



INDIAN SCHOOL AL WADI AL KABIR

Class: X	Department: SCIENCE 2020 -2021 SUBJECT : PHYSICS	Date of completion: - 30.05.2020
Worksheet No: 04 WITH ANSWERS	CHAPTER: SOURCES OF ENERGY	Note: A4 FILE FORMAT
Name of the student:	Class & Sec:	Roll No:

OBJECTIVE TYPE QUESTIONS

1. Dynamo converts the

- a. mechanical energy into electrical energy
- b. chemical energy into electrical energy
- c. heat energy into electrical energy
- d. none of the above

Ans:- a. mechanical energy into electrical energy

2. Which is the major constituent of Bio-gas?

- a. Carbon dioxide
- b. Methane
- c. Hydrogen
- d. Hydrogen sulphide

Ans:- b. Methane

3. In wind mill, the wind speed should be higher than ____ to maintain the required speed of the turbine.

- a. 5 km/hr
- b. 8 km/hr
- c. 12 km/hr
- d. 15 km/hr

Ans: d. 15 km/hr

4. Ocean thermal energy is obtained due to

- a. difference in sea level
- b. winds blowing from sea
- c. temperature difference of sea surface and depth
- d. none of the above

Ans: c. temperature difference of sea surface and depth

5. Energy trapped in earth's crust is

- a. Tidal energy
- b. Wave energy
- c. Geothermal energy
- d. thermal energy

Ans:-c. Geothermal energy

6. Assertion (A): Hydro energy is a renewable source of energy.

Reason (R): Hydro energy is inexhaustible.

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true and R is not correct explanation of A
- c) A is true and R is false
- d) A is false and R is true.

Ans:- a) Both A and R are true and R is the correct explanation of A

7. Answer question numbers 7(a) -7(d) on the basis of your understanding of the following paragraph and the related studied concepts.

Solar power in India is a fast-developing industry. The country's solar installed capacity reached 34.404 GW as of 29 February 2020. India has the lowest capital cost per MW globally to install [solar power](#) plants. Solar electricity generation recorded nearly 3.4% of total utility electricity generation in January 2019. The following table shows the Annual Solar Power Generation of the last six years.

Our country is lucky to receive solar energy for the greater part of the year. It is estimated that during a year India receives the energy equivalent to more than 5000 trillion kWh from the Sun.

Year	Solar power generation (TWh)
2013–14	3.35
2014–15	4.60
2015–16	7.45
2016–17	12.09
2017–18	25.87
2018–19	39.27

- 7(a). What are Solar cells?

(Ans:- Solar cells are devices that convert solar energy into electricity.)

- 7(b). How much voltage can be developed and how much electricity can be produced by one typical solar cell when exposed to the Sun?

(Ans:- A typical cell develops a voltage of 0.5–1 V and can produce about 0.7 W of electricity when exposed to the Sun.)

- 7(c). The future of power generation by solar energy is bright in India. Give reason.

(Ans:- Renewable source of energy.)

- 7(d). List two advantages of solar cells.

*(Ans:-Does not cause any pollution
Requires little maintenance)*

ONE MARK TYPE QUESTIONS

8. Give three major forms of fossil fuels.

(Ans:- Coal, Oil, Natural gas)

9. Write the energy conversion takes place in a hydro power plant.

(Ans:-Convert the Potential energy of falling water into Electricity.)

10. Name the part of a biogas plant where reactions takes place in the absence of oxygen.

(Ans:-Digester Chamber)

11. List two non-conventional source of energy.

(Ans:- Solar Energy, Geothermal Energy)

12. Write the name of the substance whose vapours are used to run the turbine of the generator of ocean thermal energy plant.

(Ans:- Ammonia)

TWO MARKS TYPE QUESTIONS

13. Define fuel. List any two characteristics that you would look for in a good fuel.

(Ans:- Fuels are the substances that are burnt to produce heat energy

- *High calorific value*
- *Proper ignition temperature)*

14. Why wind energy farms can be established only at specific locations? Give reasons to support your answer.

(Ans:-Wind energy farms can be established only at those places where wind blows for the greater part of the year. The wind speed should also be higher than 15km/h to maintain the required speed of turbine to generate the electricity)

15. Distinguish between renewable and non-renewable sources of energy

(Ans:- The sources of energy that get exhausted are called Non-renewable sources of energy.

Non-renewable source of energy - Coal, Petroleum, Natural Gas

The sources of energy that do not get exhausted, are called as Renewable sources of energy.

Renewable Source of energy - Air, Water, Solar radiation, Geothermal Energy, ocean waves etc.)

16. How are the wastes produced in nuclear power plants different from those produced in a thermal power plants? What happens to the waste of a nuclear power plant?

(Ans:- The waste obtained from nuclear power plants are highly radioactive in nature which emits harmful radiation whereas waste produced in a thermal power plant is non-radioactive.

