Sources Of Energy

Multiple Choice Questions

Question 1.
Which of the following is a non-renewable source of energy?
A. Wood

B. Sun

C. Fossil fuels

D. Wind

Answer:
Since non-renewable sources are those sources which once finished cannot be renewed again for millions of years. These are limited in amount and takes millions of years to renew. Wood comes from trees so it is a renewable source of energy. Sun and Wind are also renewable sources of energy but fossil fuels are non-renewable. Once they finished, can't be renewed again for millions of years.

Question 2.
Acid rain happens because
A. sun leads to heating of upper layer of atmosphere

B. burning of fossil fuels release oxides of carbon, nitrogen and Sulphur in the atmosphere

C. electrical charges are produced due to friction amongst clouds

D. earth atmosphere contains acids

Answer:
Burning of fossil fuels lead to release of oxides of carbon, nitrogen and Sulphur in the atmosphere. These are acidic oxides and results in acid rain which has harmful effects on soil and water resources.

Question 3.

Fuel used in thermal power plants is
A. water

B. uranium

C. biomass

D. fossil fuels

Answer:
Thermal power plants use fossil fuels like coal to produce electricity. These fossil fuels are burnt in power plants in huge amount to heat the water and by producing steam, the turbine runs which results in production of electricity.

Question 4.
In a hydro power plant
A. Potential energy possessed by stored water is converted into electricity

B. Kinetic energy possessed by stored water is converted into potential energy

C. Electricity is extracted from water

D. Water is converted into steam to produce electricity

Answer:
Hydropower plant uses the potential energy of falling water from certain height to produce electricity. Since there are not much water falls, so hydropower plants are associated with Dams.

Question 5.
Which is the ultimate source of energy?
A. Water7

B. Sun

C. Uranium

D. Fossil fuels

Answer:
Sun is the ultimate source of energy because most of the energy resources derives their energy from the Sun such as bio mass, ocean thermal energy and ocean energy etc.

Question 6.
Which one of the following forms of energy leads to least environmental pollution in the process of its harnessing and utilisation?
A. Nuclear energy

B. Thermal energy

C. Solar energy

D. Geothermal energy

Answer:
Solar energy leads to least environmental pollution in the process of its harnessing and utilisation because it doesn't create any kind of fuel or waste which can harm environment. Solar energy is the most environment friendly source of energy.

Question 7.
Ocean thermal energy is due to
A. energy stored by waves in the ocean

B. temperature difference at different levels in the ocean

C. pressure difference at different levels in the ocean

D. tides arising out in the ocean

Answer:
The ocean thermal energy arises due to heating of water at the surface of sea or ocean by the radiations of Sun which results in heating of upper surface of ocean but the lower surface remains cold. This temperature difference is used to obtain ocean thermal energy.

Question 8.

The major problem in harnessing nuclear energy is how to
A. split nuclei?

B. sustain the reaction?

C. dispose off spent fuel safely?

D. convert nuclear energy into electrical energy?

Answer:
Disposal of the spent fuel in a safe manner is the major issue which is creating problem in harnessing nuclear energy because the spent fuel is highly radioactive and can't be kept in environment open. It can harm ecosystem.

Question 9.
Which part of the solar cooker is responsible for green house effect?
A. Coating with black colour inside the box

B. Mirror

C. Glass sheet

D. Outer cover of the solar cooker

Answer:
In solar cooker, glass sheet is responsible for greenhouse effect because glass sheet in solar cooker is used for capturing the energy by sun which results in trapping of energy and the energy gets accumulated inside which increases the increase in temperature resulting in greenhouse effect. It helps in generation of heat which can be used for various purposes.

Question 10.
The main constituent of biogas is
A. methane

B. carbon dioxide

C. hydrogen

D. hydrogen sulphide

Answer:
The main constituent of Biogas is methane because it contains 75% of methane and can acts as an efficient fuel.

