

# Assignments in Science Class X

**Topic:** - Sources of Energy

## **IMPORTANT NOTES**

1. Energy plays a vital role in all walks of life. For example, heat energy is essential for cooking our food and electrical energy is essential for lighting, running machines and factories.
2. Any substance which is available easily and burns in air at moderate rate, producing large amount of heat energy, without leaving behind any undesirable residue, is called fuel.
3. The sources of energy, which have accumulated in nature over a period of hundreds of millions years, such that they cannot be replaced when exhausted, are called **non-renewable sources of energy**.
4. The non-renewable sources of energy are fossil fuels, such as, **coal, petroleum and natural gas**.
5. The sources of energy, which are being continuously produced in nature and are virtually inexhaustible are called renewable sources of energy.
6. The main renewable sources of energy are: Solar energy, wind energy, hydro energy, bio fuels (fuels from biomass, such as wood and biogas). Energy from oceans geothermal energy.
7. The fuels which are preserved under the Earth's crust as remains of plants and animals are called fossil fuels. Coal, petroleum and natural gas are examples of fossil fuel.
8. Fossil fuels are very precious. We must use them, when absolutely necessary. Otherwise, they will get exhausted in another hundred years or so, thereby causing unprecedented energy crisis, from which our world will never recover.
9. These days coal is extensively used in generating electric energy at the thermal stations or thermal power house.
10. Natural gas is also used for generating thermal electricity. It is also used as household fuel and the fuel for CNG buses.
11. Petroleum is refined into products such as petrol, diesel, kerosene oil, lubricating oil, furnace oil and petroleum gas.
12. All fossil fuels on burning produce large amount of carbon dioxide gas, small amounts of sulphur dioxide gas and nitrogen dioxide gas. The carbon dioxide gas produces greenhouse effect, which in turn results in global warming. Sulphur dioxide gas and nitrogen dioxide gas, in addition to producing respiratory problems cause acid rain. The acid rain affects our soil, water and forest resources.

13. A hydroelectric power plant is an arrangement in which kinetic energy of flowing water is transformed into electric energy. The electric energy so generated is called **hydroelectric energy**.

Potential energy of water stored in dam	Kinetic energy of flowing water	Kinetic energy of rotating turbine	Kinetic energy generated in generator
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Conversion of hydel energy into electric energy

14. Water stored in hydroelectric dams is gradually used throughout the year. As the dam gets periodically refilled when it rains, therefore, hydro energy is a renewable source of energy.
15. Firewood and waste materials produced by the living beings and the dead materials of living beings are collectively called **biomass**.
16. Amongst the waste materials of the living beings, the dung and excreta from the animals constitute the biomass. Amongst the dead materials of living beings, firewood, the leaves shed by the trees, dry grasses and crop residues constitute biomass.
17. Biogas is a mixture of gases formed when the slurry of animal dung and water is allowed to ferment in the absence of oxygen (or air). **The fermentation of animal dung that takes place in the absence of air due to the presence of anaerobic bacteria present in animal dung is called anaerobic fermentation.**
18. The biogas is a mixture of **methane, carbon dioxide, hydrogen and traces of hydrogen sulphide**, along with water vapour. The chief constituent of biogas is **methane gas** and is about 65% by volume.
19. **Moving air is called wind.** Winds are formed due to **uneven heating** of land mass and oceans. In addition, **rotation of the earth** and **local conditions** such as presence of mountains, deserts, seas, lakes, etc., also help in the formation of winds.
20. Moving wind has large amount of kinetic energy. This energy was traditionally used by sailors and fisherman to propel their boats. The same kinetic energy was used to run windmills.
21. The energy radiated out by the sun in the form of electromagnetic waves is called solar energy.
22. The amount of energy reaching perpendicularly per square meter per second in the outermost boundary of earth's atmosphere is called solar constant. The approximate value of solar constant is **1.4 kilojoules per square meter per second**.
23. A greenhouse is a house-like structure whose roof as well as walls is made of sheets of glass. It is used in very **cold countries** to grow vegetables and flowers in winter. As the green plants grow within the glass house, it is called **greenhouse** and the phenomenon is called **greenhouse effect**.
24. A device which directly converts solar energy into electric energy is called **Solar Cell**. **Photovoltaic Effect:** The phenomenon due to which light energy directly changes into electric energy, when light is incident on certain sensitive materials, is called **Photovoltaic Effect**.