- a. Nuclear waste are buried deep inside the earth kept in sealed lead nuclear waste container.*
- b. Some products are converted into less harmful products with short half-life.)*

THREE MARKS TYPE QUESTIONS

17. List any three ways in which construction of dams for production of electricity adversely affects the environment of that place.

- *(Ans:- Large areas of agricultural land and human habitation are to be sacrificed as they get submerged.*
- *Eco-systems are destroyed*
- *The vegetation which is submerged rots under anaerobic conditions and gives rise to methane which is a greenhouse gas.)*

18. How geothermal energy can be harnessed to produce electrical energy?

(Ans:- Energy harnessed from the heat of the interior of the earth is called Geo thermal energy. Due to geological changes, molten rocks formed in the deeper hot regions of earth's crust are pushed upward and trapped in certain regions called 'hot spots'. When underground water comes in contact with the hot spot, steam is generated. Sometimes hot water from that region finds outlets at the surface. Such outlets are known as hot springs. The steam trapped in rocks is routed through a pipe to a turbine and used to generate electricity.)

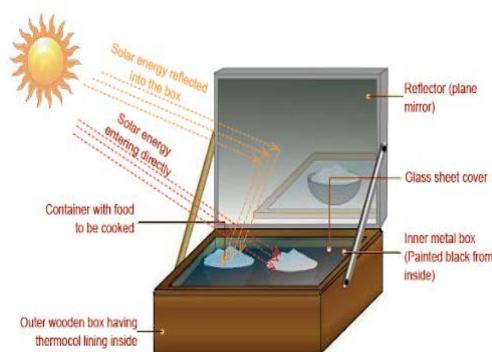
19.a. Define tidal energy

b. Explain how is tidal energy harnessed and write one limitation of the use of tidal energy

(Ans:- (i) The rise of ocean water due to attraction of moon is called high tide and its fall is called low tide. The energy obtained from tides is called tidal energy.

(ii) Tidal energy can be harnessed by constructing a dam across a narrow opening to the sea. A turbine fixed at the opening of dam converts tidal energy into electrical energy. The movement of water during high tide and low tide can be used to rotate turbine of generator and produce electricity.)

20. With the help of a diagram, explain how the design of a box type solar cooker ensures minimum loss of heat from its inside. List its three limitations



(Ans:- The box type solar cooker is blackened from inside which absorbs the heat radiation coming from the sun. The transparent glass sheet reduces the heat loss by not allowing rays to return back to space.)

Limitations

- It cannot be used during night time and on a cloudy day.
- The direction of reflector of solar cooker has to be adjusted frequently.
- It cannot be used to make chapattis or for frying)

FIVE MARKS TYPE QUESTIONS

21. What are solar cells? List the various advantages and limitations of solar cell.

Ans:-Solar cells convert solar energy into electricity.

<i>Advantages</i>	<i>Limitations</i>
<ul style="list-style-type: none"> ➤ Does not cause any pollution ➤ Requires little maintenance ➤ Work quite satisfactorily without the use of any focussing device. ➤ They can be set up in remote and inaccessible hamlets in which laying of a power transmission line may be expensive and not commercially viable. 	<ul style="list-style-type: none"> ➤ Silicon, which is used for making solar cells, is abundant in nature but availability of the special grade silicon for making solar cells is limited. ➤ The entire process of manufacture is still very expensive, silver used for interconnection of the cells in the panel further adds to the cost. ➤ The solar cell panels are mounted on specially designed inclined roof tops so that more solar energy is incident over it. The domestic use of solar cells is, however, limited due to its high cost.

22. What are the environmental consequences of using fossil fuels? Suggest the steps to minimize the pollution caused by various sources of energy including non-conventional sources of energy.

(Ans:- Environmental consequences of using fossil fuels:- Burning of Fossil fuels can release harmful gases and cause air pollution/acid rain and causes greenhouse effect

Steps to minimize the pollution:- Judicious use of energy sources,

- Minimize use of fossil fuels such as wood, coal, petrol and LPG. etc.
- Planting more trees as they release oxygen and absorb carbon dioxide gas in the atmosphere.
- Minimize the use of automobiles. Minimize the use of personal vehicles by using public transport systems.
- For the generation of electricity, use of renewable resources like wind and water in the place of fossil fuels.
- Use of recycled materials instead of plastic.)

23. State the meaning of “hot spot” in the context of earth crust. What are the merits and limitations of the energy that can be obtained from the deep inside the earth?

(Ans:-The regions where molten rocks are formed in the deeper hot regions of earth crust which are pushed upward and trapped in certain regions called hot spots.

