

Chapter – 14 Sources of Energy

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Q1. What is a good source of energy?

Answer:

A good source of energy is:

1. give a large amount of energy per unit mass.
2. cheap and easily available.
3. easy to store and transport.
4. safe to handle and use, and
5. Which does not cause environmental pollution.

Q2. What is a good fuel?

Answer:

A good fuel:

1. has a high calorific value
2. has a proper ignition temperature
3. burns without giving out any smoke or harmful gases
4. burns smoothly and does not leave behind much ash after burning
5. is cheap, easily available, easy to handle, safe to transport and convenient to store.

Q3. If you could use any source of energy for heating your food, which one would you use and why?

Answer:

I would use LPG for cooking the food because:

1. LPG has a high calorific value. It gives a lot of tea on burning.
2. It burns with a smokeless flame, so does not cause air pollution.
3. It does not produce any poisonous gases on burning.
4. It does not leave behind any ash after burning.

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Q1. What are the disadvantages of fossil fuels?

Answer:

Disadvantages of fossil fuels:

1. Fossil fuels are non-renewable sources of energy. Once exhausted, fossil fuel will not be available to us in the near future.
2. The fossil fuels produce acidic gases like sulphur dioxide and nitrogen oxides.
3. The fossil fuels produce large amount of carbon dioxide gas causing increase in greenhouse effect and global warming.
4. The fossil fuels produce smoke and ash which pollutes air.

Q2. Why are we looking at alternative sources of energy?

Answer:

alternative sources of energy are better for two reasons:

1. The fossil and nuclear fuels are limited on earth.
2. The harmful effects of pollution are from burning of fossil fuels and radioactive wastes of the nuclear power plants.

Q3. How has the traditional use of wind and water energy been modified for our convenience?

Answer:

1. The traditional use of wind energy is modified by the improved technology to generate electricity by wind-powered generators.
2. The traditional use of energy of flowing water is also modified by improved technology to generate electricity by water-powered generators.

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Q1. What kind of mirror-concave or plane-would be best suited for use in a solar cooker? Why?

Answer:

A concave mirror reflector is used in a solar cooker, because a concave reflector converges sun's heat rays to a small area at its focus so a high temperature is produced. Such a temperature is not achieved in a solar cooker by using a plane mirror reflector. Convex mirror reflector, being a diverging mirror is not used in a solar cooker.

Q2. What are the limitations of energy that can be obtained from the oceans?

Answer:

The energy from the oceans is obtained in three forms: tidal energy, wave energy and ocean energy.

Limitations: -

1. The rise and fall of water in high and low tides is cannot generate electricity on a large scale.
2. The wave energy can be harnessed, where the sea-waves are very strong. The efficiency of power plants based on wave energy is low.
3. A temperature difference of 20°C between the surface water of ocean and deeper water is necessary to harness ocean thermal energy. The efficiency of OTEC power plants is very low.

Q3. What is geothermal energy?

Answer:

Geothermal energy is the heat energy from hot rocks inside the earth which is due to fission of radioactive materials.

Geothermal energy is used to produce electricity at some place in the world.

Q4. What are the advantages of nuclear energy?

Answer:

Advantages of nuclear energy are: -

1. It produces a large amount of useful energy from a nuclear fuel.
2. the nuclear power plant can produce electricity for 2 to 3 years.
2. It does not produce gases like carbon dioxide which cause greenhouse effect or sulphur dioxide cause acid rain.

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Q1. Can any source of energy be pollution free? Why or why not?

Answer:

No source of energy is pollution free. The use of every source of energy disturbs the environment in one way or the other.

Example: the use of a wind generator, solar cooker and solar cells for energy is pollution free but the processes and devices used cause pollution and damaged the environment.

Q2. Hydrogen has been used a rocket fuel. Would you consider it a cleaner fuel than CNG? Why or why not?

Answer:

Hydrogen is a cleaner fuel than CNG, because the burning of hydrogen produces only water, which is harmless. CNG produces carbon dioxide gas and water which cause greenhouse effect in the atmosphere and lead to the excessive heating of the environment in the longer run.

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Q1. Name two energy sources that you would consider to be renewable. Give reasons for your choices.

Answer:

Hydro energy and Biomass energy are the renewable source of energy.

