CBSE Test Paper 05

Chapter 14 Sources of Energy

1. A solar water heater cannot be used on? **(1)**

    a. A sunny day
    b. A cloudy day
    c. A windy day
    d. A hot day

2. India exploded her first under ground nuclear device **(1)**

    a. Pokhran
    b. Kota
    c. Ranchi
    d. Jaipur

3. Statement A : obtaining energy from nuclear fusion reaction is preferable to obtaining of energy from nuclear fission reactions. , Statement B : Electricity generated by the water stored in a dam can be considered to be another form of solar energy. **(1)**

    a. Both the Statement A and B are false
    b. Both the statement A and B are false
    c. Statement A is true, Statement B is false
    d. Statement B is true, Statement A is false

4. A fuel would be regarded as 'environment friendly' if **(1)**

    a. It produces large amount of ash
    b. Its combustion products are non poisonous
    c. Its combustion products are pollutant
    d. Its calorific value is less

5. Which of the following is a primary fuel **(1)**

    A. Wood

B. Diesel
C. Natural gas
D. Kerosen

a. A and C
b. A and B
c. A and D
d. A, B and D

6. What type of energy is possessed by wind? **(1)**

7. Name two forms of energy in which solar energy manifests itself in oceans. **(1)**

8. Name two dams whose construction was opposed by local people **(1)**

9. What is the scope of wind energy in India ? **(1)**

10. What is L.P.G.? Why is it called a good fuel? **(5)**

11. Describe a solar cooker. Give its advantage. **(5)**

12. Energy from various sources is considered to have been derived from the sun. Do you agree? Justify your answers. **(5)**

13. What is pollution caused by fuels ? Give some details of pollution by coal, petrol and diesel. **(5)**

14. What are hazards of incomplete combustio? **(5)**

15. Compare and contrast fossil fuels and the sun as source of energy. **(5)**

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Answers

1. b. A cloudy day
   Explanation: Solar heater works with the help of sunlight but on a Cloudy day there is no sunlight on earth as result of which solar heater will not work.
2. a. Pokhran
   Explanation: Pokhran is a small town in district of Jaislmer(Rajasthan). Here India first time explanted nuclear power exercise. It was on May 18 1974.
3. d. Statement B is true, Statement A is false
   Explanation: Nuclear fusion creates more destruction than fission so statement A is false and solar energy helps in water cycle so statement B is true.
4. b. Its combustion products are non poisonous
   Explanation: If the products are poisonous then there will be a lot of pollution as a result of which everyone on the earth gets effects which inturn leads to the destruction of life.
5. a. A and C
   Explanation: Wood and Natural gas are the primary fuels that are found in nature and can be extracted, captured, cleaned or graded without any sort of enegy conversion or transformation processs.
6. As wind is nothing but moving air, so it posses kinetic energy
7. Tidal energy and Ocean thermal energy are two forms of energy in which solar energy manifests itself in oceans.
8. Tehri Dam (Ganga river) , Sardar Sarovar Dam (Narmada river) are two dams whose construction was opposed by local people.
9. After Germnay , U.S.A. and Denmark , India ranks fourth in world in wind power generation. Ministry of Renewable Sources of Energy is implementing the world's

largest Wind Resources Assessment Programme to support wind energy programmes. To promote utilization of wind power, a Centre of Wind Energy (C-WET) has been set up at Chennai. Out of a total capacity of 1.025 MW power of India , 380 MW is being generated at Kanya Kumari, Kerala.

10. The petroleum gas liquefied under pressure is called liquefied petroleum gas (L.P.G.) It consists mainly of butane with small amount of propane and ethane. This the domestic gas that we use. The gas used for domestic cooking purposes is called Liquefied Petroleum Gas (L.P.G.) because it is obtained from petroleum and it is liquefied by compression before filling in cylinders.