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ➤ <i>It is a renewable source of energy.</i> ➤ <i>It involves low running cost.</i> ➤ <i>It does not create any pollution</i> ➤ <i>It helps in sustaining a clean environment.</i> ➤ <i>Maintenance cost of geothermal power plant is low</i> 	<ul style="list-style-type: none"> ➤ <i>Geographically, there are very limited number of places where geothermal power plants are likely to operate effectively.</i> ➤ <i>Enhanced geothermal system can trigger earthquakes, therefore it affects land stability severely.</i> ➤ <i>There is an abundance of greenhouse gases below the earth's surface. They might escape through the holes drilled during construction. This leads to global warming and acid rain.</i> ➤ <i>Geothermal energy cannot be easily transported unlike other sources of energy.</i>

PREVIOUS YEAR BOARD QUESTIONS

24. Define nuclear fission. Write the steps involved in generating electricity in a nuclear reactor. (CBSE 2016)

(Ans:- Nuclear fission is a process in which heavy nuclei break into lighter nuclei along with liberation of lot of energy.

- a. The heat energy produced in nuclear fission converts water into steam.
b. Steam run turbine and produce electricity.)*

25. State the principle of working of ocean thermal energy conversion plant. Explain how the plant works? Write one essential condition for it to operate properly. (CBSE 2013)

(Ans:-The water at the surface of the ocean is warmer than the water at deeper depths. The temperature difference can be used by Ocean Thermal Energy Conversion systems to generate electricity.

In the Ocean Thermal Energy Conversion plant(OTEC plant), the energy of warm surface water is used to convert low boiling point liquid ammonia into gaseous state. The vapour of ammonia at high pressure is used to spin the turbines of generators converting the Ocean Thermal energy to electricity. The used vapour passes through the condenser where cold water, pumped from the deeper parts of ocean condenses ammonia vapour into a liquid. This process is repeated again and again to get continuous production of electricity.)

26. Bio-gas is an excellent fuel. Justify the statement by giving two reasons. (CBSE 2015)

(Ans:-a. Biogas is clean fuel as it does not create pollution.

b. It makes use of waste materials and slurry left is used as a manure.)

27. State any three reasons to justify that LPG is considered an ideal fuel. (CBSE 2014)

(Ans:-a. It can be easily transported in liquefied form filled in cylinders.

b. It has high calorific value.

c. It does not create pollution)

OTHER BOARD QUESTIONS (with Hints)

28. What is a solar cell panel? Mention any three applications. (CBSE 2011)

(Ans:- Solar cell panel -Large number of solar cells connected together in a particular arrangement.

Applications-Artificial satellites stationed in outer space/ Traffic signals/ Calculator...)

29. Out of two solar cookers, one was covered with a plane glass slab and the other was left open.

Which of the two solar cookers will be more efficient and why? (CBSE 2011)

(Ans:-More efficient- Solar cooker with plane glass slab.

Reason:-Glass slab allows the heat radiation from sun to enter the solar cooker and does not allow the reflected heat radiation to go outside the box. Thus, heat gets trapped inside the box increases the temperature.)

29. Name four gases commonly present in bio-gas. State two advantages of using this gas over fossil fuels. (CBSE 2010)

(Ans:- Methane, Carbon dioxide, Hydrogen and Hydrogen sulphide.)

Advantages:- Burns without smoke, leaves no residue, Cheaper as compared to fossil fuels.)

30. Write the name of the substance whose vapours are used to run the turbine of the generator of an ocean thermal energy plant. (CBSE 2013)

(Ans:- Ammonia)

EXEMPLAR QUESTIONS

31. What is a good source of energy?

(Ans:- High calorific value)

- Easily accessible
- Easy to store and transport
- Be economical
- Non-polluting

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

(Ans:- Natural gas can be used for heating and cooking food because it is a clean source of energy. It does not produce a huge amount of smoke on burning. Although it is highly inflammable, it is easy to use, transport, and it produces a huge amount of heat on burning.)

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

i) **Coal:** It is produced from dead remains of plants and animals that remain buried under the earth's crust for millions of years. It takes millions of years to produce coal.

Industrialization has increased the demand of coal. However, coal cannot replenish within a short period of time. Hence, it is a non-renewable or exhaustible source of energy.

ii) **Nuclear sources** are exhaustible as the amount of nuclear fuels on the earth is limited)

34. Why are we looking at alternate sources of energy?

(Ans:- Conventional sources like fossil fuels are very limited. These energy reserves were created due to decomposition of organic material over the years. The rate of consumption of such sources are very high and are non-renewable. It takes millions of years to reproduce. So, we need to find an alternative source of energy. So that if there are no sources left our life can still go on without any difficulties.)

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

(Ans:- Earlier, the windmills were used to harness wind energy to do mechanical work such as lifting/drawing water from a well. Today, windmills are used to generate electricity. In windmills, the kinetic energy of wind is harnessed and converted into electricity. Water energy which was used for transportation before is now a good source to generate electricity. Dams have been constructed on rivers for generating electricity. Waterfalls were used as a source of potential energy which was converted to electricity with the help of turbines.)

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