SOURCES OF ENERGY

Question 1

Question: Name the following:
1) Two renewable sources of energy (non - conventional)
2) Two non-renewable or conventional sources of energy
3) Two forms of energy usually used at homes
4) The radiation emitted from a hot source
5) The component of sunlight that is absorbed by the ozone layer of the atmosphere.
6) Two activities in our daily life in which solar energy is used
7) The kind of surface that absorbs maximum heat
8) The device that directly converts solar energy into electrical energy
9) The range of temperature attained inside a box-type solar cooker placed in the sun for 2-3 hours
10) The two elements which are used to fabricate solar cells

Answer:
1) Sun and wind
2) Coal and Wood
3) Heat energy and Electrical energy
4) Infra-red rays
5) Ultra-violet rays
6) Cooking food using solar cookers and drying clothes and food grains
7) Black Surface
8) Solar cell
9) 100 ^{o}C - 140 ^{o}C
10) Silicon and Germanium

Question 2

Question: State an important characteristic of a source of energy.

Answer: It should supply enough amount of useful energy in a controlled manner.

Question 3

Question: Which component of sun's energy is responsible for drying clothes?

Answer: Infra-red rays

Question 4

Question: Define solar constant.

Answer: The amount of solar energy received per second by 1m^2 area of the earth's surface at an average distance between the sun and the earth. It's value is 1.4 kW/m^2.

Question 5

Question: What type of energy is possessed by wind?

Answer: Kinetic energy

Question 6

Question: Though a hot iron emits radiations, it is not visible to us. Why?

Answer: It emits infra-red radiations which are invisible to the eyes.

Question 7

Question: What type of radiations is emitted by a 100 W electric bulb?

Answer: Visible light and infra-red radiations are the two types of radiations emitted by a 100 W electric bulb.

Question 8

Question: How is the conductivity of a semi-conductor affected when light falls on it?

Answer: The conductivity of the semi-conductor increases.

Question 9

Question: What is the main cause for winds to blow?

Answer: Due to unequal heating of the earth's surface there is a difference in pressure in the atmosphere. The air moves from region of high pressure (cold region) to the region of low pressure (hot region). This moving air is called wind.

Question 10

Question: What is the minimum wind speed required for generating electricity in a wind mill?

Answer: The wind velocity must be at least 15km/hr.

Question 11

Question: What is a wind farm?

Answer: The region where large number of windmills is erected to produce electricity is called a wind farm.

Question 12

Question: Name the constituent elements present in coal.

Answer: Carbon, Hydrogen, Oxygen and small amount of sulphur and nitrogen are present in coal.

Question 13

Question: Where are the thermal power plants generally setup?

Answer: Near coal or oil fields so that the fuel can be easily transported.

Question 14

Question: What is the principle involved in the working of the thermal power plant?

Answer: In a thermal power station, coal is burnt in a boiler and the water in the boiler is converted to steam. Steam under high-pressure is directed onto a turbine, to turn the turbine shaft. This shaft which is connected to an electrical generator produces electricity as it turns. A condenser converts the spent steam from the turbine back to water and this water is pumped back into the boiler.

Question 15

Question: What is the energy conversion involved in a thermal power plant?

Answer: In a thermal power plant the chemical energy stored in fossil fuels or radioactive substances is converted successively into thermal energy, mechanical energy and, finally to electrical energy.

Question 16

Question: What kind of energy does the flowing water possess?

Answer: Kinetic energy

Question 17

Question: How does construction of dams on rivers help mankind?

Answer: It helps in controlling floods and also helps in irrigation.

Question 18

Question: Why is biomass considered as a steady source of energy?

Answer: Biomass is considered as a steady source of energy due to the large livestock population of our country.

Question 19

Question: What is Biomass?

Answer: Biomass is an organic material obtained from plants and animals. Some examples of biomass fuels are wood, crops, manure, and some garbage.

Question 20

Question: What is biogas?

Answer: Biogas is a mixture of various gases formed when the animal dung mixed with water is allowed to decompose by anaerobic micro organisms.

Question 21

Question: Which gases constitute the biogas?

Answer: Methane, carbon-di-oxide, hydrogen and hydrogen sulphide are the main constituents of the biogas.

Question 22

Question: What are the uses of biogas?

Answer: Used in gas stove as fuel in rural areas, street lighting and also for running engines.

Question 23

Question: What are the raw materials required for a biogas plant?

Answer: Animal dung, poultry wastes, plant wastes, human excreta, industrial wastes and domestic wastes.

Question 24

Question: What is the principle of the biogas plant?

Answer: Biogas is produced as a result of anaerobic fermentation of biomass in the presence of water.

Question 25

Question: What is combustion?

Answer: The chemical process in which a substance burns in air or oxygen with the release of heat and light energy is called combustion.

Question 26

Question: What is anaerobic degradation?

Answer: Decomposition taking place in the absence of oxygen by anaerobic bacteria is known as anaerobic degradation.

Question 27

Question: Define ignition temperature.

Answer: The minimum temperature at which a substance catches fire and starts burning.

Question 28

Question: Why is the slurry from a bio-gas plant used as manure?

Answer: It is rich in nitrogen and phosphorous and is thus excellent manure.

Question 29

Question: Write the principle of the windmill?

Answer: The blowing wind strikes across the blades of the windmill which is placed at an angle. The wind exerts a force on these blades and rotates it. This in turn rotates the turbine to generate electricity.

Question 30

Question: Why is wind energy maps prepared?

Answer: It gives us an idea of the average wind velocity throughout the year at different places.

Question 31

Question: Where is the largest wind energy farm established in India?

Answer: The largest wind energy farm in India is located at Kanyakumari in Tamil Nadu.

Question 32

Question: What are the different forms of energy obtained from ocean?

Answer: Tidal energy, Wave energy and Ocean thermal energy.

Question 33

Question: What is the energy conversions involved in the tidal powered electric plant?

Answer:

Question 41

Question: What is a nuclear reactor?

Answer: A nuclear reactor is a device or a furnace where controlled fission chain reaction is carried out and the energy released is used to generate electricity.

Question 42

Question: Define nuclear fusion reaction.

Answer: Nuclear fusion is a reaction in which two or more light nuclei combine to form a heavier nucleus releasing an enormous amount of energy.

Question 43

Question: Why is fusion reaction preferred to fission reaction?

Answer: The fusion reaction releases energy which is ten times more than fission process. Moreover there are no radioactive by-products that need to be disposed.