25. The group of solar cells connected in specific pattern to produce desired potential difference and magnitude of current is called **Solar Panel**.
26. The solar cell is also called **photovoltaic cell**. The term **photo** stands for **light** and **voltaic** stands for generation of **potential difference**. Thus, a **photovoltaic cell** is a device which converts light energy into electric energy due to the generation of potential difference.
27. During tides an enormous amount of water in the sea rises up through a good height and then falls down. The tides have enormous amount of mechanical energy (potential energy + kinetic energy). This energy can be used to generate electricity.
28. Nuclear energy is generated by two methods. The basic principle is that when a heavy nucleus of elements such as uranium, thorium or plutonium is split or when the lighter elements such as hydrogen or deuterium is fused to form heavy element, such that the total mass of products is less than that of participating atoms, then the difference in mass is converted into energy. The energy released is given by famous equation  $E = mc^2$ , first derived by Albert Einstein in 1905.

## VERY SHORT ANSWER QUESTIONS

### IMPORTANT QUESTIONS

1. What is the main source of energy for earth?
2. How is biomass used as fuel?
3. Give two examples of primary fuels.
4. Give two examples of secondary fuels.
5. Name two fuels which can be derived from coal.
6. What is the major difference between renewable sources and non-renewable sources of energy?
7. Name the component of sunlight that mainly carries heat with it.
8. Name the type of radiation emitted by a hot electric iron.
9. Name any two materials that are used for making solar cells.
10. Name two forms in which solar energy manifests itself in oceans.
11. Name any two components of solar radiation that are not visible to us.
12. Fill in the blank space:
  - (a) \_\_\_\_\_ is a dark coloured viscous and foul smelling fossil fuel.
  - (b) The decomposition of animal dung or biomass in the absence of air is called \_\_\_\_\_ .
  - (c) The chief constituent of natural gas is \_\_\_\_\_ .
13. Name two renewable sources of energy.
14. What is the minimum wind velocity required for obtaining useful energy in a windmill?

15. Name the process that converts solar energy into chemical energy in nature.
16. Give two examples of fossil fuels.
17. Name any three varieties of coal found in nature.
18. Name any two components obtained by the fractional distillation of petroleum that are not used as a fuel.
19. State two forms in which energy is mainly utilised at our homes.
20. Write the full forms of LPG and CNG.
21. Exposure to which component of solar radiation could be health hazard?
22. Why do we use black surface in solar devices?
23. What is the advantage of using parabolic concentrator in solar heating devices?
24. What is the advantage with the use of semiconductors in the solar cells?
25. What percentage of solar energy is directly received by our Earth?
26. Define solar constant.
27. What is the magnitude of solar constant for the Earth?
28. Name three important constituents of solar light.
29. What kind of radiations is emitted by hot bodies?
30. What happens to the wavelength of radiations emitted as the temperature of hot body falls?
31. What is a solar panel?
32. Name one property of water which makes it act as storehouse of solar energy.

## **QUESTIONS FROM CBSE EXAMINATION PAPERS**

1. Name two main combustible components of biogas.
2. Why should solar cookers are to be covered with glass plate?
3. Construction of dams submerges large areas of forests, how does this contribute to the greenhouse effect?
4. Name chief component of solar cells. What energy conversion takes place in a solar cell?
5. Name two sources of energy which are pollution free.
6. What is biomass?
7. What type of energy is possessed by huge waves near the sea shore?
8. Write two different ways of harnessing energy from ocean.
9. What steps would you suggest to minimize environmental pollution caused by burning of fossil fuels?

10. The use of dry wood as domestic fuel is not considered as good. State two reasons for it?
11. What type of reflector is usually used in box type solar cooker?
12. Name the device which directly converts solar energy into electrical energy.
13. What are the two disadvantages of burning fossil fuels?
14. What are wind energy farms?
15. Thermal power plants are set up near coal or oil fields. Give reason.
16. What is solar panel?
17. What is greenhouse effect?
18. Classify CNG and hydrogen in to renewable and non-renewable sources of energy.
19. Why do we blacken the outer surface of a solar cooker?
20. Which one of the following is a renewable resource? Natural gas, petroleum, ground water, coal.
21. Firewood is our conventional fuel. List any four reasons for replacing it by the alternative sources of energy.
22. Which one of the following gases is the major constituent of biogas? Carbon monoxide, hydrogen, methane, carbon dioxide.
23. Why is biogas considered an ideal fuel for domestic use?
24. What is a solar cell?
25. Define the term 'energy'.
26. Write the largest constituent of liquefied Petroleum Gas (LPG).
27. Name the type of mechanical energy possessed by water stored behind a dam.
28. Can a solar panel be used as a source of energy in a space probe sent to Uranus or beyond?

