Worksheet 14.5

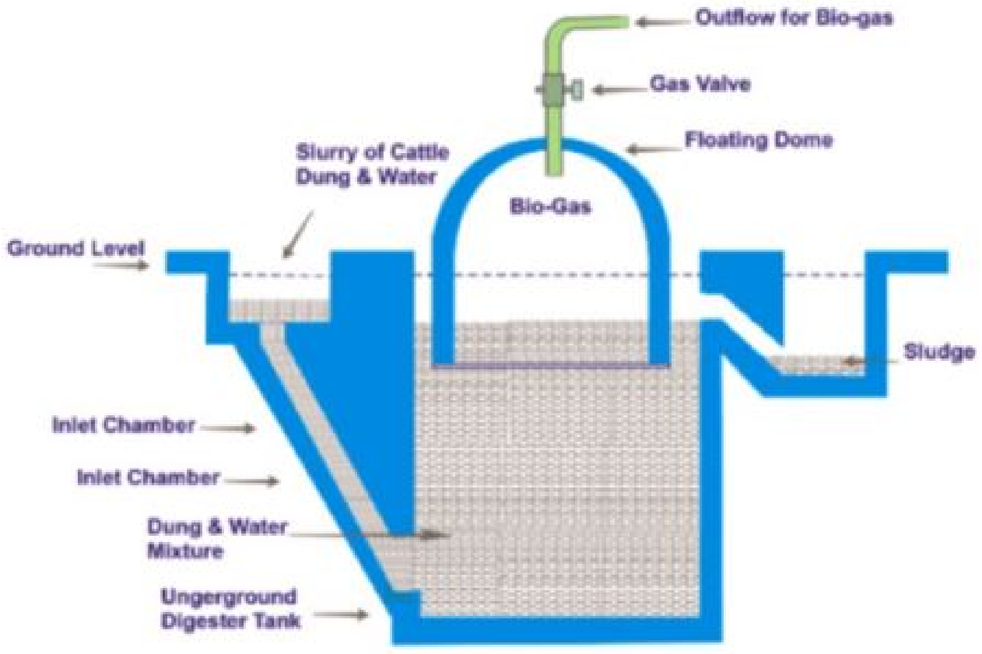
Marks - 25

Case study based questions

10th Science

Sources Of Energy

Passage - 1 **5 Marks**



The decomposition which takes place in the absence of oxygen is called anaerobic degradation. Anaerobic degradation is carried out by the micro-organisms called anaerobic bacteria. Biogas is a mixture of methane, carbon dioxide, hydrogen and hydrogen sulphide. The major constituent of biogas is methane.

Q 1. The decomposition which takes place in the absence of oxygen is called

(1) Anaerobic degradation
(2) Aerobic degradation
(3) Oxidation
(4) None of these

Q 2. The major constituent of biogas is .....

(1) Ethane
(2) Methane
(3) Propane

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(4) None of these

Q 3. Biogas is a mixture of methane, carbon dioxide, hydrogen and oxygen.

(1) TRUE
(2) FALSE

Q 4. Biogas is a mixture of methane, carbon dioxide, hydrogen sulphide and .....

(1) Sulphur
(2) Oxygen
(3) Hydrogen
(4) Nitrogen

Q 5. ..... bacteria degrades carbon compounds of cow dung and plant wastes to produce biogas.

(1) Anaerobic bacteria
(2) Aerobic bacteria

Passage - 2 **5 Marks**

Worksheet 14.5

Marks - 25

Cow-dung and water are mixed in equal proportions in the mixing tank M to prepare the slurry. It takes about 50 to 60 days for the new gas-plant to become operative (start functioning). The spent dung-slurry, left after the extraction of biogas, is rich in nitrogen and phosphorus compounds and hence forms a good manure.

Q 1. Slurry is a mixture of cow dung and water.

(1) TRUE
(2) FALSE

Q 2. Mixture of cow dung and water in equal proportions prepare .....

(1) Mud
(2) Slurry
(3) Cow dung cakes
(4) None of these

Q 3. A new biogas plant becomes operative in ..... days.