Question 44

Question: Give two main differences between renewable and non-renewable sources of energy.

Answer:

Renewable Source of Energy	Non -renewable Source of Energy
Can be used again and again	Cannot be used again and again
Not exhaustible (non-conventional energy)	Is exhaustive (conventional energy)
Examples: Solar energy, Wind energy	Examples: Coal and petroleum

Renewable Source of EnergyNon -renewable Source of EnergyCan be used again and againCannot be used again and againNot exhaustible (non-conventional energy)Is exhaustive (conventional energy)Examples: Solar energy, Wind energyExamples: Coal and petroleum

Question 45

Question: A sheet of glass is used in solar heating devices. Why?

Answer: Glass sheet has a property that allows the infra-red rays of short wavelength from the sun to get into the device but does not allow the infra-red rays of longer wavelength to leave the solar heating device. Thus the energy is trapped inside the heating device. Glass sheet produces green-house effect.

Question 46

Question: Why is a reflector used in a solar cooler?

Answer: The plane mirror is used as reflector. It is used to concentrate solar energy inside the device and thereby increase its efficiency.

Question 47

Question: Why is the inner side of the solar cooker painted black?

Answer: Black colour is a very good absorber of heat and a very poor reflector. So it maximises the absorption of heat and also retains heat.

Question 48

Question:
1) The use of wood as a fuel is not advised although forests can be replenished. Explain why?
2) The use of dry wood as domestic fuel is not considered as good. State any two reasons for it.

Answer: 1) Deforestation (i.e., cutting of tress in large number) causes many problems like floods, erosion of fertile land and environmental imbalance.

2) Replenishment of forests takes long time and as such wood cannot be available to supply continuous energy.

Question 49

Question: Why the sun is called the ultimate source of fossil fuels?

Answer: Fossil fuels are formed by the deposition of plants and animals in the course of millions of years. These plants and animals during their lifetime directly or indirectly were depended on the sun for their survival.

Question 50

Question: How were fossil fuels formed?

Answer: The dead plants and animals which were buried deep under the earth for millions of years got converted into fossil fuels like coal, petroleum and natural gas. This happens because of absence of oxygen, high pressure, heat and bacterial action.

Question 51

Question: Mention two disadvantages of using wood as fuel.

Answer: 1) While burning wood, major portion of the heat is lost to the surroundings and only 8% of the total heat is actually used for cooking so it is wasted.

2) Lot of smoke is produced due to incomplete combustion leading to air pollution and health hazards.

Question 52

Question: State two limitations of solar energy.

Answer: 1) The solar energy reaches the earth's surface in a diffused form. It has been estimated that the solar energy received in the upper atmosphere is 1.4 kW/m^2. Thus, it is too small for doing useful work.

2) It is not available uniformly all the time and at all the places of the earth. It is more in the Equatorial Regions than in the Polar Regions.

Question 53

Question: State two limitations of biogas plants.

Answer: 1) The initial cost of installation is very high.

2) The number of cattle owned by an average family of farmers is inadequate to feed a biogas plant.

Question 54

Question: What are the two advantages of wind energy?

Answer: 1) Wind energy is a natural resource and is available with out any cost
2) It does not cause any kind of pollution

Question 55

Question: Explain the principle underlying the working of a solar cell.

Answer: Solar cell is a device which directly converts solar energy into electrical energy. This principle is based on the phenomenon of photovoltaic effect. The Phenomenon due to which light energy directly changes into electrical energy, when light is incident on certain sensitive materials (semi conductors) is called photovoltaic effect.

Question 56

Question: What is a solar panel?

Answer: A group of solar cells connected in specific pattern to produce desired potential difference and magnitude of current is called a solar panel. The energy stored in the solar panel with the help of storage batteries gives us only direct current.

Question 57

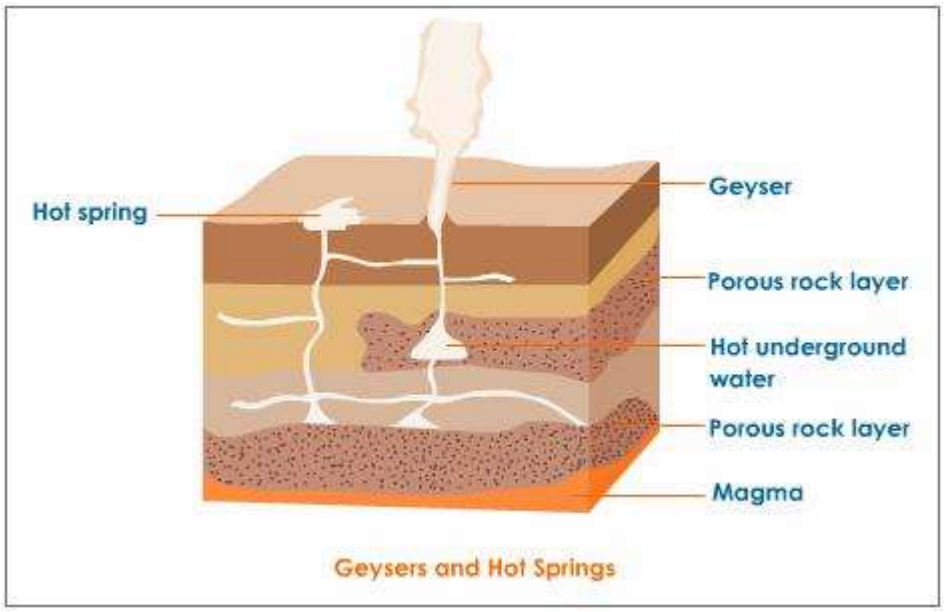
Question: State the two limitations of tidal energy.

Answer: 1) The tides do not possess enough energy to generate electricity on a large scale.
2) Only few sites are suitable for building such barrages.

Question 58

Question: How are hotspots created in the earth's crust?

Answer: The upper part of the mantle is very hot (1500 ^{o}C) and as a result the rocks in contact with gets heated up. Rain water which seeps into the ground slowly percolates through the cracks in the upper crust and they also get heated. This water gets collected at certain places close to the earth's surface and are called hotspots.



Question 59

Question: What are natural geysers?

Answer: In some places, the steam formed under the surface of the earth does not get trapped. Instead it forces its way up through the cracks in the rocks along with hot water and gushes out from the surface of the earth to form natural geysers.

Question 60

Question: What are the two kinds of nuclear reactions? Define them.