## **SHORT ANSWER QUESTIONS**

### **IMPORTANT QUESTIONS**

1. Explain why fossil fuels are classified as nonrenewable sources of energy.
2. Why is the use of wood as a fuel not advised, although forests can be replenished?
3. Why are the secondary fuels better than primary fuels?
4. Why is the burning of firewood in traditional chulhas considered disadvantages?
5. Name three characteristics of fuels that determine their quality.
6. How will the hydro energy be affected, if there is no solar energy?
7. Name three types of fuels. Which of them is the best and why?

8. How much solar energy will be received by  $1 \text{ m}^2$  area in one hour, if the solar constant is 1.4 kilowatt per square metre?
9. State any two activities from our daily life in which solar energy is utilised.
10. What prevent us in making use of solar cell panels to meet all our domestic needs of electricity?
11. Why is tidal energy not likely to be a potential source of energy?
12. Explain why only a part of solar energy that strikes the upper regions of atmosphere, reaches the surface of earth.
13. Mention any four areas where solar cells are being used as a source of energy.
14. Describe the potential of the following as future source of energy from the oceans:  
(i) biomass          (ii) deuterium
15. Why is the efficiency of solar devices much lower than that of similar devices operated upon by electricity?
16. Why solar cells have gained much importance in the recent past?
17. Why is the zigzag copper tube painted black in a solar water heater?
18. Why should we harness solar energy? Name some devices which are used for harnessing solar energy.
19. State the function of the following in a box type solar cooker (i) glass sheet (ii) plane mirror

## **QUESTIONS FROM CBSE EXAMINATION PAPERS**

1. State in brief the reaction involved in harnessing nuclear energy from uranium. Mention any two environmental hazards involved in harnessing nuclear energy.
2. What is biomass? Name the process by which biogas is prepared from biomass. Why this gas is called gobar gas?
3. Write any two advantages of using biogas.
4. Write the general principle involved in generating nuclear energy. Name a fuel used in a nuclear reactor.
5. The difference in temperature between the surface of the sea and deeper sections can be used to obtain energy. Explain how this is done?
6. Give the disadvantages of constructing big dams across the river. How does construction of dams across the river get linked with production of greenhouse gases?
7. What do you mean by 'ocean thermal energy'? How electricity can be generated from the energy?
8. Explain why?
  - (a) Solar cookers are covered with glass plate.
  - (b) The solar cooker is painted black from inside.

9. A student constructed a model of box type solar cooker. He used a transparent plastic sheet to cover the open face of the box. He found that this cooker does not function well. What could be the possible drawbacks in his model? List any four draw backs.
10. What steps can be taken to minimize environmental pollution caused by the burning of fossil fuels?
11. How has the traditional use of wind and water energy been modified for our convenience?
12. Differentiate between renewable and nonrenewable sources of energy with one example for each.
13. Large scale use of nuclear energy becomes prohibitive due to some hazards. Discuss major hazards associated with nuclear power plant.
14. You are given with two solar cookers, one with a plane mirror as reflector and the other with concave mirror as reflector. Which one is more efficient? Give reason for your answer.
15. What are the constituents of biogas? Write any two uses of this gas.
16. What are renewable sources of energy? Give two examples.
17. What are the disadvantages of using fossil fuels?
18. You have wood, kerosene and L.P.G. Which one source of energy would you use for preparing your food and why? Give three reasons.
19. What are the disadvantages of constructing dams for hydroelectric power station?
20. Describe how hydro-energy can be converted into electrical energy. Write any two limitations of hydro-energy.
21. List any four characteristics of biogas on account of which it is considered an ideal fuel.
22. Write two advantages of classifying energy sources as renewable and non-renewable.
23. What are fossil fuels? Give two examples of fossils fuels.
24. Discuss one limitation each for extracting energy from: (a) winds (b) tides
25. What is the importance of hydropower plants in India? Describe how electric energy is generated in such plants.
26. What is a solar cell panel? Write two advantages associated with such panels.
27. Explain the principle of working of a windmill.
28. Why is energy of water flowing in a river considered to be an indirect form of solar energy?
29. Write two examples of fossil fuel. Why are they preferred to wood?
30. Name two places of our country where fields of natural gas are found. Why is it called a clean fuel? Give two reasons.
31. Describe two ways of getting useful energy from water of ocean.
32. Electricity generated with windmill is another form of solar energy. Explain.

33. People at hill stations often get sunburns on their skin. Which component of sunlight is responsible for this? Why this effect is not usually observed near sea level?