(1) 30-40
(2) 40-50
(3) 50-60
(4) 60-70

Q 4. The spent dung-slurry left after the extraction of biogas in rich in

(1) Nitrogen and phosphorus
(2) Oxygen and calcium
(3) Sulphur and calcium
(4) Hydrogen and nitrogen

Worksheet 14.5

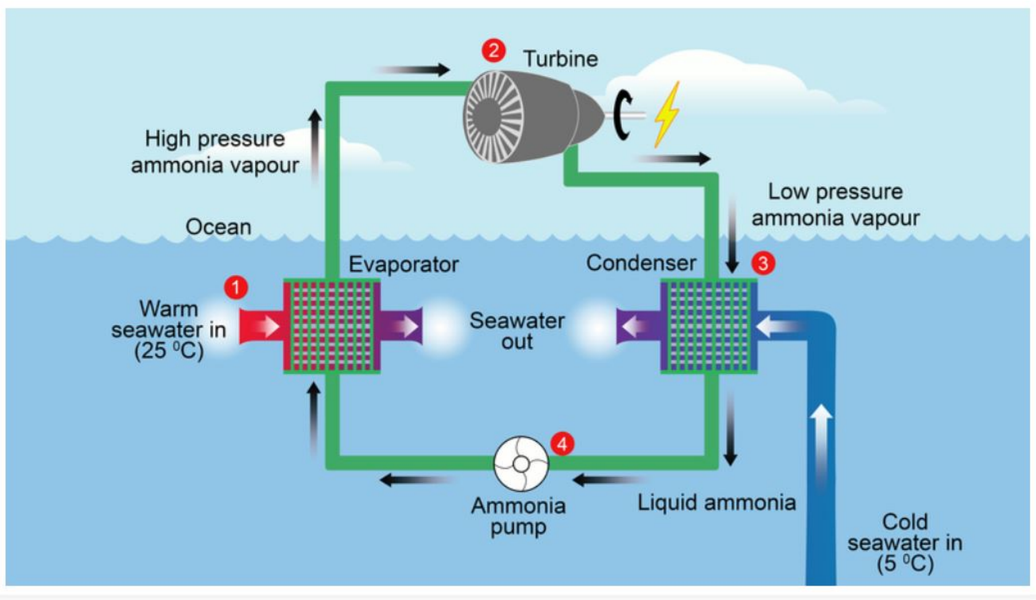
Marks - 25

Q 5. Mostly we use ..... in biogas plants.

(1) Human excreta
(2) Cow dung
(3) Plant waste
(4) None of these

Passage - 3

5 Marks



A very large area of sea is called an ocean. 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. 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 devices used to harness ocean thermal energy are called Ocean Thermal Energy Conversion power plants (or OTEC power plants).

Q 1. A very large area of sea is called .....

(1) Ocean
(2) Reservoir
(3) Pond
(4) Lake

Worksheet 14.5

Marks - 25

Q 2. There is always a temperature difference between the water “at the surface of ocean” and “at deeper levels.”

(1) TRUE
(2) FALSE

Q 3. The energy available due to the difference in the temperature of water at the surface of the ocean and at deeper levels is called .....

(1) Optical Thermal Energy
(2) Ocean Thermal Energy
(3) Ocean Temperature Energy
(4) None of these

Q 4. Expand OTEC power plants.

(1) Optical Thermal Energy Conversion
(2) Ocean Thermal Energy Conversion
(3) Ocean Thermal Energy Conversion
(4) None of these