Answer: Nuclear Reactions are broadly classified as nuclear fission reaction and nuclear fusion reaction. Nuclear Fission Reaction The process of splitting of a heavy nucleus into a number of light nuclei with the liberation of tremendous amount of energy and two or three neutrons is called nuclear fission. Nuclear Fusion Reaction Nuclear fusion is a reaction in which two or more light nuclei combine to form a heavier nucleus releasing an enormous amount of energy. Nuclear fusion takes place at a very high temperature of the order of 10^{7} Kelvin.

Question 61

Question: Write two differences between nuclear fission and fusion reactions.

Answer:

Nuclear Fission	Nuclear Fusion
A heavy nucleus splits up into two or more light nuclei	Two light nuclei combine together to form a heavy nucleus
Harmful nuclear radiations are emitted and this causes pollution	No harmful radiations are emitted and hence pollution free

Nuclear FissionNuclear FusionA heavy nucleus splits up into two or more light nucleiTwo light nuclei combine together to form a heavy nucleusHarmful nuclear radiations are emitted and this causes pollutionNo harmful radiations are emitted and hence pollution free

Question 62

Question: What principle governs the nuclear reactions?

Answer: When a heavy nucleus of elements like Uranium or Plutonium is split or when the lighter elements such as hydrogen or deuterium is used to form a heavy element, the total mass of products is less than that of participating atoms. This difference in mass is converted into energy. This energy released is given by Einstein's famous equation $E=mc^2$ where 'E' stands for energy released, 'm' stands for difference in mass of the original and the product nucle and 'c' stands for velocity of light which is equal to 3×10^8 m/s.

Question 63

Question: Why is biogas a better fuel than animal dung cakes?

Answer: Biogas is a better fuel than animal dung cakes, because:
1) Burning of animal dung - cake causes lot of pollution whereas biogas is smokeless fuel.
2) The calorific value of animal dung-cake is much lower than that of biogas.
3) Animal dung cakes leave residue after burning whereas biogas leaves no residue.

Question 64

Question: State the characteristics of a good fuel.

Answer: A good source of fuel would be the one which would:
1) do a large amount of work per unit volume or mass
2) be easily accessible
3) be easy to store and transport and
4) be economical

Question 65

Question: State the advantage of hydel energy?

Answer: 1) The water required for generating hydel power is available free of cost
2) Hydel power stations are pollution free
3) The construction of dams on the rivers helps in the flood control and provides water for irrigation

Question 66

Question: State the limitation of hydel energy.

Answer:

1. A vast variety of flora and fauna as well as human settlements get submerged in the water of the reservoir. Thus, animals and people are rendered homeless.

2. It disturbs the ecological balance in the downstream area of the river. As there are no annual floods due to construction of the dam. This downstream region does not get nutrient rich silt and decreases the fertility of the soil and finally the crop yields also decrease.

3. The fish in the downstream area do not get sufficient nutrient materials and they die.

4. The vegetation which is submerged rots under anaerobic conditions and gives rise to large amounts of methane which is a green- house gas.

5. It creates the problem of satisfactory rehabilitation of displaced people

Question 67

Question: Mention the conditions necessary for the formation of biogas.

Answer: 1) A fairly large amount of water should be added to the animal dung to make the slurry.

2) This slurry should be made to ferment only in the absence of air (anaerobic fermentation)

3) The temperature of the slurry should be maintained around 35 ^{o}C

Question 68

Question: Mention the advantages of fixed dome type biogas plant.

Answer: 1) It requires raw materials which are easily available like animals and plant waste, human excreta, waste food materials etc.

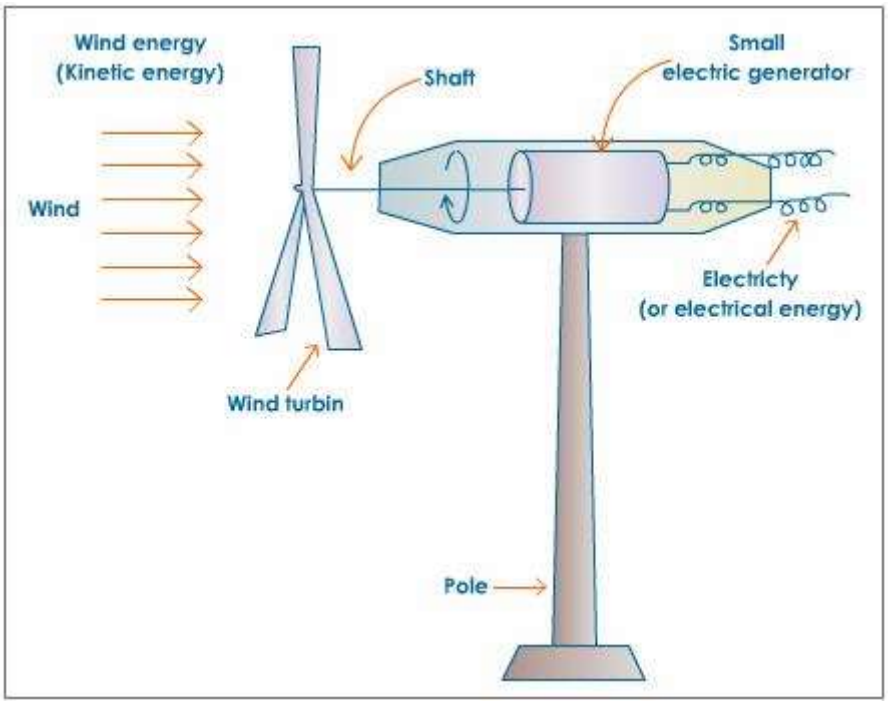
2) It is inexpensive

3) The construction of the plant is easy as it is constructed by cement and bricks

Question 69

Question: Explain the working of a windmill.

Answer: Wind turbines are used to produce electricity. The windmills that generate electricity are conventional in their propeller design, which employs 2 or 3 tapered blades.



The axle of the windmill is connected to the shaft of an armature in the generator. When the fast moving wind rotates the blades of the windmill, the armature inside the generator rotates and produces electricity.

Question 70

Question: Describe a simple activity to show that a black surface absorbs more heat than a white one. What is your observation and inference?

Answer: 1) Take two conical flasks and paint one white and the other black
2) Fill them with equal amount of water and place them in sunlight for one hour
3) Touch the flasks and find out which one is hotter
4) You may also use a laboratory thermometer to record the exact temperature

Observation and Inference The thermometer in the black conical flask records a higher temperature. This is because black surface absorbs more heat than any other surface under identical conditions. The above concept is used in designing the device called the solar cooker.