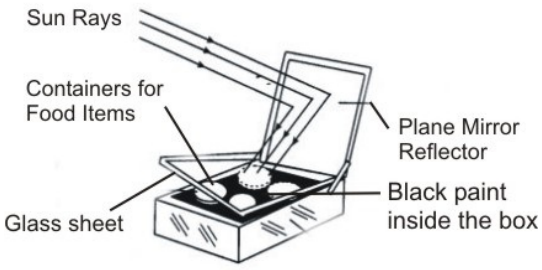
    Uses of L.P.G.

    The L.P.G. is mainly used for domestic heating purposes. It is obtained in cylinders. When we turn the knob of the gas cylinder, the pressure is released resulting in decrease of pressure inside the cylinder so that highly volatile L.P.G. changes into gas. The gas flows to the burner of the cooking stove. When ignited, the gas burns with a blue flame producing a lot of heat. This heat is used for cooking our food.

    Advantages of L.P.G.

    Liquid petroleum gas is considered to be a good fuel because of the following reasons :

    i. L.P.G. has a high calorific value. Its calorific value is about 50 kJ/g. This means that when 1 gram of L.P.G. burns in a gas stove, it produces about 50 KJ of heat energy. Therefore, it has higher efficiency as a fuel.
    ii. It is very neat and clean domestic fuel. It burns with a smokeless flame and so does not cause pollution.
    iii. It does not produce any poisonous gases on burning.
    iv. L.P.G. is easy to handle and it is convenient to store.
    v. It undergoes complete combustion.

11. 

Solar cooker is a device used for cooking food with the help of solar energy. A solar cooker consists of an insulated metal box which is painted all black from inside. A plane mirror reflector is attached to the box. There is a thick glass sheet which acts as a cover over the box. The food to be cooked is placed in the box and the box is covered with the glass sheet. The cooker is placed in the sunlight and the position of the reflector is adjusted in such a way that a strong beam of sunlight falls over the cooker top. These rays pass through the transparent glass sheet and are absorbed by the black box and the containers. The use of black surface and black containers is due to the fact that a black surface absorbs more heat than any other colour. Therefore, the box and the containers absorb maximum amount of infra-red radiation from the sunlight falling on it. As a result, the temperature inside the box rises to about 100°–140°C in two to three hours and this heat cooks the food in the containers. This type of solar cooker can be used to prepare food items which require slow heating and cannot be used for baking and frying purposes.
Advantages of Solar cooker :

a. The use of solar cooker for cooking food materials saves fuel.
b. It is cheaper method of cooking food.
c. In this method, food is cooked at comparatively lower temperature and therefore, the nutrients of food are not destroyed during cooking.

12. Yes, sun is the ultimate source of energy. Directly or indirectly, all the forms of energy derived from solar energy.

i. **Non-renewable sources of energy** Fossil fuels like coal, petroleum and natural gas are formed due to burial of large plants and ancient creatures.
ii. **Renewable sources of energy** They are indirectly derived from solar energy such as:
    a. **Energy from flowing water Clouds** are formed when water in Takes, rivers, seas, etc., evaporates due to solar energy. They bring rainfall and snow fall.
    b. **Bio-energy** Plants in the process of photosynthesis convert the solar energy into food (chemical energy). This food is consumed by animals.
    c. **Wind energy** Wind arises due to uneven heating of the earth's surface by the

sun rays at two different adjoining places. Wind possesses kinetic energy.

d. **Ocean thermal energy** Sun is responsible for the temperature difference between the water at the surface and water at depth in seas and oceans.
e. **Wave energy** The waves are generated by strong winds (due to solar energy) blowing across the sea.

iii. **Solar heating devices** They derive their energy directly from solar energy and convert it into other usable forms of energy.