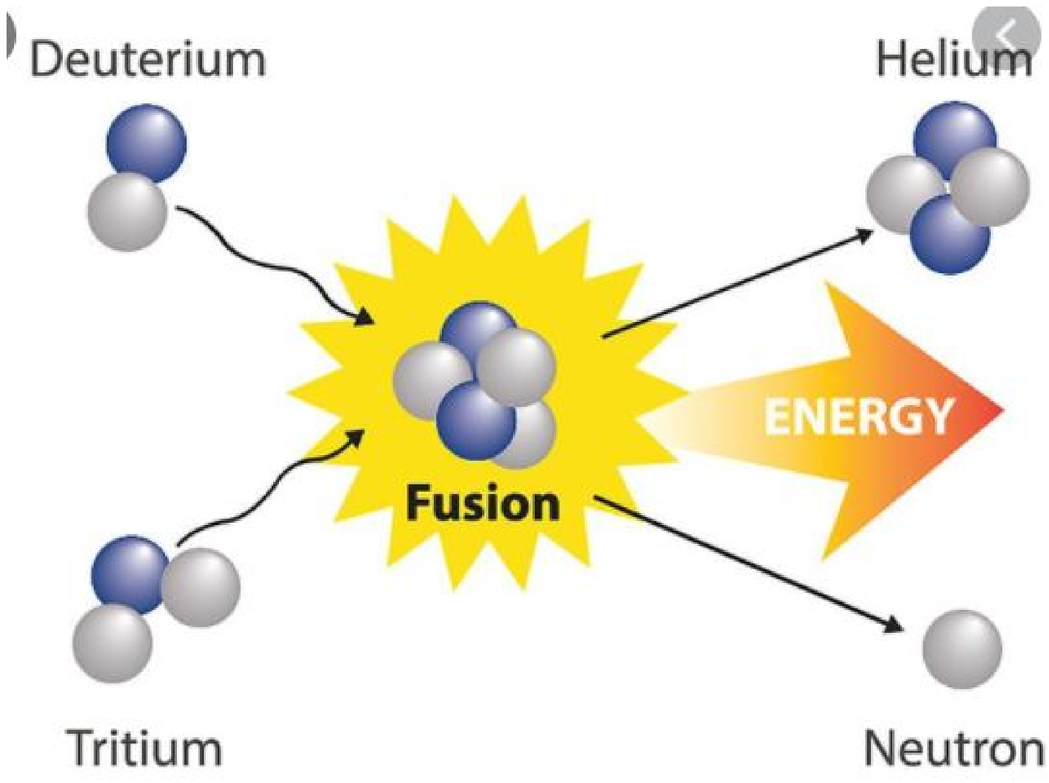
Q 5. A temperature difference of 10° C (or more) between the surface water of ocean and deeper water is needed for operating OTEC power plants.

(1) TRUE
(2) FALSE

Passage - 4 **5 Marks**

Worksheet 14.5

Marks - 25



The process in which two nuclei of light elements (like that of hydrogen) combine to form a heavy nucleus (like that of helium), is called nuclear fusion. The conditions needed for carrying out nuclear fusion process are 'millions of degrees of temperature' and 'millions of pascals of pressure'.

Q 1. The process in which two nuclei of light elements combine to form a heavy nucleus, is called

(1) Nuclear fission
(2) Nuclear fusion
(3) Combination
(4) None of these

Q 2. The conditions needed for carrying out nuclear fusion process are

(1) Millions of degrees of temperature
(2) Millions of pascals of pressure
(3) Both of these
(4) None of these

Q 3. Heating two deuterium atoms at extremely high temperature produce heavy nucleus of ..... and a ..... is emitted.

(1) Helium , neutron
(2) Protium , proton
(3) Tritium , electron
(4) None of these

Q 4. The energy produced in nuclear fusion reaction is much more than that produced in a nuclear fission reaction.

(1) TRUE
(2) FALSE

Q 5. The nuclear reactions which occur at extremely high temperatures are called ..... reactions.

(1) Thermal
(2) Thermonuclear
(3) Exothermic
(4) Endothermic

Passage - 5

5 Marks

Worksheet 14.5

Marks - 25

Thermonuclear reactions (fusion reactions which occur at very high temperatures) are used for producing a weapon of mass destruction called hydrogen bomb. The hydrogen bomb consists of heavy isotopes of hydrogen called deuterium and tritium along with an element lithium-6.

