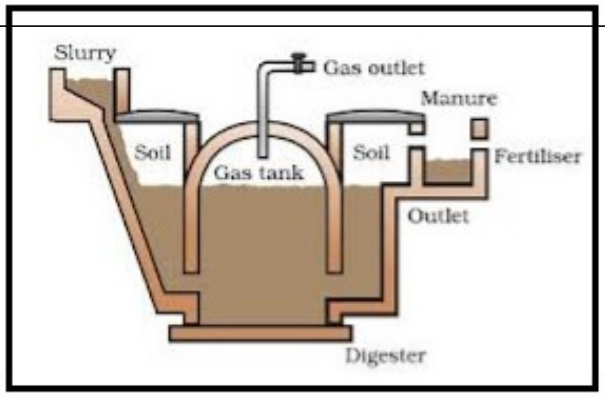
CHENNAI PUBLIC SCHOOL

• Anna Nagar • Chennai -600 101

	STD - X SOURCES OF ENERGY	
1)	Name some sources of energy. Fossil fuels, sun, wind, flowing water, bio- fuels are some sources of energy.	
2)	Name the main categories of sources of energy. (a) Renewable sources of energy (b) Non- renewable sources of energy	
3)	Name some renewable and non – renewable sources of energy. Renewable sources: wind, tides, sun, bio-mass and hydro energy Non – renewable sources: coal, petrol and CNG	
4)	What is a good source of energy? A good source of energy is that (a) which would do a large amount of work per unit volume (b) which is easily accessible (c) which is easy to store and transport and (d) that is economical.	
5)	What is a good fuel? A good fuel is one that (a) that has high calorific value (b) produces less harmful gases on combustion (c) Is cheap and easily available (d) Is easy to handle, safe to transport and convenient to store.	
6)	What are the disadvantages of fossil fuels? (a) Air pollution is caused by burning fossil fuels. (b) the fossil fuels are non- renewable sources of energy (c) The oxides of sulphur, nitrogen and sulphur that are released on burning fossil fuels are acidic oxides. These lead to acid rain which affects our water and soil resources. (d) Carbon dioxide produced by burning these fuels produce the green houseffect.	
7)	Why is there a need to look into the use of alternate sources of energy? There is a need to look into the use of alternate source of energy because (a) the fossil fuel reserves in the earth are limited which may get exhausted soon (b) the use of alternate sources of energy will reduce the pressure on fossil fuels making them last for a longer period of time (c) the pollution being caused by the burning of fossil fuels can be avoided by using alternate sources of energy.	
8)	Name the three forms of energy which could be harnessed from the oceans. (a) Tidal energy (b) sea- wave energy and (c) ocean thermal energy.	
9)	What is ocean thermal energy? The energy available due to difference in the temperature of water at the surface of the ocean and at deeper levels is called ocean thermal energy.	
10)	What are the limitations of the energy that can be obtained from the oceans? (a) There are very few sites around the world which are suitable for building tidal dams (b) Wave energy is suitable only where waves are very strong (c) The energy potential from the sea is quite large but its commercial exploitation is difficult	
11)	Define geo thermal energy The heat energy obtained from hot molten rocks inside the earth is called Geo thermal energy.	
12)	Give the construction and working of a solar cooker. Construction (i) Box (B): This is an insulated metal or a wooden box painted black from inside because black surface absorbs more heat.	

	(ii) Glass cover (G) : A cover made of two sheets of toughened glass held together is used as a cover . **(iii) Plane mirror reflector (R): Plane mirror reflector fixed in a frame is fixed to the box B as to allow the reflected sunlight to fall on the glass cover of the box.** **(iv) Cooking containers (C): A set of containers made of aluminium and blackened from outside are kept in the box B.** **<u>Working</u>:** **The solar cooker is placed in sunlight and the reflector (plane mirror) is adjusted in such way that a strong beam of sunlight enters the box through the glass sheet. The blackened metal surfaces absorb infra-red radiations from the beam of sunlight. The food absorbs heat and gets cooked.**	
13)	**What is bio-gas?** **Bio-gas is a mixture of methane, carbon dioxide, hydrogen and hydrogen sulphide.** **Bio gas is produced by the anaerobic degradation of animal wastes like cow-dung or plant wastes in the presence of water.**	
14)	**Describe the working of a biogas plant with the help of a labelled diagram.**  **The bio-gas plant has a dome –like structure built with bricks.** **A slurry of cow-dung and water is made in the mixing tank from where it is fed into the digester.** **The digester is a sealed chamber in which there is no oxygen.** **Anaerobic micro- organisms that do not require oxygen break down complex compounds of the cow- dung slurry. It takes a few days for the decomposition process to complete and generate gases.** **The bio-gas is stored in the gas tank above the digester from which they are drawn through pipes for use.**	
15)	**Define bio-mass. Give three examples.** **The material obtained from the bodies of plants and animals is called bio-mass.** **Examples: cattle-dung, sewage, crop residue, wood, etc**	
16)	**Name the main constituent of bio-gas.** **The main constituent of bio-gas is methane (75%).**	
17)	**Define anaerobic degradation.** **The decomposition which takes place in the absence of oxygen by anaerobic micro organisms is called anaerobic degradation**	
18)	**Explain solar panel.** **A solar cell is a device which converts solar energy directly into electricity. A group of solar cells is called a solar panel. It consists of a large number of solar cells joined together in a definite pattern. It provides a lot of electric energy required by artificial Satellites, water pumps, street lighting, etc.** **For joining the various solar cells in a solar panel, silver wires are used because silver metal is the best conductor of electricity having a very low resistance.**	
19)	**State two advantages and two disadvantages of geothermal energy.** **Advantages:** ➢ **The use of geothermal energy does not causes any pollution.** ➢ **The use of geothermal energy is quite economical.** **Disadvantages:** ➢ **It is not available everywhere.** ➢ **Deep drilling in the earth to obtain geothermal energy is very difficult.**	
20)	**Mention any two advantages and two disadvantages of producing hydroelectricity**	

by building dams on rivers

Advantages:

- **the generation of electricity from water does not produce any environmental pollution.**
- **Water energy is a renewable source of electric energy which will never get exhausted.**

Disadvantages:

- **A vast variety of flora and fauna (plants and animals) get affected.**
- **Dams can be constructed only at a limited number of places.**

21) Differentiate between box-type solar cooker and spherical reflector type solar cooker

Box-type solar cooker	Spherical reflector type solar cooker
1. Plane mirror is used as a reflector. 2.It does not concentrate solar energy at a point. 3. Comparatively low temperature is produced in it. 4.it is used to cook the food materials which require slow heating. 5. Baking and frying is not possible in it.	1. Concave or parabolic reflector is used. 2.It concentrates the solar energy at a point called focus. 3. Very high temperature is produced. 4.It can cook food materials which require strong heating. 5. Baking and frying can be done in it.

22) Give some peaceful uses of nuclear energy.

Nuclear energy can be used

(i) For generating electricity, (ii) In the treatment of cancer, (iii) For the improvement in agriculture and industry.

23) Explain why a sheet of glass plate is used in solar heating devices.

Glass sheet has a property that allows the infra-red rays of shorter wave length from the sun to get into the device but does not allow the infra-red rays of longer wave length to leave the solar heating device. Therefore, that energy is trapped inside the heating device. A kind of greenhouse effect is produced by the glass sheet.

24) What are the advantages of nuclear energy?

(i) It produces huge amount of energy from very small amount of a nuclear fuel.

(ii) It does not produce gases like carbon dioxide which contribute to greenhouse effect or sulphur dioxide which causes acid rain

(iii)Once the nuclear fuel is loaded into the reactor, the nuclear power plant can go on producing electricity for two to three years at a stretch.

Hence there is no need for putting in the nuclear fuel again and again.

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

Hydrogen is a cleaner fuel than CNG because the burning of hydrogen produces only water, which is completely harmless. The burning of CNG produces carbon dioxide and water. This CO_2 can produce greenhouse effect in the atmosphere and lead to the excessive heating of the environment in the long-run.

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

(i) Fossil fuels (ii) Nuclear fuels

Fossil fuels are present in a limited amount in the earth. Once exhausted, they will not be available to us again. It takes millions of years for fossil fuel to be formed. The nuclear materials which can be conveniently extracted from the earth are limited and hence they will get exhausted one day.

27)	**Compare and contrast fossil fuels and the sun as direct sources of energy.** ➢ **The reserves of fossil fuels are limited, i.e., exhaustible whereas solar energy is available in abundance (and that too without cost), i.e., inexhaustible.** ➢ **Fossils fuels cause pollution on burning whereas solar energy is pollution-free** ➢ **Fossil fuels can provide energy at any required time where as solar energy becomes unavailable when the sky is covered with clouds.**	
28)	**What are the limitations of extracting energy from** **(i) the wind (ii) waves (iii) tides** **(i) <u>the wind energy</u>** **(a) It is not available at all times.** **(b) It requires a very large area of land.** **(c) It is not possible to have a windmill everywhere as to run it, the minimum wind speed of 15 km/hr is required (only possible in open areas like the seaside).** **(ii) <u>waves energy</u>** **(a) Wave energy would be possible only where waves are very strong** **(b) It is costly to set up devices to trap wave energy.** **(c) Very few sea coasts in the world have suitable sites for the purpose of harnessing tidal energy.** **(iii) <u>tidal energy</u>** **The rise and fall of tides happen only twice in a day and is not sufficient to generate electricity continuously.**	
29)	**What is bagasse?** **Bagasse is the remaining part of the sugarcane from which juice has been extracted**	
30)	**What is the minimum wind velocity required for obtaining useful energy with a windmill?** **Minimum velocity required for obtaining useful energy with a windmill is about 15km\hr.**	
31)	**Give an example of indirect harnessing of solar energy.** **All green plants prepare carbohydrates from carbon dioxide and water in the presence of sunlight called as photosynthesis. All non-green plants and animals directly or indirectly consume food from the green plants (producers) and store this food in their bodies in the form of chemical energy. In other words, solar energy is transformed into chemical energy.**	
32)	**State the important uses of solar cells.** **Solar cells are used:** • **For providing electricity in artificial satellites.** • **For lighting the street lights, traffic signals, running television sets and radio sets in remote areas.** • **For providing electricity in lighthouses.** • **For operating electronic watches and calculators.**	
33)	**Explain why the glass sheet lid in a box-type solar cooker allows the infra-red rays present in sunlight to enter but does not allow the infra-red rays emitted by inside surface of cooker to go out.** **Glass has a property that it allows the infra-red rays of shorter wavelength to pass through, but it does not allow the infra-red rays of longer wavelength to pass through it. Thus the glass lid of a solar cooker allows the sun's infra-red rays which are of shorter wavelength to pass through, i.e., into the solar cooker but it does not allow the infra-red rays emitted by inside surface of cooker to pass through as these rays are of a longer wavelength. In this way, heat does not escape from the solar cooker.**	

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