Question 71

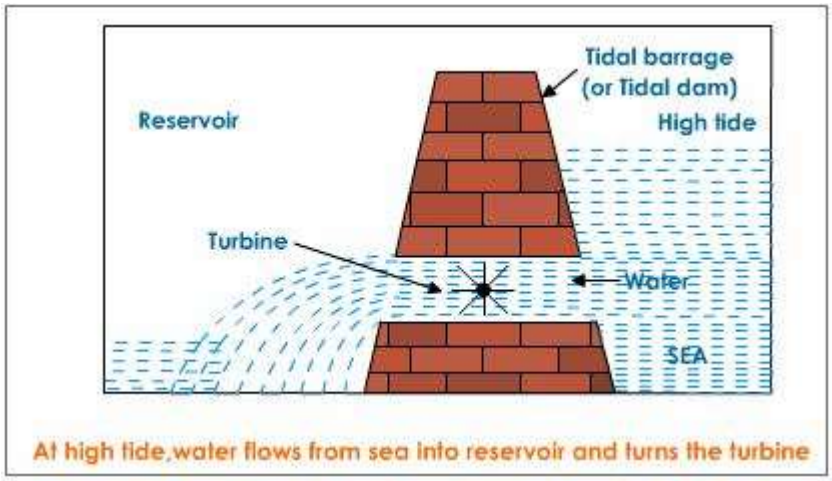
Question: List the uses of solar cells.

Answer: A Solar cells or solar cell panels are used in:
1) Artificial satellites and in space probes like Mars orbiters
2) Wireless transmission systems or TV relay stations in remote locations
3) Traffic signals, calculators and in toys

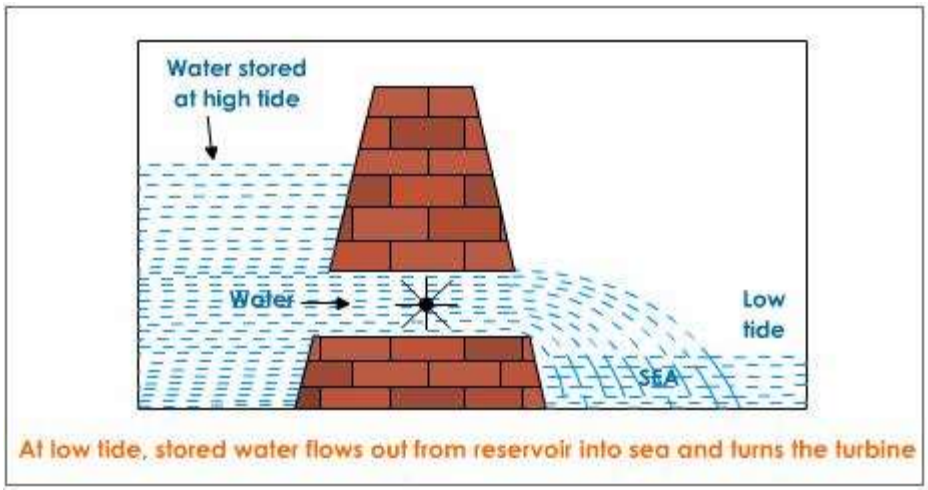
Question 72

Question: Explain the working of tidal energy power plant with a neat diagram.

Answer: During high tide, when the level of water in the sea is high, sea-water flows into the reservoir of the barrage and turns the turbines. The turbines then turn the generator shaft to produce electricity.



During low tide, the sea-water stored in the barrage reservoir is allowed to flow out into the sea. This flowing water also turns the turbines and generates electricity. Thus, as the sea-water flows in and out of the tidal barrage during high and low tides, the turbines rotate continuously to generate electricity.



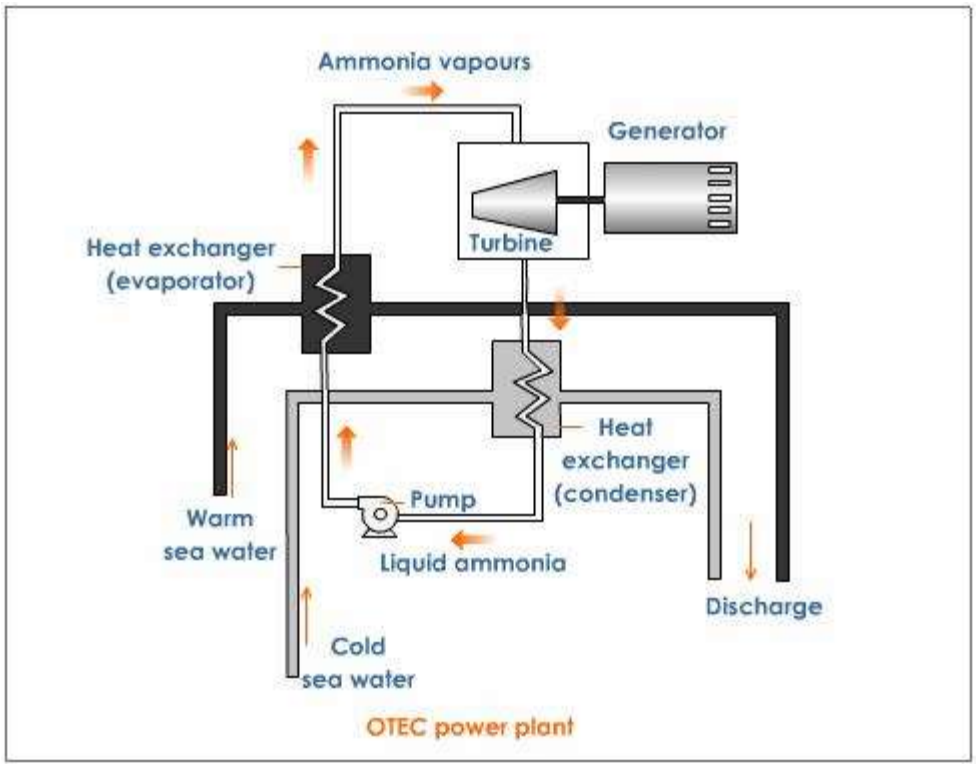
The energy conversion involved in a tidal power plant is given below:

Question 73

Question: Write a short note on ocean thermal energy.

