molten rocks formed in the deeper hot regions of earth's crust are pushed upwards and are trapped in hot spots. When underground water comes in contact with the hot spot, steam is generated. This steam is routed through a pipe to a turbine and used to generate electricity.

Question 4:

What are the advantages of nuclear energy?

Answer 4:

The advantages of nuclear energy are as follows:

- Large amount of energy is produced per unit mass.
- It does not produce smoke. It is a clean energy.
- Fission of one atom of uranium produces 10 million times the energy released by burning of one atom of carbon.
- Fusion of four hydrogen atoms produces huge amount of energy.

Question 1:

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

Answer 1:

No source of energy can be pollution-free. It is considered that solar cells are pollution-free. However, even their making causes environmental damage indirectly. Also, in the case of nuclear energy, there is no waste produced after the fusion reactions. However, it is not totally pollution-free. To start the fusion reactions, approximately 10^7 K temperature is required, which is provided by fission reactions. The wastes released from fission reactions are very hazardous. Hence, no source of energy is pollution-free.

Question 2:

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

Answer 2:

Hydrogen can be considered a cleaner fuel because its burning produces water vapour which is non-polluting. However, due to explosive nature of hydrogen, its storage and transportation is difficult

Question 1:

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

Answer 1:

Solar energy, wind energy, ocean energy etc., are renewable sources of energy due to the following reasons:

- These forms of energy are available in plenty in our natural environment in the form of continuous currents of energy.
- These energy sources will not be depleted because their supply is large and extraction of usable energy from these sources is negligible.

Question 2:

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

Answer 2:

Coal and petroleum are two exhaustible sources of energy. These fuels were formed over millions of years ago and there are only limited reserves. If we continue to use them as at present, these reserves will be exhausted very soon.

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