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Q1.

Charcoal.

Q2.

Geothermal energy.

Q3.

Geothermal energy.

Q4.

Anaerobic bacteria.

Q5.

Methane.

Q6.

Bio gas consists of methane, carbon dioxide, hydrogen and hydrogen sulphide.

Q7.

Needed:- water.

Not needed:- oxygen.

Q8.

Biogas.

Q9.

Apart from cattle dung, human excreta, agriculture wastes, vegetable wastes, poultry droppings, paper scrap etc. can also be added to a biogas plant.

Q10.

Three forms of energy which could be harnessed from the sea are:

(i) Tidal energy

(ii) Wave energy

(iii) Ocean thermal energy.

Q11.

(i) Sea-waves energy.

(ii) Ocean thermal energy.

Q12.

OTE stands for Ocean Thermal Energy.

Q13.

Anaerobic bacteria help in the degradation of cow-dung in the presence of water but in the absence of oxygen.

Q14.

False

Q15.

(a) solar.

(b) twice.

Q16.

(a) The dead parts of plants and trees, and the waste material of animals are called biomass. It is the organic matter which is used as a fuel to produce energy. E.g., wood, agricultural wastes and cow dung.

(b) Wood.

Q17.

Two ways in which cow-dung can be used as a fuel are:

1. In the form of cow-dung cakes, which can be used directly as a fuel.

2. By preparing biogas from cow-dung.

Biogas is better than cow-dung cakes because it gives a cleaner than cow-dung cakes and after extracting biogas, the spent cow-

dung can be used as a manure.

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Q18.

Charcoal is prepared by burning wood in a limited supply of air, so that water and other volatile materials present in it get removed. Charcoal is a better fuel than wood because it has a higher calorific value than wood, and it burns without producing smoke whereas wood produces a lot of smoke on burning.

Q19.

(i) Biomass is a renewable source of energy and hydroelectricity is also a renewable source of energy.

(ii) The use of biomass by burning causes air pollution but the use of hydroelectricity does not cause any pollution.

(iii) Biomass gives heat energy which can be used for cooking and heating only. On the other hand, hydroelectricity can run all types of electrical appliances.

(iv) Biomass energy can be obtained without using any special device but hydroelectricity can be produced only by establishing hydro-power plants.

Q20.

Biogas is considered an ideal fuel for domestic use because:

(a) Biogas burns without smoke and hence does not cause air pollution.

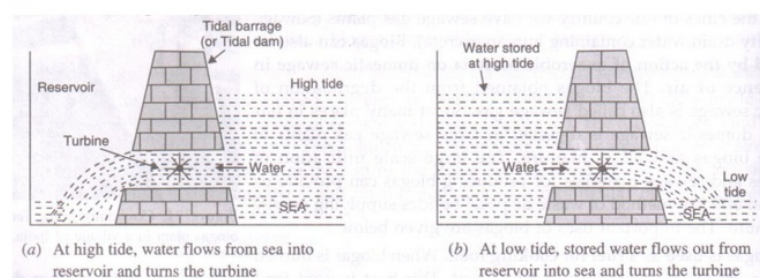
(b) Biogas has a high calorific value. That is, biogas produces a large amount of heat per unit mass.

(c) Biogas is cheaper than most common fuels.

(d) Biogas is a clean fuel since it burns completely without leaving any residue behind.

Q21.

(a)



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 to produce the electricity. And during the low tide, when the level of sea-water is low, 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.

(b) Tidal energy is not likely to be a potential source of energy because there are very few sites around the world which are suitable for building tidal barrages, and the rise and fall of sea-water during high and low tides is not enough to generate electricity on a large scale.

Q22.

Sea-waves energy can be harnessed by the following ways:

1. By setting up floating generators in the sea which would move up and down with the sea-waves and their movement would drive the generators to produce electricity.
2. By letting the sea-waves move up and down inside large tubes so that when the waves move up, the air in the tubes is compressed and this compressed air can then be used to turn a turbine of a generator to produce electricity.

Q23.

The energy available due to the difference in the temperature of

water at the upper surface and the deeper layers of ocean is known as ocean thermal energy.

Ocean thermal energy is used to generate electricity in an Ocean Thermal Energy Conversion power plant (OTEC power plant). A temperature difference of 20°C or more between the surface water and deeper water is needed for the operation of these plants. The warm surface water of ocean is used to boil a liquid like ammonia or chlorofluorocarbon. The high pressure of liquid vapours is used to turn the turbine of a generator and produce electricity.

Q24.

Limitations of energy that can be harnessed from the sea:

1. There are very few sites around the world which are suitable for building tidal barrage for harnessing tidal energy. Moreover, the rise and fall of sea-water during high and low tides is not enough to generate electricity on a large scale.
2. The harnessing of sea-waves energy is a viable proposition only at those places where sea-waves are very strong.
3. Though the energy potential from the sea is very large but its large scale exploitation is difficult at the moment.