Answer: The water at the surface of an ocean gets heated by the heat of the sun and attains a higher temperature than the colder water at deeper levels in the ocean. So, there is always a temperature difference between the water "at the surface of ocean" and "at deeper levels." At many places in the ocean, this difference in temperatures of water is up to 20^{o}C. The energy available due to the difference in the temperature of water at the surface of the ocean and at deeper levels is called ocean thermal energy (OTE). The ocean thermal energy can be converted into "usable form" of energy like electricity. This can be done as follows:

The devices used to harness ocean thermal energy are called Ocean Thermal Energy Conversion power plants (or OTEC power plants). In one type of OTEC power plants, the warm surface water of ocean is used to boil a liquid like ammonia or a chlorofluorocarbon (CFC). The high pressure vapours of the liquid (formed by boiling) are then used to turn the turbine of a generator and produce electricity. The colder water from the deeper ocean is pumped up to cool the used up vapours and convert them again into a liquid. This process is repeated again and again.



Advantages

1) A greater advantage of the ocean thermal energy is that it can be used continuously for 24 hours throughout the year.

2) Ocean thermal energy is a renewable source of energy and its use does not cause any pollution. Sea-wave energy and ocean thermal energy are the two forms in which solar energy manifests itself in oceans.

Limitation
1) The installation and maintenance of an OTEC power plant is very high and efficient commercial exploitation is difficult.

Question 74

Question: List the hazards of nuclear power generation.

Answer: 1) In case of accidents or explosion, the radioactive materials can contaminate vast areas of land, crops, water, people etc

2) The number of safety measures that has to be considered before setting up a plant makes the construction of the plant expensive

3) The disposal of radioactive wastes in the fission process is a major problem. Expensive long-term storage areas have to be built

4) They also pose security problems, as the fuel and the by-products can be used to build nuclear weapons

Question 75

Question: What steps would you suggest to consume energy effectively?

Answer: 1) Coal should be burnt in specially designed Chulhas or Angittees to get maximum heat energy

2) We should not burn cow-dung cakes directly but should use in the production of biogas which is more efficient and cleaner

3) LPG must be used properly and checked for any leakage

4) Electrical appliances must be switched off when not required

5) Engines of vehicles must be checked regularly to make sure that they consume the right quantity of fuel

Question 76

Question: What is a fuel? Give any four characteristics of a good fuel.

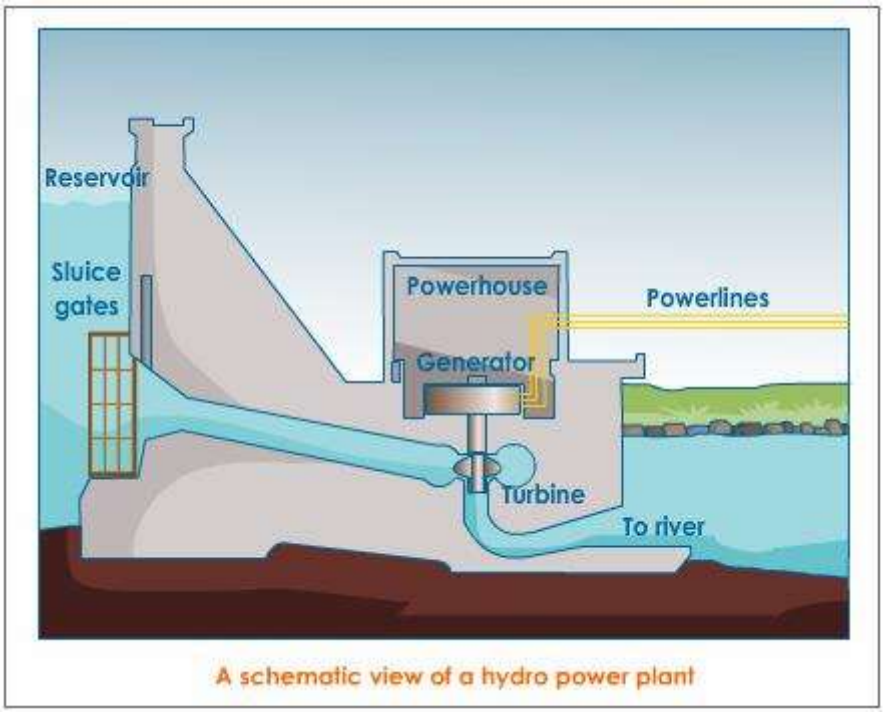
Answer: Any substance which is available easily and burns in air at moderate rate, producing large amount of heat energy, without leaving behind any undesirable residues is called a fuel. Characteristics:
1) Should be cheap and easily available
2) Easy to store
3) Should not pose any hazards during transportation
4) High calorific value

Question 77

Question: Explain the construction and working of a hydro-electric power plant with a neat schematic diagram.

Answer: Principle The water flowing in a river is collected by constructing a high rise dam. This stored water is then allowed to fall from the top of the reservoir on to a water turbine located at the bottom of the dam. The fast moving water rotates the blades of the water turbine, which in turn rotates the armature of the generator and produces electricity.

Construction and Working



A schematic view of a hydro power plant

Water flowing in high altitude rivers is stored in a man-made reservoir as shown in the figure. The kinetic energy of the flowing water is transformed into potential energy as the water level rises. This water is carried through pipes to the turbine situated at the bottom of the dam. The water turbine has cup-shaped discs around its circumference. A jet of moving water rotates the water turbine rapidly which in turn rotates the shaft which is attached to its centre. The other end of the shaft is connected to the coil of an electric generator. The generator coil rotates and produces electricity.

Question 78

Question: Briefly explain the construction and working of a fixed dome type biogas plant.

Answer: Raw Materials Required
Forms of biomass listed below may be used along with water:
1) Animal dung
2) Poultry wastes
3) Plant wastes (Husk, grass, weeds etc.)
4) Human excreta

5) Industrial wastes(Saw dust, wastes from food processing industries)
6) Domestic wastes (Vegetable peels, waste food materials)

Principle
Biogas is produced as a result of anaerobic fermentation of biomass in the presence of water.