Q 1. Thermonuclear reactions are used for producing a weapon of mass destruction called

(1) Hydrogen bomb
(2) Nitrogen bomb
(3) Nuclear Bomb
(4) None of these

Q 2. The two heavy isotopes of hydrogen are

(1) Deuterium , protium
(2) Deuterium , tritium
(3) Protium , tritium
(4) None of these

Q 3. The hydrogen bomb consists of heavy isotopes of hydrogen called deuterium and tritium alongwith an element .....

(1) Oxygen-16
(2) Carbon-14
(3) Lithium-6
(4) None of these

Q 4. The function of lithium-6 used in hydrogen bomb is to produce more ..... needed for fusion.

(1) Protium

---

(2) Tritium
(3) Deuterium
(4) None of these

Q 5. Thermonuclear reactions occurs at

(1) Very high temperature
(2) Room temperature
(3) Very low temperature
(4) None of these

Worksheet 14.6

Marks - 25

Case study based questions

10th Science

Sources Of Energy

Passage - 1 **5 Marks**

The sun which gives us heat and light, derives its energy from the fusion of hydrogen nuclei into helium nuclei, which is going on inside it, all the time. The main nuclear fusion reaction taking place in the sun which releases a tremendous amount of energy is the fusion of 4 hydrogen atom nuclei to form a bigger nucleus of helium atom. The total energy produced by the fusion of hydrogen into helium is tremendous. All this energy is released in the form of heat and light. It is this energy which makes the sun shine and give us heat and light.

Q 1. The sun derives its energy from the fusion of ..... into ..... which is going on inside it all the time.

(1) Hydrogen , helium
(2) Carbon , oxygen
(3) Helium , hydrogen

---

(4) Oxygen , carbon

Q 2. In the sun, fusion of ..... hydrogen atom nuclei forms a bigger nucleus of helium atom.

(1) 3
(2) 4
(3) 5
(4) 6

Q 3. ..... reactions of ..... are the source of the sun's energy.

(1) Nuclear fusion , helium
(2) Nuclear fission, hydrogen
(3) Nuclear fusion , hydogen
(4) None of these

Q 4. Stars obtain their energy from the nuclear fission reactions of helium.

(1) TRUE
(2) FALSE

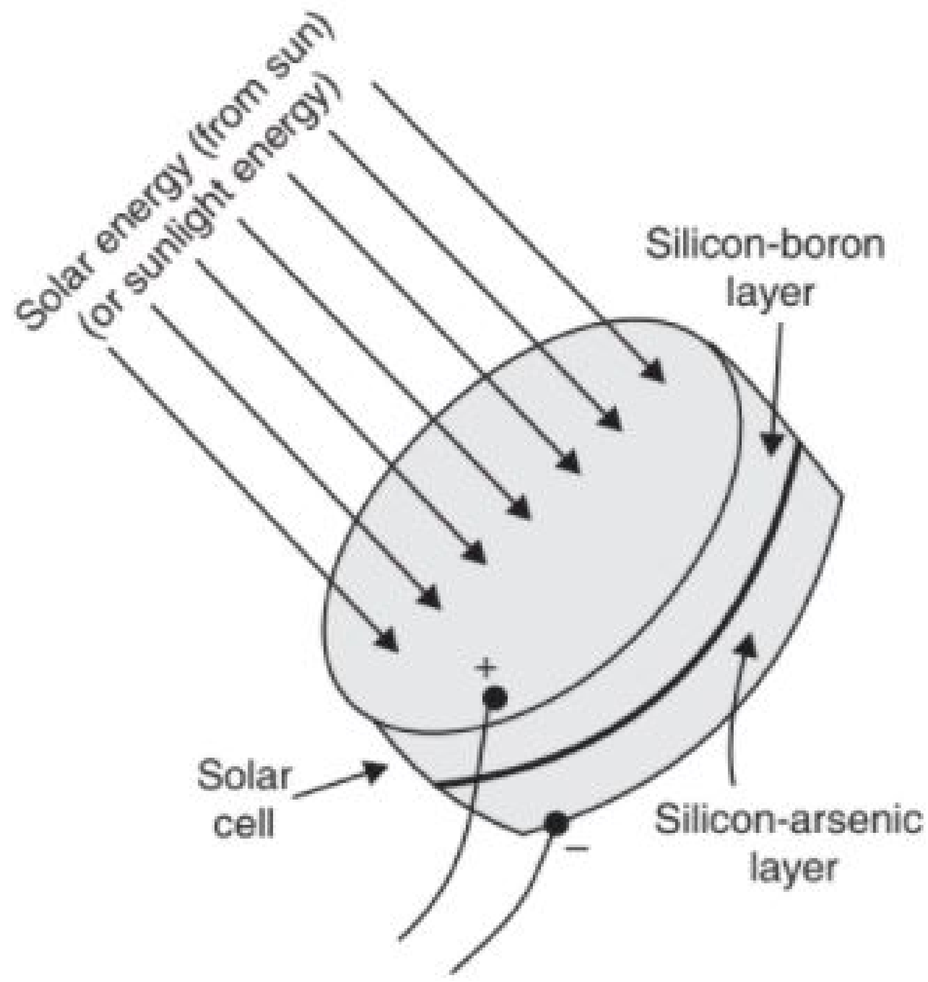
Q 5. The energy produced in nuclear fusion reaction is much more than that produced in a nuclear fission reaction.