Question 11.
The power generated in a windmill
A. is more in rainy season since damp air would mean more air mass hitting the blades

B. depends on the height of the tower

C. depends on wind velocity

D. can be increased by planting tall trees close to the tower

Answer:
The power generated in a windmill depends on the velocity of wind because power is generated by the wind. The more is the velocity of the wind, the more will be the power generated.

Question 12.
Choose the correct statement
A. Sun can be taken as an inexhaustible source of energy

B. There is infinite storage of fossil fuel inside the earth

C. Hydro and wind energy plants are non-polluting sources of energy

D. Waste from a nuclear power plant can be easily disposed off

Answer:
Sun is an inexhaustible source of energy because Sun is radiating its energy from 5 billion years and it will continue to radiate the same amount of energy even after 5 billion years. So, it is an inexhaustible source of energy.

Question 13.

In a hydroelectric power plant more electrical power can be generated if water falls from a greater height because
A. its temperature increases

B. larger amount of potential energy is converted into kinetic energy

C. the electricity content of water increases with height

D. more water molecules dissociate into ions

Answer:
Hydropower plant uses the potential energy of falling water from certain height to produce electricity. So, if the water will fall from a greater height, the potential energy will have a higher value which is then converted into kinetic energy and hence the kinetic energy will be higher resulting in generation of more electric power.

Question 14.
Choose the incorrect statement regarding wind power
A. It is expected to harness wind power to minimum in open space

B. The potential energy content of wind blowing at high altitudes is the source of wind power

C. Wind hitting at the blades of a windmill causes them to rotate The rotation thus achieved can be utilised further

D. One possible method of utilising the energy of rotational motion of the blades of a windmill is to run the turbine of an electric generator

Answer:
Wind energy is generated by the the kinetic energy of the wind which on hitting the blades of the turbine results in movement of blades which helps to run the turbine of the generator. So, it is the high speed of wind or high kinetic energy of the wind and not potential energy.

Question 15.
Choose the incorrect statement
A. We are encouraged to plant more trees so as to ensure clean environment and also provide bio-mass fuel

B. Gobar-gas is produced when crops, vegetable wastes etc., decompose in the absence of oxygen

C. The main ingredient of bio-gas is ethane and it gives a lot of smoke and also produces a lot of residual ash

D. Bio-mass is a renewable source of energy

Answer:
Ethane is not the main ingredient of bio gas instead Methane is the main constituent of the Bio gas. It contains 75% of methane and can acts as an efficient fuel.

Short Answer Questions

Question 1.
Why is there a need to harness non-conventional sources of energy? Give two main reasons.

Answer:
There is a need to harness non-conventional sources of energy due to the following two reasons:

1. They are in-exhaustible and present in nature in enough amount and can't be replenished as compared with conventional sources of energy which once replenished, can't be reproduced again for thousands of years.

2. Non-conventional sources of energy are environmental friendly. They don't create any kind of pollution. Therefore, there will be no harm to mankind and environment from use of non-conventional sources of energy.

Question 2.
Write two different ways of harnessing energy from ocean.

Answer:
The two different ways of harnessing energy from ocean are:

1. Tidal energy: Due to the gravitational pull of Moon on Earth results in rise in the level of the ocean which causes high and low tides. The difference in the ocean-level results in tidal energy. This energy can be harnessed by construction of dams across the Sea.

2. Ocean Thermal Energy: The ocean thermal energy arises due to heating of water at the surface of sea or ocean by the radiations of Sun which results in heating of upper surface of ocean but the lower surface remains cold. This temperature difference is used to obtain ocean thermal energy.

Question 3.
What steps would you suggest to minimise environmental pollution caused by burning of fossil fuels?

Answer:
The steps which can be taken to minimise the environmental pollution caused by burning of fossil fuels are as follows:

1. Switching over to non-conventional sources of energy such as wind energy, solar energy and ocean energy to reduce the pollution.

2. Switching to the CNG over fossil fuels in automobiles.

3. Afforestation: Growing more trees will help in reducing pollution.

4. Use of solar cookers for cooking food instead of biogas.

5. Avoiding use of biogas for cooking instead using LPG gas for cooking purposes.

Question 4.
What is the role of a plane mirror and a glass sheet in a solar cooker?