Construction
The biogas plant is a brick and cement structure having the following five sections:

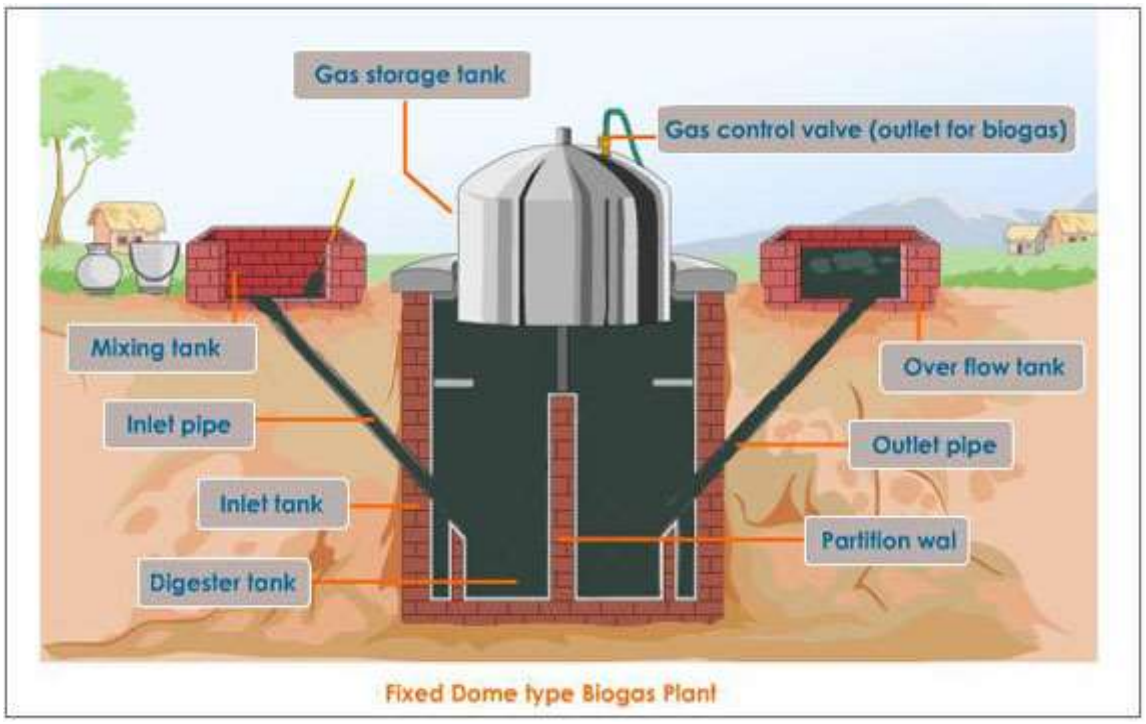
1) Mixing tank present above the ground level

2) Inlet chamber: The mixing tank opens underground into a sloping inlet chamber

3) Digester: The inlet chamber opens from below into the digester which is a huge tank with a dome like ceiling. The ceiling of the digester has an outlet with a valve for the supply of biogas

4) Outlet chamber: The digester opens from below into an outlet chamber

5) Overflow tank: The outlet chamber opens from the top into a small over flow tank



Fixed Dome type Biogas Plant

Working
1) The various forms of biomass are mixed with an equal quantity of water in the mixing tank. This forms the slurry

2) The slurry is fed into the digester through the inlet chamber. The temperature of the slurry must be maintained around 35 ^{o}C. Any drop in temperature will reduce the anaerobic activity and hence the yield of biogas

3) When the digester is partially filled with the slurry, the introduction of slurry is stopped and the plant is left unused for about two months

4) During these two months, anaerobic bacteria present in the slurry decompose or ferment the biomass in the presence of water

5) As a result of anaerobic fermentation, biogas is formed, which starts collecting in the dome of the digester

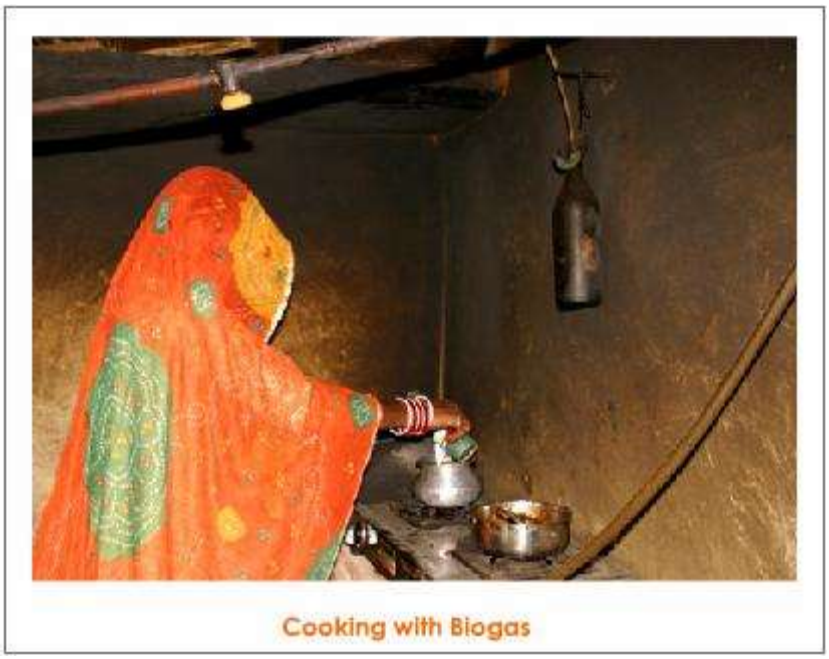
6) As more and more biogas starts collecting, the pressure exerted by the biogas forces the spent slurry into the outlet chamber

7) From the outlet chamber, the spent slurry overflows into the overflow tank

8) The spent slurry is manually removed from the overflow tank and used as manure for plants

9) The gas valve connected to a system of pipelines is opened when a supply of biogas is required

10) To obtain a continuous supply of biogas, a functioning plant can be fed continuously with the prepared slurry