## **SHORT ANSWER QUESTIONS**

### **IMPORTANT QUESTIONS**

1. State the advantages of obtaining biogas from animal dung and biowastes.
2. Why are fossil fuels classified as non-renewable sources of energy? What steps should be taken to conserve them?
3. Mention any two advantages and two disadvantages of producing hydroelectricity by building dams on the rivers.
4. How can the energy of tides be harnessed?
5. It is difficult to use hydrogen as a source of energy, although its calorific value is quite high. Explain.
6. Mention three advantages of a solar cell.

### **QUESTIONS FROM CBSE EXAMINATION PAPERS**

1. State in brief the process of harnessing kinetic energy of the wind to do work. Mention any four limitations of harnessing wind energy on a large scale.
2. How is nuclear energy generated? State in brief the process of utilizing this energy in the production of electricity. Mention the major hazards of nuclear power generation.
3. How is charcoal different from coal? How is it prepared? State two criteria for considering charcoal a better fuel than wood for domestic purposes.
4. (a) What is a fuel? (b) Write any two characteristics of a good fuel.
5. Giving a schematic diagram of biogas plant explain the production of biogas and manure. Give the composition of bio-gas.
6. What is biomass? Draw a schematic diagram of biogas plant. Give the composition of biomass.
7. (a) How charcoal is better fuel than wood?  
(b) How does biogas plant help to reduce the problem of pollution?
8. (a) What is Geothermal energy? (b) What are the advantages of wind energy?
9. How does construction of dams across the river get linked with production of greenhouse gas? How do technological inputs improve the efficiency of biomass fuels?
10. What is biomass? Explain the principle and working of a biogas plant using a labeled schematic diagram.
11. Biogas is considered to be a boon to the farmers. Give reasons.
12. What is nuclear energy? Give two advantages and two hazards of nuclear energy.



13. Why is it not possible to make use of solar cells to meet all our energy needs? State at least three reasons to support your answer.
24. Write four characteristics of good source of energy. Explain how burning of fossil fuels cause acid rain.
15. List the disadvantages of using biomass as fuel in the conventional manner. Give two examples of technological input to improve efficiency of these fuels.
16. What is biogas? How is it obtained? Why is the use of biogas obtained from cow dung preferred to burning of cow dung cakes?
17. Write the problems faced in construction of big dams.
18. Write three limitations of harnessing three types of energy from oceans.
19. Write three advantages and three limitations of using Solar cooker.
20. Draw a labeled diagram of a biogas plant.
21. Name two semiconductors used in solar cell. What is solar cell panel? State two main advantages of solar panel.
22. What are renewable sources of energy? Classify the following into renewable and non-renewable sources of energy. Wind, Coal, Tide, Natural gas.
23. (a) Distinguish between renewable and nonrenewable sources of energy.  
(b) Choose the renewable sources of energy from the following list: Coal, Biogas, Sun, and Natural gas
24. What is biogas? Why biogas is considered an ideal fuel for domestic use?
25. How is charcoal obtained from wood? Why charcoal is considered a better fuel than wood?
26. How is energy generated in a nuclear fission reaction? What is the large scale use of nuclear energy pro-habitué?
27. Describe the various steps involved in obtaining biogas and explain what is meant by anaerobic decom-position.
28. Explain how the oceans regulate the temperature of the globe.

## **LONG ANSWER QUESTIONS**

### **IMPORTANT QUESTIONS**

1. With the help of a diagram, explain the construction and working of a box type solar cooker.
2. State the energy changes taking place in and around a hydroelectric power station when:
  - (i) Water flows into the reservoir from catchment area, such that level of water in the reservoir rises.
  - (ii) Water is released from the reservoir through iron gates by control valve.
  - (iii) The water is directed towards the turbine of hydroelectric plant.
  - (iv) The turbine is coupled to the armature of the generator.

(v) The coil of the armature rotates in magnetic field.

3. Make a list of conventional and nonconventional sources of energy. Give a brief description of harnessing one non-conventional source of energy.

## **QUESTIONS FROM CBSE EXAMINATION PAPERS**

1. What is the main basic cause for winds to blow? Name a part of India where wind energy is commercially harnessed. Compare wind power and power of water flow in respect of generating mechanical and electrical energies. What is the hindrance in developing them?

2. Name any three forms of energy of the oceans which can be converted into usable energy forms. Describe how it is done in each case. What is the likelihood of their use on a large scale?

3. What are?

(i) solar concentrators and

(ii) solar cell panels? How are they an improvement on simple devices? Why is it that solar cell panels are costly?

4. Describe the construction and working of a fixed dome type biogas plant with the help of a labeled diagram.

5. Describe sequentially the events that resulted in the formation of petroleum. Name four places where it is found in India. Name the aviation fuel used in aero plane jet engines.