13. i. **Pollution caused by fuels :** The burning of fuels releases many harmful gases and solid residues in the clean air around us. This cause danger to our lives and environment. The contamination of air with dust, smoke and harmful gases is called air pollution. Combustion of fuels is one of the major causes of pollution in atmosphere in our cities and towns. Most of the air pollution is due to the products of combustion of fuels in homes, transport and industry. The main pollutants in air are carbon monoxide, carbon dioxide, oxides of sulphur and nitrogen.

ii. **Pollution caused by burning coal :** Coal contains mainly the compounds of carbon, hydrogen, oxygen, sulphur, nitrogen etc. and some free carbon. This leads to respiratory troubles, headache, dizziness, unconsciousness, etc.

a. Combustion of coal, in the presence of insufficient supply of air liberates carbon monoxide. Carbon monoxide is very dangerous. This leads to respiratory troubles, headache, dizziness unconsciousness etc.
b. Coal contains compounds of sulphur and nitrogen. These compounds on combustion give oxides of sulphur and nitrogen which are corrosive and poisonous. Sulphur dioxide is very irritating and affects our lungs.
c. When coal is burnt, a large amount of smoke is also produced in air. The smoke contains some un-burnt particles. These particles, when inhaled, create breathing problems.

iii. **Pollution caused by Burning of Petrol and Diesel :** The major cause of air pollution in big towns and cities it's the gases produced by the burning of petrol and diesel oil in the internal combustion engines of cars, scooters, buses, trucks, motorcycles and other heavy vehicles. Methods of control the Pollution caused by Vehicles : It is difficult to control the air pollution caused by burning of petrol or diesel than those caused by burning of coal. This is due to the fact that petrol an diesel are burnt in moving vehicles. It is very difficult to control air pollution

produced by these vehicles because they keep moving from one place to another. Scientists are working with full strength to devise methods to control pollution. Some methods to decrease the pollution created by burning of petrol and diesel are :

a. The condition of engines of the vehicles should be well maintained and regularly checked so the complete combustion of fuel takes place in the engines. This will decrease the pollution due to incomplete combustion of petrol and diesel.
b. To avoid lead pollution in the environment, car engines should be redesigned so that theses can run on unleaded petrol.
c. The exhaust gases before releasing into the air be treated with catalysts like platinum so that unwanted products are converted into harmless compounds.
d. There should be proper check of pollution causing vehicles. The law should be followed strictly to get pollution check for all vehicles.
e. Vehicles should be used only when absolutely necessary. For short distance, habit of walking should be followed.

14. **Hazards of Incomplete combustion :**

Fuels contain a good amount of carbon. When combustion is complete, most of carbon gets converted into harmless carbon dioxide but when combustion is incomplete, the carbon does not burn properly resulting in following hazards :

a. Major portion of carbon gets converted into extremely poisonous carbon monoxide. Carbon monoxide pollutes the atmosphere and causes acute respiratory problems.
b. Sun emits a very large amount of ultraviolet rays which are very harmful to us. These radiations are stopped by layer of ozone gas (O_3) present between 50 to 80 km from earth. thus we are saved from harmful effect of ultraviolet rays. Carbon monoxide produced due to partially burnt carbon combines with ozone and gets converted to carbon dioxide.

$CO + O_3 \rightarrow CO_2 + O_2$

This damages ozone layer and hence exposes us to harmful of ultraviolet radiations. If the automobiles are not properly services and tuned, they produce a large amount of partially burnt carbon monoxide. This is the reason as to why the

government stresses for periodical pollution tests.

c. During partial combustion some of the unburnt carbon passages into atmosphere in form of soot. There is not only sheer wastage of fuel but also pollutes atmosphere.

15. i. Both are natural sources of energy.
    ii. Both are widely used sources of energy.
    iii. Least technology is required to get energy by any of the sources.

Contrast :

i. Sun's energy can be used only during day but fossil energy can be sued any time during day or during night.
ii. Solar energy is almost free where, as fossil energy costs much.
iii. Infinite amount of solar energy is available almost free of cost whereas there is a limited stock of fossil fuel.
iv. Solar energy is renewable source of energy where as it takes millions of year to produce fossil fuel.
v. Solar energy is totally pollution free where, as fossil fuel produces a lot of pollution.