Cooking with Biogas

Question 79

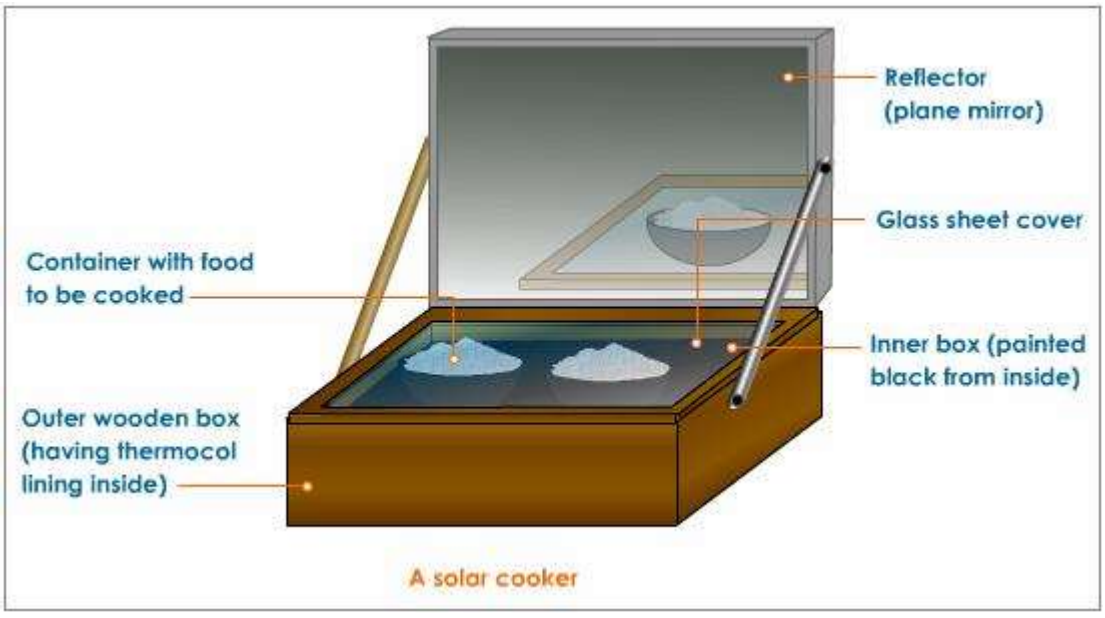
Question: Explain the working of two devices that use solar energy.

Answer: A solar heating device is one which allows collection of a large amount of heat from the sunlight in a given region and restricts the loss of heat to the surrounding in the form of radiation.

Solar Cooker

The following facts help us to design an efficient solar cooker.
1) A black body absorbs maximum heat
2) Loss of heat by convection can be restricted in a closed system
3) Radiation losses can be avoided by reflecting the rays inside the body with the help of reflecting object like a plane mirror
4) Conduction can be reduced by using poor conducting materials

Construction



A solar cooker

A solar cooker contains a wooden box having thermocol lining from inside. A box made aluminium is placed inside the wooden box. The inner side of the aluminium box is painted black. The top is closed by a glass sheet. A plane mirror is fixed to the hinged lid.

The box is closed such that the inner part does not come in contact with the outside air, there by reducing heat loss due to convection currents. The glass top reflects the light in to the box thereby reducing the heat loss due to radiation. The temperature inside the box is about 100 - 140^{o} C.

A phenomenon similar to green house effect happens here. The glass top allows infrared radiations emitted by the sun into the box and traps the infrared radiations emitted by hot objects inside the cooker. This type of solar cooker can be used for cooking. But the time of cooking depends on the intensity of the sunlight and hence the time taken is shorter in summer and longer in winter. Rice, pulses and vegetables can be boiled by keeping them inside the box. Baking and frying can be done in reflector type solar cooker. A huge spherical concave mirror is used as a reflector.

Solar Cells Another device that harnesses solar energy is the solar cell. Solar cells are expensive and are used only when supplying electricity becomes difficult.

Solar cells are the devices where solar energy is directly converted into electricity.

Sunlight can be used to run machinery and generate electricity.

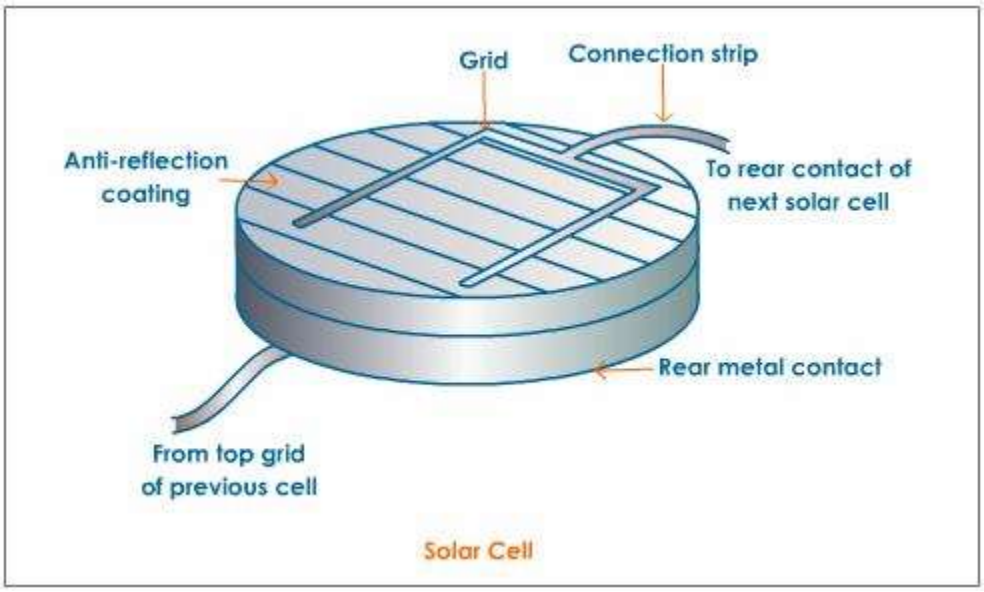
About hundred years ago it was found that when sunlight falls on a thin layer of selenium electricity is produced. But the efficiency of the conversion was low (as low as 0.6%). Solar cells were not popular for a long time because of this low efficiency.

Solar cells are made of naturally available semiconductors such as silicon and germanium. The resistivity of these materials is between those of conductors and insulators. Therefore they are called semiconductors. They behave like insulators at low temperature and like conductors above room temperature. To increase its conductivity semiconductors are doped with impurities. Semiconductors which are doped with impurities like boron or aluminium are termed as p-type semiconductors and those doped with impurities like phosphorous, are called n-type semiconductors. In p-type semiconductors holes are majority carriers and electrons are minority carriers and in n-type semiconductors electrons are majority carriers and holes are minority carriers. The first practical solar cell was constructed in 1954 with an efficiency of 1%. Today we have selenium based solar cells with an efficiency of 25%.

Construction and Working of a Solar Cell Solar cell is a very thin sandwich of n-type and p-type wafer thin semiconductors of silicon. A U-shaped metal grid is embedded into the thin semiconductor chip as shown in the fig. The lower end of the sandwich is fixed to a metal base which has a metal lead. The grid has a lead contact on the top surface which can be connected to another solar cell in series. The upper surface of semi

conducting sandwich is coated with anti-reflection coating.

