Mastermind Career Institute

(Class-11 & 12 / IIT-JEE / NEET)

Chapter Notes

Class - 10

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Class X: Physics
Chapter 14: Source s of Energy

Key Learning:

1. A windmill is a simple machine that works with the energy of the wind. The windmill can be used to run a pump to draw water from the ground. It can also be used to run a flour mill to grind grain.
2. The moving water also possesses kinetic energy. The water – wheel is a device used for obtaining energy from flowing water.
3. The energy of naturally flowing water in high rivers is generally stored behind dams as potential energy and then further used to generate electricity. The electricity produced by using the energy of flowing water is known as hydro – electric power. The most important advantage of water energy is that like wind energy, it does not cause any pollution.
4. Renewable sources of energy: The renewable sources of energy are those sources which are being produced continuously in nature and are inexhaustible. The important examples of renewable source of energy are: wood, falling water, geothermal power, sun, wind,, tides, gobar gas etc.

   The renewable source are also known as non – conventional sources of energy.
5. The non – renewable sources are those sources which got accumulated in nature over a long time and can't be quickly replaced when they get exhausted. The important examples of non – renewable sources of energy are: Coal, natural gas, petroleum, uranium, etc. The non – renewable sources are also known as conventional sources of energy.
6. The energy radiated by the sun is called solar energy. It is interesting to note that the solar energy recovered on the earth in one day is about 50, 000 times more than the total energy consumed by all the nations of the world in one year.
7. There are two limitations of solar energy:

   a. The solar energy that reaches the earth is in a very diffused form

b. The solar energy is not uniformly available at all the time and all the places.

8. Any device that gets heated by the sun's energy is called a solar heating device. Such a device helps in collecting as much solar energy as possible. It is done by using a black pointed surface, a glass sheet cover and a reflector.

9. A solar cooker is a heating device which is used to cook food by utilizing the energy radiated by the sun. A solar heater is used to heat water by utilizing the energy radiated by the sun. The solar power plants are used to produce electricity by using the solar energy. The solar cells are used to convert solar energy directly into electrical energy. The solar cells are made from semi- conductor elements like silicon and germanium.

10. The oceans act as a storehouse of solar heat energy. Because the oceans covers almost 71% collector of solar heat energy. The energy collector of solar heat energy. The energy from the oceans is available in different forms. They are:
    a. Ocean Thermal Energy (OTE)
    b. Sea – waves energy
    c. Tidal energy
    d. Energy from salinity gradient in seas
    e. Energy from sea – vegetation
    f. Energy from the nuclear fusion of deuterium that is present in oceans

11. There is always some significant temperature difference between the water 'at the surface of ocean' and 'at deeper levels'. This temperature difference is even upto 2°C at enable the flow of heat. The energy available as a result of difference in the temperature water at the surface of the ocean and at deeper levels is known as ocean thermal energy. It is also abbreviated as OTE.

12. The rise of ocean water as a result of moon's attraction is called 'high tide and the fall of water is called 'low tide'. The rise and fall of tidal

waves takes place twice in a day. This gives rise to enormous movement of water between high tides and low a tides and is an excellent source of energy in many coastal areas of the world. The tidal energy can also be harnessed by constructing some tidal barrier or tidal dam.

13. Fuels are substances which are used for producing heat energy. Fuels are sued for producing electricity.
14. The waste material of plants and animals are called biomass. When plants and animal die, their biomass can be used as fuel.
15. The remains of plant and animals buried under the earth millions of years ago are known as fossils. These fossils are excellent fuels and are called fossil fuels. The common examples of fusil fuels are coal, petroleum and natural gas.
16. Petroleum is a mixture of several hydrocarbons with traces of salt, rock particles and water.
17. Fuels used directly to produce heat are called primary fuels and fuels derived from primary fuels are known as secondary fuels.
18. The nuclear reactor (commonly known as atomic reactor or atomic pile) is a specially designed furnace for carrying out the controlled fission of a radioactive material line U – 235 for producing atomic power. The heat energy produced from fission reactions is ultimately converted into electricity.
19. Nuclear fuel is the fissionable material used in the nuclear reactor for producing energy by the process of fission. The nuclear fuel used is enriched which slows down the speed of neutrons so as to cause the fission of uranium 235 effectively. Heavy water is an important moderator.
20. The process in which an unstable nucleus of a heavy atom (like U – 235) splits up into two medium - sized nuclei with the liberation of an enormous amount of energy is called nuclear fission.

$_{92}U^{235} + {}_{0}n^{1} \rightarrow {}_{56}Ba^{141} + {}_{56}Kr^{92} + 3({}_{0}n^{1}) + \text{energy}$