Q25.

A safe and efficient method for the disposal of biowastes and sewage materials is to utilise them for producing biogas. This method is advantageous to us for getting energy and manure without polluting the environment.

Q26.

Following sources of energy are not derived from the sun:

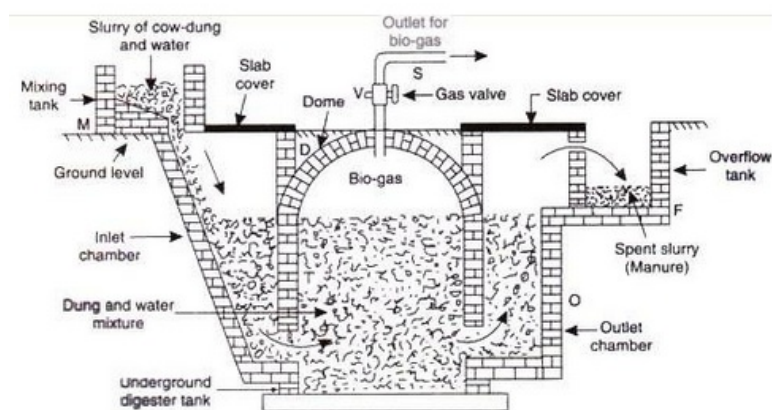
Geothermal energy, nuclear fuels, tidal energy.

Q27.

(a) Biogas is a mixture of gases produced by anaerobic degradation of biomass in the presence of water but in the absence of oxygen. Methane is the major component of biogas.

(b) Cow-dung and water.

(c) Construction and working of biogas plant:



A biogas plant consists of a wall-shaped, underground tank called digester, which is made of bricks, and has a dome shaped roof D. The dome acts as a gas-holder. There is a gas outlet S at the top of the dome having a valve V. There is a sloping inlet chamber I connected to a mixing tank M and a rectangular outlet chamber O connected to the overflow tank F.

Cow dung and water are mixed in equal proportions in the mixing tank M to prepare the slurry. This slurry is fed into the digester tank through the inlet chamber I to fill the tank upto the cylindrical level. Then, the cow-dung undergoes anaerobic degradation with the evolution of biogas which collects in the dome. The pressure of biogas on the slurry forces the spent slurry to go into the overflow tank F through outlet chamber O, from where it is removed.

(d) Two uses of bio gas:

- (i) For cooking purpose
- (ii) For lightning purpose

(e) Two advantages of biogas:

- (i) Smoke-free cooking
- (ii) High calorific value

Q28.

- (a) Geothermal energy is the heat energy from hot rocks present inside the earth.
- (b) Hot rocks present inside the earth are the source of heat contained in geothermal energy.
- (c) Extremely hot rocks present below the surface of earth heat the underground water and turn it into steam. As more and more steam is formed between the rocks, it gets compressed to high pressures. This high pressure steam is brought up through pipes and is used to run the turbine of a generator to produce electricity.
- (d) Advantage of geothermal energy:
 - (i) It is very economical to use.
 - (ii) It does not cause any pollution.
- (e) Disadvantage of geothermal energy:-
 - (i) It is not available everywhere.
 - (ii) Deep drilling in the earth is required, which is technically very difficult and expensive.

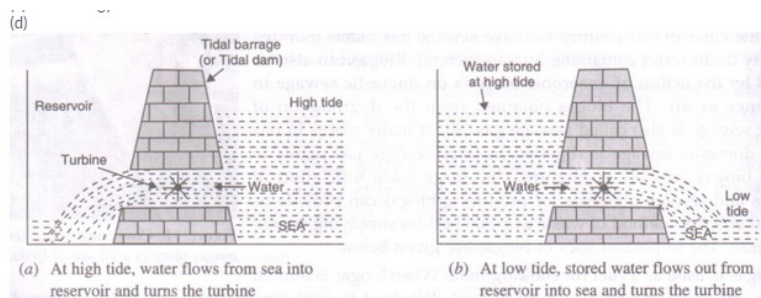
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Q42.

- (a) Ocean thermal energy
- (b) No
- (c) Ocean thermal energy is used to generate electricity in an Ocean Thermal Energy Conversion power plant (OTEC power plant). A temperature difference of 20°C or more between the surface water and deeper water is needed for the operation of these plants. The warm surface water of ocean is used to boil a liquid like ammonia or chlorofluorocarbon. The high pressure of liquid vapours is used to turn the turbine of a generator and produce electricity.
- (d) 200°C

Q43.

- (a) High tide
- (b) Low tide
- (c) Tidal energy
- (d)



Q44.

A is coal; B is coke; C is wood; D is charcoal

Q45.

Geothermal energy.

***** END *****