When visible light falls on the solar cell the n-type wafer produces a large number of electrons. These electrons drift towards p-type wafer thereby generating an electric potential.



The potential difference produced by a single solar cell of 4 cm^2 is between 0.4 to 0.5 volts and the magnitude of electric current is 60 milli-amperes.

Question 80

Question: Discuss the advantages and disadvantages of using solar cells

Answer: Advantages of Using Solar Cells
1) It is present in abundance

2) They have no moving parts and hence require little maintenance and work quite satisfactorily without any focusing device

3) It does not cause any environmental pollution like the fossil fuels and nuclear power.

4) Solar cells last a longer time and have low running costs

Disadvantages
The entire process of manufacture is still very expensive as silver is used for interconnection of these cells in the panel, which is a very expensive metal. Silver is the best conductor of electricity having very low resistance and it increases its efficiency.

A practical problem linked with the use of solar cell panels is regarding the storage of electricity general by them. The electricity generated by the solar cell panel is stored during the day with the help of storage batteries which give us only direct current. But to operate our devices we need alternating current. Therefore we need to convert DC to AC before using any appliance and thus it increases the cost of such solar panels as the sources of electricity.

Question 1

Question: Solar constant is _____.

1. 140 Wm^{-2}
2. 1.4 Wm^{-2}
3. 1.4 kWm^{-2}
4. 1.4 MWm^{-2}

Answer: 3

Question 2

Question: The radiation in the sunlight that gives us the feeling of hotness is _____.

1. visible radiation
2. infra-red
3. red
4. ultra-violet

Answer: 2

Question 3

Question: Which of the following is not a bio-mass source?

1. Gobar gas
2. Coal
3. Wood
4. Nuclear energy

Answer: 4

Question 4

Question: The energy which is not derived from the sun is _____.

1. bio-mass
2. fossil fuels
3. nuclear energy
4. geo-thermal energy

Answer: 3

Question 5

Question: Harmful radiation emitted by the sun is _____.

1. visible
2. infra-red
3. ultra-violet
4. radio waves

Answer: 3

Question 6

Question: A substance which produces a lot of heat on burning is called _____.

1. oxidising agent
2. biogas
3. biomass
4. fuel

Answer: 4

Question 7

Question: Fuel formed under the earth's surface by the decomposition of organic matter is called _____.

1. organic fuel
2. biogas
3. fossil fuel
4. under ground fuel

Answer: 3

Question 8

Question: Which of the following causes the least pollution when burnt?

1. Petrol
2. Diesel
3. Coal
4. Natural gas

Answer: 4

Question 9

Question: The main constituent of LPG is _____.

1. methane
2. butane
3. hydrogen
4. propane

Answer: 2

Question 10

Question: The main constituent of CNG is _____.

1. methane
2. butane
3. ethane
4. propane

Answer: 1

Question 11

Question: Which of these is not a renewable source of energy?

1. The sun
2. Natural gas
3. Wind
4. Ocean tidal energy

Answer: 2

Question 12

Question: The radiations absorbed by ozone layer are _____.

1. infra-red
2. ultra-violet
3. visible
4. gamma rays

Answer: 2

Question 13

Question: The radiations emitted by a hot furnace are _____.

1. ultra-violet
2. infra-red
3. X-rays
4. micro waves

Answer: 2

Question 14

Question: The radiations emitted by the sun and responsible for the cause of skin cancer are _____.

1. infra-red
2. X-rays
3. micro-waves
4. ultra-violet

Answer: 4

Question 15

Question: The efficiency of the solar cooker can be increased by placing a _____.

1. plane mirror
2. convex mirror
3. convex lens
4. concave lens

Answer: 1

Question 16

Question: The maximum temperature that can be attained in a box-type solar cooker is _____.

1. 200 ^{o}C
2. 140 ^{o}C
3. 80 ^{o}C
4. 250 ^{o}C

Answer: 2

Question 17

Question: A solar cell is made up of _____.

1. silicon
2. titanium
3. magnesium
4. teflon

Answer: 1

Question 18

Question: Which of the following is not combustible?

1. oxygen
2. hydrogen
3. butane
4. methane

Answer: 1

Question 19

Question: The lid of the solar cooker is made up of _____.

1. plastic sheet
2. black sheet
3. plane mirror
4. glass

Answer: 4

Question 20

Question: In a solar panel, the metal used is _____.

1. gold
2. copper
3. silver
4. nickel

Answer: 3

Question 21

Question: A solar cell converts _____.

1. heat energy into electrical energy
2. solar energy into electrical energy
3. heat energy into light energy
4. solar energy into light energy

Answer: 2

Question 22

Question: Floating generators are used in the sea to harness _____.

1. tidal energy
2. wave energy
3. hydel energy
4. energy from OTEC power plant

Answer: 2

Question 23

Question: The temperature difference between the upper layers and the deeper layers of the ocean should be _____ to install an OTEC power plant.

1. 40 ^{o}C
2. 50 ^{o}C
3. 20 ^{o}C
4. 30 ^{o}C

Answer: 3

Question 24

Question: The molten material mixed with gases in the mantle of the earth is called _____.

1. core
2. lava
3. geyser
4. magma

Answer: 4

Question 25

Question: The scientist who first carried out critical nuclear fission reactionis _____.

1. Otto Hahn
2. Enrico Fermi
3. Hans Bethe
4. Einstein

Answer: 2

Question 26

Question: The source of energy of the sun is _____.

1. nuclear fission
2. chemical reaction
3. nuclear fusion
4. photoelectric effect

Answer: 3

Question 27

Question: India exploded her first underground nuclear device at _____.

1. Kota
2. Ranchi
3. Jaipur
4. Pokhran

Answer: 4

Question 28

Question: The energy of a thermal neutron is about _____.

1. 0.025 ev
2. 0.25 ev
3. 0.0025 ev
4. 0.00025 ev

Answer: 1

Question 29

Question: The fuel used in the nuclear reactor is _____.

1. Cadmium
2. Radium
3. Uranium
4. Thorium

Answer: 3

Question 30

Question: Nuclear fusion reactions happens spontaneously in _____.

1. the core of the earth
2. the commercial nuclear reactor
3. the atmosphere of the sun
4. the eruption of a volcano

Answer: 3