(1) TRUE
(2) FALSE

Passage - 2 **5 Marks**

Worksheet 14.6

Marks - 25



Solar cells use the energy in sunlight to produce electricity. Thus, solar cell is a device which converts solar energy (or sun's energy) directly into electricity. Since solar energy is also called sunlight energy, so we can also say that a solar cell converts sunlight energy into electrical energy.

Q 1. ..... is a device which converts solar energy directly into electricity.

(1) Solar cells
(2) Pencil cell
(3) Battery cell
(4) Moon cell

Q 2. A solar cell converts sunlight energy into ..... energy.

(1) Geothermal
(2) Electrical
(3) Nucelar
(4) Tidal

Worksheet 14.6

Marks - 25

Q 3. A solar cell is usually made from .....

(1) Gold
(2) Silver
(3) Silicon
(4) None of these

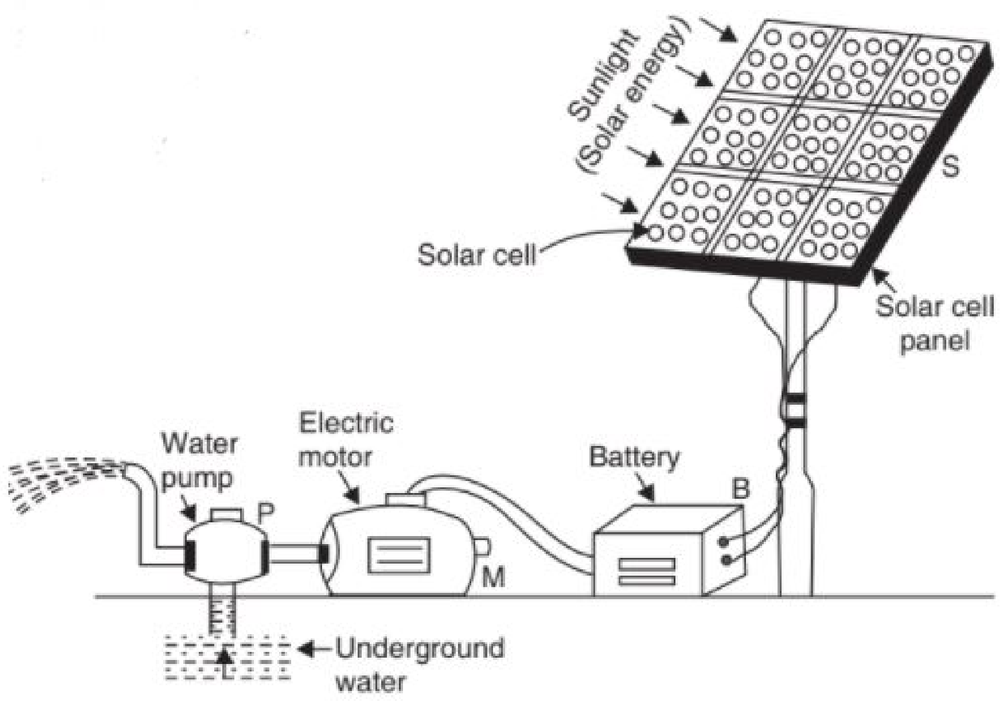
Q 4. A simple solar cell consists of sandwich of a 'silicon-boron layer' and a 'silicon-arsenic layer'