Answer:
The plane mirror is used in a solar cooker to focus the rays coming from the Sun. Glass sheet in solar cooker is used for capturing the energy by sun which results in trapping of energy and the energy gets accumulated inside which increases the increase in temperature resulting in greenhouse effect. It helps in generation of heat which can be used for various purposes.

Question 5.
Mention three advantages of a solar cell?

Answer:
The three advantages of a solar cell are as follows:

1. Solar cell doesn't have any moving parts.

2. It requires less maintenance.

3. It works efficiently without use of any focussing device.

4. Solar cells can be set up in remote areas where laying of power transmission line is economical.

5. It doesn't create any kind of pollution and is environmental friendly.

Question 6.
What is biomass? What can be done to obtain bio-energy using biomass?

Answer:
The sources of the fuel which are produced from plant and animal waste is known as biomass. Bio-energy can be obtained using biomass in a plant which has a dome like structure built with bricks. A slurry of cow-dung and water is mixed in mixing tank from where it is fed into the digester. These complex compounds of cow-dung and slurry, is decomposed with the help of anaerobic microorganisms. After few days of decomposition, Methane, Carbon dioxide, Hydrogen and Hydrogen sulphide gases are generated. The biogas is then stored in the gas tank

above the digester from which they are then drawn to the pipes for usage. In this way, bio-energy is obtained by using biomass.

Question 7.
What are the limitations in obtaining energy from wind?

Answer:
The limitations in obtaining energy from the wind are as follows:

1. Wind energy farms can be established only at the places where wind blows for a greater part of year.

2. The wind speed to generate wind energy should be greater than 15 Km/h to maintain the speed of turbine as required.

3. There should be some backup facility which should be used to store energy when there is no wind.

4. Establishment of large wind farms are required to large areas of land.

5. It is highly economical.

Long Answer Questions

Question 1.
Which is the process used to harness nuclear energy these days? Explain it briefly.

Answer:
The process which is used to harness the nuclear energy these days is Nuclear fission reaction where the nucleus of heavy atoms is bombarded with the low energy neutrons and can be split it into lighter nuclei. A huge amount of energy is produced during nuclear fission reaction. It produces 10 million times the energy produced during the combustion of carbon from coal. The energy released during

the nuclear fission reaction produces steam and therefore, helps in generating electricity.

In nuclear fission reaction, the difference in mass Δm, between the original nucleus and the nuclei which is obtained as a product is converted to energy E at a rate which is given by the equation:

E = Δmc2

Where, c is the speed of light in vacuum.

Question 2.
How can solar energy be harnessed? Mention any two limitations in using solar energy. How are these limitations overcome?

Answer:
Solar energy can be harnessed by using a solar cooker. Solar cooker is the device which uses solar energy for cooking of food. Solar cooker functions as follows:

It is made up of an insulating wooden box which is painted with black colour from inside. The box is covered with a glass and consists of a plane mirror which reflect the radiations of sun and focus the rays from Sun. The food which is to be cooked is kept in the containers inside the Solar cooker and then they are covered with the glass sheet. The Rays coming from the Sun are absorbed by the black surface of the box and there is rise in the temperature which led to cook the food.

The limitations in using the solar energy are as follows:

1. Solar cooker can't be used at night because of absence of Sun's radiations.

2. There is a need to change the direction of the reflector so that radiations should fall on the solar cooker.

The limitations can be overcome by using a solar cell which converts solar energy into electricity.

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

Answer:
The conventional sources of energy are as follows:

Fossil fuels such as Coal, Petroleum, Diesel and Natural gas.

The non-conventional sources of energy are: Wind Energy, Solar energy, Ocean Energy and Nuclear Energy.

The process which is used to harness the nuclear energy is: Nuclear fission reaction and Nuclear Fusion Reactions

Nuclear fission reactions are the reactions where the nucleus of heavy atoms is bombarded with the low energy neutrons and can be split it into lighter nuclei. A huge amount of energy is produced during nuclear fission reaction. It produces 10 million times the energy produced during the combustion of carbon from coal. The energy released during the nuclear fission reaction produces steam and therefore, helps in generating electricity.

