

**KIRAN TUTORIALS**

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**Std 10 (English)****Science And Technology - II****Date 30-09-20****Time 1HRS****Chapter 5.00****Marks 20****Q.1 Multiple Choice Questions 2**

- 1 Major electricity produced today is by  
 a. burning natural gas      b. coal combustion      c. Hydrogen fuel      d. Solar panels

**Ans** Option b.

- 2 Which of the following is used in solar cooker to harvest the solar energy?  
 a. Solar panels      b. Silicon cell      c. Mirrors      d. Glass lid

**Ans** Option c.**Q.2 Find the odd one out 2**

- 1 Thermal power plant, CNG power plant, Biogas plant, Hydroelectric plant

**Ans** Hydroelectric plant, No fuel is burnt in this power plant while in thermal.  
 CNG - Natural gas and Biogas biofuels are burnt for power generation.

- 2 Wind, Water, Charcoal, Sunlight

**Ans** Charcoal, It is conventional source of energy while others are non-conventional.

**Q.3 State True or False 2**

- 1 In power stations based on natural gas, fission of nuclei of atom takes place to produce electrical energy.

**Ans False.**

In power stations based on natural gas, combustion of natural gas takes place to produce electrical energy.

- 2 Combustion of fossil fuels lead to environmental degradation.

**Ans True.**

Fossil fuels when burnt, emit harmful gasses which can cause environmental degradation.

**Q.4 Give scientific reasons (Any Two) 4**

- 1 The construction of turbine is different for different types of power plants.

**Ans** i. Turbines used in different types of power plants are of varied design and structure.  
 ii. In different power plants, the energy that creates kinetic energy in the turbine is different and in different conditions of temperature and pressure.  
 iii. To get maximum yield of electric power, the design of turbine is essential to look after and increase the efficiency of the processing plant.  
 iv. Gas turbine, steam turbine, water turbine all are distinguish by their blade structure and body designs. Therefore, turbines used are different in different types of power plants.

- 2 Generator consists of a magnet to generate electric current.

**Ans** i. Generator is the device responsible for generation of electric power in any conducting material.  
 ii. It works on the basic principle of electromagnetic induction which explains generation of potential

difference due to change is magnetic field.

- iii. If the conductor is stationary and the magnet rotates, field around conductor is changed inducing emf in it.
- iv. If the magnet is stationary and conductor rotates even then the field is changed resulting in induced emf.
- v. As the principle states, any change in magnetic field produces potential difference across the conductor.
- vi. Thus, magnet is necessary for electricity generation in the generator to create a magnetic field.

**3** Burning of natural gas results in less pollution than coal combustion.

- Ans**
- i. Coal contains elements such as carbon, sulphur and nitrogen.
  - ii. Burning of coal results in emission of gases like carbon dioxide, sulphur oxide and nitrogen oxide which are harmful to the health.
  - iii. Along with the emission of gases due to burning of coal, soot particles are also released into the environment.
  - iv. In Power generation plant based on energy of natural gas , the turbine is run by a gas at very high temperature and pressure generated by combustion of natural gas.
  - v. The efficiency of this type of power generation plant is higher than that of power generation plant based on coal.
  - vi. Moreover, since the natural gas does not contain sulphur, burning of natural gas results in less pollution.

**Q.5 Write Short Notes (Any Two)**

**4**

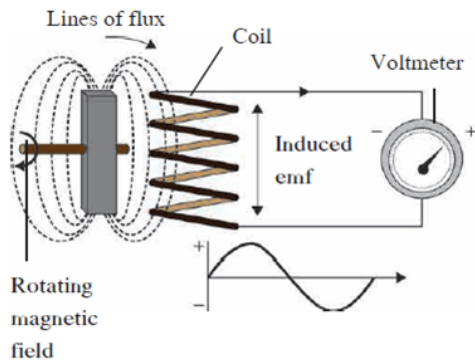
**1** Write short note on Non- renewable sources of energy.

- Ans**
- i. Non-renewable energy is the conventional source of energy which can not be used again and again.
  - ii. This sort of energy is sustainable to exhaustion. These non-renewable energies like **coal**, oil and gas are getting scarce.
  - iii. Energy sources like oil, **coal** and gas are known as fossil fuels.
  - iv. Electricity generation based on fossil fuels like coal, natural gas and nuclear fuels like uranium and plutonium are not environment friendly.
  - v. It means, that if electrical energy is generated using these fuels, it can lead to environmental degradation.
  - vi. Formation of fossil fuels like coal, crude oils and natural gases (LPG and CNG) took millions of years. Also, the reserves of these fuels are limited. They are going to deplete in future.

**2** Write short note on Non-conventional sources of energy.

- Ans**
- i. **Energy** generated by using wind, tides, solar, geothermal heat, and biomass including farm and animal waste as well as human excreta is known as **non-conventional energy**.
  - ii. All these **sources** are renewable or inexhaustible and do not cause environmental pollution.
  - iii. Electricity generation from water reservoir, wind, Sunlight, biofuels etc are the examples of such methods.
  - iv. The energy sources used in such options i.e. water-reservoir, wind, sunlight, biofuel are never-ending i.e are perpetual.
  - v. Moreover, use of these sources do not lead to environmental problems discusses above. Therefore, electricity generation through these sources can be called environment friendly.
  - vi. We can also call the energy generated by these processes as green energy.

