Short Answer Type Questions – II

[3 marks]

Q. 1. Firewood is a conventional fuel. List any four reasons for replacing it with alternate sources of energy.

Ans. (i) Wood has low calorific value as compared to other sources of fuel.

(ii) It causes air pollution on burning.

(iii) Cutting down of trees causes depletion of forest leading to imbalance in nature.

(iv) Only 8-10% energy of burning firewood is utilised and the remaining is wasted.

Q. 2. State two advantages and two disadvantages of geothermal energy.

Ans. Advantages:

(i) The use of geothermal energy does not cause any pollution.

(ii) The use of geothermal energy is quite economical.

Disadvantages:

(i) It is not available everywhere.

(ii) Deep drilling in the Earth to obtain geothermal energy is very difficult.

Q. 3. What is biogas? Why is biogas considered an ideal fuel for domestic use?

Ans. Biogas is a combustible mixture of methane (about 75%), carbon dioxide, hydrogen and hydrogen sulphide gas. It is obtained by anaerobic decomposition of human and animal excreta and agricultural and urban waste materials.
Biogas is considered an ideal fuel for domestic use because of the following reasons:

(i) It has high calorific value.

(ii) It does not produce smoke.

Q. 4. Why is biogas a better fuel than animal dung cakes?

Ans. Biogas is a better fuel than animal dung cakes because:

(i) Burning of animal dung cake causes lot of pollution whereas biogas is a smokeless fuel.

(ii) The calorific value of animal dung cake is much lower than that of biogas.

(iii) Animal dung cakes leave residue after burning whereas biogas leaves no residue.

Q. 5. What causes the wind to blow?

Ans. The Sun rays fall on the equatorial region more intensively than on any other part of the Earth. Thus, the hot air of equatorial region, being lighter, rises upwards and cooler air from polar region starts blowing towards the equator to fill the space vacated by hot air.

This moving air is called wind. Therefore, Sun's energy causes winds on the Earth.

Q. 6. Give some uses and advantages of solar energy.

Ans. Uses:

(i) For cooking food in a solar cooker.

(ii) For heating water in solar geysers.

(iii) For generating electricity in space satellites, calculators, watches, etc., by solar cells.

(iv) For generating electricity on a large scale by a solar power plant.

(v) To melt metals in solar furnaces.

Advantages:

(i) It does not cause any pollution.

(ii) It is a renewable source of energy.

(iii) It is free of cost.

Q. 7. State the important uses of solar cells.

Ans. Solar cells are used

(i) for providing electricity in artificial satellites.

(ii) for lighting the street lights, traffic signals, running television sets and radio sets in remote areas.

(iii) for providing electricity in lighthouses.

(iv) for operating electronic watches and calculators.

Q. 8. Explain solar cell panel.

Ans. A solar cell is a device which converts solar energy directly into electricity. A group of solar cells is called a solar cell panel. It consists of a large number of solar cells joined together in a definite pattern. It provides a lot of electric energy required by artificial satellites, water pumps, street lighting, etc. For joining the various solar cells in a solar panel, silver wires are used because silver metal is the best conductor of electricity having a very low resistance and which also increases efficiency.

Q. 9. Explain why only a small part of the solar energy that strikes the upper regions of atmosphere reaches the surface of the Earth.

Ans. When the solar energy falls on the top surface of the atmosphere then the following happens:

(i) Some solar energy is reflected back into the space by the atmosphere, and

(ii) The atmosphere also absorbs a lot of solar energy, for example, most of the ultraviolet rays are absorbed by the ozone layer.

So, the solar energy which reaches us through the Earth's atmosphere are mainly in the form of heat rays (infra red rays) and visible light, which is a small part of the solar energy.

Q. 10. Why is charcoal considered a better fuel than wood? What are the disadvantages of converting wood into charcoal?

Ans. Charcoal is considered a better fuel than wood because:

(i) It has high calorific value.

(ii) It does not produce any smoke.

Disadvantages:

(i) 1 kg of wood on destructive distillation produces only 0.25 kg of charcoal making it an expensive fuel.

(ii) For production of charcoal, more and more trees would have to be cut down which causes deforestation and disturbs the ecological balance of the Earth.

Q. 11. Explain how the energy of flowing water is related to solar energy.

Ans. When solar energy falls on the water surface then evaporation of water from water surfaces like ocean, river and other water bodies takes place to form clouds. The clouds are then taken to distant place by air currents, and ultimately water comes back to the surface in the form of rain and snow. During evaporation, a part of solar energy gets converted into potential energy of water molecules. The potential energy of water molecules gets converted into kinetic energy during rain and snowfall.
Thus, energy of water flowing in a river is considered to be an indirect form of solar energy.

Q. 12. Mention any two advantages and two disadvantages of producing hydroelectricity by building dams on rivers.

Ans. Advantages:

(i) The generation of electricity from water does not produce any environmental pollution.

(ii) Water energy is a renewable source of electric energy which will never get exhausted.

Disadvantages:

(i) A vast variety of flora and fauna (plants and animals) get affected.
(ii) Dams can be constructed only at a limited number of places.

Q. 13. What is the importance of hydro power plants in India? Describe how electric energy is generated in such plants.

Ans. Importance: Hydro power plants are of prime importance as about 25 per cent of our energy requirement in India is met by hydro power plants.

(i) A high rise dam is constructed at a suitable place on the river to obstruct the flow of water and thereby, collect water in larger reservoirs. Due to rise in water level the kinetic energy of flowing water is transformed into potential energy of stored water

(ii) The water from the high level in the dam is carried through sluice gates and pipes to the turbine of electric generator, which is fitted at the bottom of the dam. Due to flowing water, turbine is rotated at a fast rate and hydel electricity is produced.

(iii) A hydro power plant converts the potential energy of falling/stored water into electricity.

Q. 14. (i) Name the device used to convert

(a) solar energy into heat, and (b) solar energy into electricity,

(ii) Explain the principle of working of a windmill.

Ans. (i) (a) Solar energy into heat: Solar cooker.

(b) Solar energy into electricity: Solar cell.

(ii) The wind rotates the blades of the windmill. This, in turn, rotates the connecting rod (shaft) and the crank (u-bend) moves up and down. Since the pump rod is connected to the crank, the pump rod of the water pump also moves up and down and lifts the water from the well or flooded mine. Thus, the rotational movement of the blades of the windmill is used to drive a large number of machines.

Q. 15. Describe the steps involved in obtaining biogas and explain what is meant by anaerobic decomposition.

Ans. Following steps are involved in obtaining biogas:

(i) Mixing (slurry of cattle-dung and water)

(ii) Digesting (cattle-dung undergoing decomposition by anaerobic bacteria).

(iii) Formation of biogas (mixture of methane, CO_2, H_2 and H_2S).

(iv) Spent slurry (residue left after the formation of biogas).

The process by which the biomass changes into biogas in the absence of air due to an anaerobic microorganism is termed as an anaerobic decomposition.

Q. 16. Biogas is considered to be a boon to the farmers. Give reasons.

Ans. Biogas is considered to be a boon to the farmers because:

(i) Farmers can produce clean domestic fuel from the wastes like animal dung, dry leaves, dry plants, etc.

(ii) Spent slurry can be used in the fields as manure to increase the fertility of the soil.

(iii) Biogas can be used to generate electricity which can be utilised to run modern machines used in the fields to save time and energy.