(1) TRUE
(2) FALSE

Q 5. The solar cell is covered with a ..... cover for protection.

(1) Steel
(2) Glass
(3) Cloth
(4) None of these.

Passage - 3 **5 Marks**



A single solar cell can produce only a small amount of electricity. In those cases where more electrical power is needed, a large number of solar cells are joined

together in series. This group of solar cells is called a 'solar cell panel'. Thus, a solar cell panel consists of a large number of solar cells joined together in a definite pattern.

Q 1. A potential difference of about ..... is generated between the top and bottom surface of a solar cell.

(1) 0.5 V
(2) 0.05 V
(3) 0.9 V
(4) None of these

Q 2. The maximum efficiency of the best designed solar cell is about ..... percentage.

(1) 45
(2) 25
(3) 67
(4) 98

Q 3. A solar cell panel consists of a large number of solar cells joined together in a definite pattern.

(1) TRUE
(2) FALSE

Q 4. The various solar cells in a solar cell panel are joined together by using connecting wires made of ..... metal.

(1) Magnesium
(2) Platinum
(3) Silver

(4) None of these

Q 5. The electricity produced by a solar cell panel during the day time can be stored by charging a bettery.

(1) TRUE
(2) FALSE

Passage - 4 **5 Marks**

It is the kinetic energy of wind which is utilised for doing work. Solar energy (or sun's energy) is responsible for the blowing of wind. The electricity generated by a single wind turbine is quite small (because a single wind turbine can run only a small generator). So, in order to generate a large amount of electricity, a large number of wind turbines are erected over a big area of land.

Q 1. ..... energy of wind which is utilised for doing work.

(1) Kinetic
(2) Potential
(3) Electrical
(4) None of these

Q 2. Wind blows due to the uneven heating of earth by the sun in different regions.

(1) TRUE

(2) FALSE

Q 3. The complete setup of generating electricity by using wind energy is called .....

(1) Electricity generator
(2) Wind generator
(3) Turbine
(4) None of these

Q 4. A setup of having a large number of wind turbines working at a place to generate electrical energy on a large scale is called a .....

(1) Agricultural farm
(2) Poultry farm
(3) Wind energy farm
(4) None of these

Q 5. The minimum wind speed necessary for satisfactory working of a wind generator is about .....

(1) 12 km/hr
(2) 8 km/hr
(3) 10 km/hr
(4) 15 km/hr

Passage - 5 **5 Marks**

Worksheet 14.6

Marks - 25

If India's wind energy is fully harnessed, then 45,000 megawatt of electrical power can be generated. At present we are generating more than 1025 MW of electricity from wind energy. This is going to increase soon when some more wind energy farms start working.

Q 1. The wind power potential of our country is estimated to be about 4500MW.

(1) TRUE
(2) FALSE

Q 2. At present we are generating more than ..... of electricity from wind energy.

(1) 1025 MW
(2) 2000 MW
(3) 2345 MW
(4) 2501 MW

Q 3. The largest wind energy farm in India is established in

(1) Karnataka
(2) Kerala
(3) Tamil Nadu

(4) Andhra Pradesh

Q 4. ..... is ranked first in the world for harnessing wind energy for the production of electricity.

(1) India
(2) Italy
(3) China
(4) Germany

Q 5. Which country is known as country of winds?

(1) Denmark
(2) Italy
(3) China
(4) Dubai