Nuclear fusion reactions are the reactions in which lighter nuclei are combined together to form heavy nuclei which results in tremendous amount of energy.

Question 4.
Why is there a need for harnessing non-conventional sources of energy? How can energy be harnessed from the sea in different ways?

Answer:
There is a need to harness non-conventional sources of energy because non-conventional sources of energy are environment friendly and doesn't create any kind of pollution. Moreover, Non-renewable sources of energy are inexhaustible and can be used as an alternative source of energy because fossil fuels are limited and once they exhausted, they can't be reused again. So, there is a strong need to switch to non-conventional sources of energy.

The two different ways of harnessing energy from ocean are:

Tidal energy: Due to the gravitational pull of Moon on Earth results in rise in the level of the ocean which causes high and low tides. The difference in the ocean-level results in tidal energy. This energy can be harnessed by construction of dams across the Sea.

Ocean Thermal Energy: The ocean thermal energy arises due to heating of water at the surface of sea or ocean by the radiations of Sun which results in heating of upper surface of ocean but the lower surface remains cold. This temperature difference is used to obtain ocean thermal energy.

Wave Energy: The kinetic energy which is possessed by the huge waves of the sea can be used for generating the energy in form of electricity. This energy is used for rotation of turbine and thus in production of electricity.

Question 5.
What are the environmental consequences of using fossil fuels? Suggest the steps to minimise the pollution caused by various sources of energy including non-conventional sources of energy.

Answer:
The environmental consequences of using the fossil fuels are as follows:

1. Burning of fossil fuels resulted in Air pollution.

2. The burning of fossil fuels causes release of acidic oxides like Carbon, Nitrogen and Sulphur which causes Acid rain.

3. The acid rain has severe impact on soil and water resources.

4. Due to Air pollution by burning of fossil fuels has resulted in change in climatic conditions.

5. Global warming and Green house effect are some of the consequences of using of fossil fuels.

The various steps which can be used to minimise the pollution caused by various sources of energy including non-conventional sources of energy are as follows:

1. Switching over to non-conventional sources of energy such as wind energy, solar energy and ocean energy to reduce the pollution.

2. Switching to the CNG over fossil fuels in automobiles.

3. Afforestation: Growing more trees will help in reducing pollution.

4. Use of solar cookers for cooking food instead of biogas.

5. Avoiding use of biogas for cooking instead using LPG gas for cooking purposes.

Question 6.
Energy from various sources is considered to have been derived from the sun. Do you agree? Justify your answer.

Answer:
Energy from various sources is considered to have been derived from the Sun. This statement is correct because Sun is the ultimate source of energy because most of the energy resources derives their energy from the Sun such as bio mass, ocean thermal energy and ocean energy etc. Ocean thermal energy is produced by heating of water surface by Sun which results in difference in temperature which can be used for production of energy. Similarly, unequal heating of landmass and water bodies results in air movement and causes blowing of wind. This wind is then used in windmills to produce electricity by moving the turbine of generator. So, Energy from various sources is considered to be derived from Sun.

Question 7.
What is biomass? Explain the principle and working of a biogas

plant using a labelled schematic diagram.

Answer:

The sources of the fuel which are produced from plant and animal waste is known as biomass.

Bio-energy can be obtained using biomass in a plant which has a dome like structure built with bricks. A slurry of cow-dung and water is mixed in mixing tank from where it is fed into the digester. These complex compounds of cow-dung and slurry, is decomposed with the help of anaerobic microorganisms. After few days of decomposition, Methane, Carbon dioxide, Hydrogen and Hydrogen sulphide gases are generated. The biogas is then stored in the gas tank above the digester from which they are then drawn to the pipes for usage. In this way, bio-energy is obtained by using biomass.

Biogas acts as efficient fuel and produces 75% of methane gas which is environment friendly.