1. Hydro-energy is a renewable source of energy because it is supplied by the water cycle in nature and it will never get exhausted.
2. Biomass energy in wood is a renewable source of energy because trees are cut for obtaining wood, so no more trees will grow in forest.

Q2. Give the names of two energy sources that you would consider to be exhaustible. Give reasons for your choices.

Answer:

Coal and Petroleum are exhaustible energy, because are fossil fuels which were formed in the earth slowly and have taken millions of years to form and get accumulated.

Class 10 Science NCERT Textbook – Page No. 254 and 255 (Exercise)

Q1. A solar water heater cannot be used to get hot water on

- a) A sunny day
- b) A cloudy day
- c) A hot day
- d) A windy day

Answer: Object b)

A solar water heater uses the solar energy to heat the water. On a cloudy day, the sunlight is not intense and bright, so gets reflected back in the sky from the clouds which prevents the sunlight from reaching the ground.

Q2. Which of the following is not an example of a bio-mass energy source?

- a) Wood
- b) Gobar-gas
- c) Nuclear energy
- d) Coal

Answer: Option c)

Nuclear energy is obtained by fusion and fission of atoms resulting in tremendous release of energy. It is not an example of bio-mass energy source.

Q3. 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?

- a) Geothermal energy
- b) Wind energy
- c) Nuclear energy
- d) Bio-mass

Answer: Option c)

Nuclear energy is produced by nuclear fusion and nuclear fission.

Q4. Compare and contrast fossils fuels and the Sun as direct sources of energy.

Answer:

The sun is a renewable source of energy but fossils fuels are a non-renewable source of energy.

The sun's energy does not cause pollution but burning of fossils fuels causes pollution.

The sun's energy is in a diffused form but in fossil fuels it is in concentrated form.

A special device is required to utilize sun's energy but not required in case of fossil fuel.

The sun's energy is available only during the day time when the sun shines but energy of fossil fuels can be used all the time.

Q5. Compare and contrast bio-mass and hydro-electricity as sources of energy.

Answer:

Bio-mass is obtained by the dead plants and animals. It is a renewable source of energy. Example: - bio-mass sources of energies are wood, gobar gas.

Hydroelectricity is the potential energy of the stored water at a certain height which is made to fall on the turbines of the generator, generating electricity. Example: - dams and reservoirs are used in hydro-electricity.

Q6. What are the limitations of extracting energy from –

- a) The wind?
- b) Waves?
- c) Tides?

Answer:

- a) The wind energy is trapped by windmills. The windmills require a speed more than 15 km/h to generate electricity.
- b) Waves extract energy for which strong ocean waves are needed.
- c) Tides extract energy when the sun, the moon and the earth is in a straight alignment and the tides should be strong.

Q7. On what basis would you classify energy sources as

- a) Renewable and non-renewable?
- b) Exhaustible and inexhaustible?

Are the options given in a) and b) the same?

Answer:

- a) Renewable and non-renewable:

Renewable energy sources replenish on their own and are in nature. Example: - Solar energy, tidal energy, wind energy and bio-mass.

Non-renewable energy sources do not replenish on their own and have limited availability in nature. Example: - fossil fuels like petroleum, coal and natural gas.

- b) Exhaustible and Inexhaustible:

Exhaustible source of energy depletes after few hundred years like coal and petroleum.

Inexhaustible source of energy do not deplete and are available in abundant quantity like solar and wind energy.

Q8. What are the qualities of an ideal source of energy?

Answer:

Qualities of an ideal source of energy are:

1. It should be easily available
2. It should be economical
3. Easily transportable and storage
4. It should be pollution free
5. The amount of energy produced should be huge.

Q9. What are the advantages and disadvantages of using a solar cooker? Are there places where solar cookers would have limited utility?

Answer:

Advantages of solar cooker:

1. The heat source of a solar cooker is sunlight.
2. It is clean, renewable and inexhaustible.
3. it is pocket friendly.

Disadvantages of solar cooker:

1. It does not work well on a cloudy day.

Q10. What are the environmental consequences of the increasing demand for energy? What steps would you suggest to reduce energy consumption?

Answer:

The demand from industries for energy is fulfilled by fossil fuels as they are readily available. Too much exploitation of fossil fuel cause greenhouse and global warming.