**3** Write short note on the given below diagram.

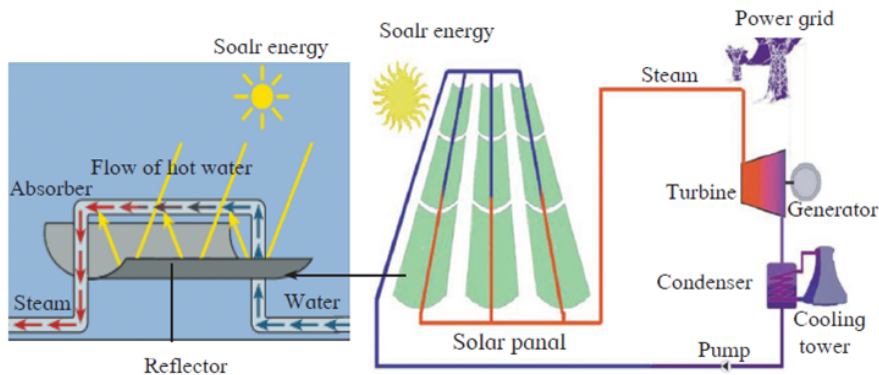


- Ans**
- i. Most of the electric power plants are based on the principle of electromagnetic induction invented by Michael Faraday.
  - ii. According to this principle, whenever magnetic field around a conductor changes, a potential difference is generated across the conductor.  
The field around a conductor can be changed in two ways. If a conductor is stationary and magnet is rotating, the field around the conductor changes or if a magnet is stationary, but the conductor is moving then also the field around the conductor will change.
  - iii. Thus, in both these cases, a potential difference is created across the conductor.
  - iv. The electrical power generating machine based on this principle is called electric generator.
  - v. Such large generators are used in commercial power generation plants.

**Q.6 Write answers based on given diagram/ figure**

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**Based on the diagram above, answer the following questions :**

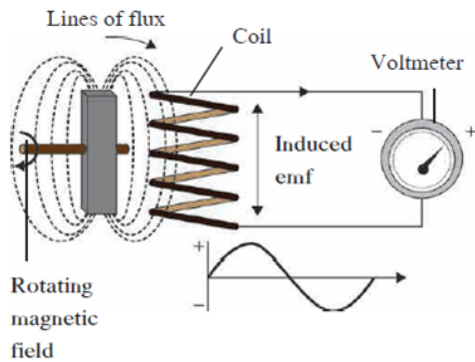
- i. Why are reflectors used in the power plant?
- ii. How does the rotation of turbine create electrical energy?
- iii. Which power plant is shown in the figure?

- Ans**
- i. Reflectors are used to reflect and concentrate solar radiation on absorbers by which solar energy is converted into heat energy.  
The turbine rotates because of the energy obtained from the source. This turbine is connected to electric generator and thus the magnet in electric generator starts rotating and electric energy is produced.
  - ii. The figure shows schematic representation of Solar Thermal power plant.

**Q.7 Answer the following (Any One)**

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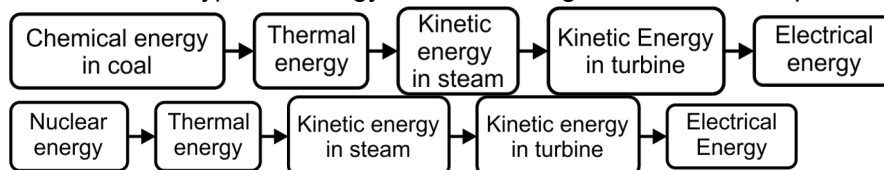
- 1 Explain about the diagram given below.



- Ans**
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  - ii. According to this principle, whenever magnetic field around a conductor changes, a potential difference is generated across the conductor.  
The field around a conductor can be changed in two ways. If a conductor is stationary and magnet is rotating, the field around the conductor changes or if a magnet is stationary, but the conductor is moving then also the field around the conductor will change.
  - iii. Thus, in both these cases, a potential difference is created across the conductor. The electrical power generating machine based on this principle is called electric generator.
  - iv. Such large generators are used in commercial power generation plants. Turbine is used to rotate the magnet in the generator. A turbine has blades.  
When a flow of liquid or gas is directed on the blades of the turbine, it rotates because of the kinetic energy of the flow. This turbine is connected to electric generator. Thus the magnet in electric generator starts rotating and electric energy is produced.
- 2** Which type / types of power generation involve maximum number of steps of energy conversion ? In which power generation is the number minimum.

- Ans**
- i. Maximum steps of energy conversion are observed in two types of energy generator plants.
    - a. Thermal power plant.
    - b. Nuclear power plant.

- ii. It involves four types of energy conversion to generate electrical power as follows:



- iii. The minimum types of energy during conversion is when solar cells produce electrical power.
- iv. It involves only two types of energies solar energy and electrical (DC) energy.

