

PHYSICS - X-PART-3 CLASS 56

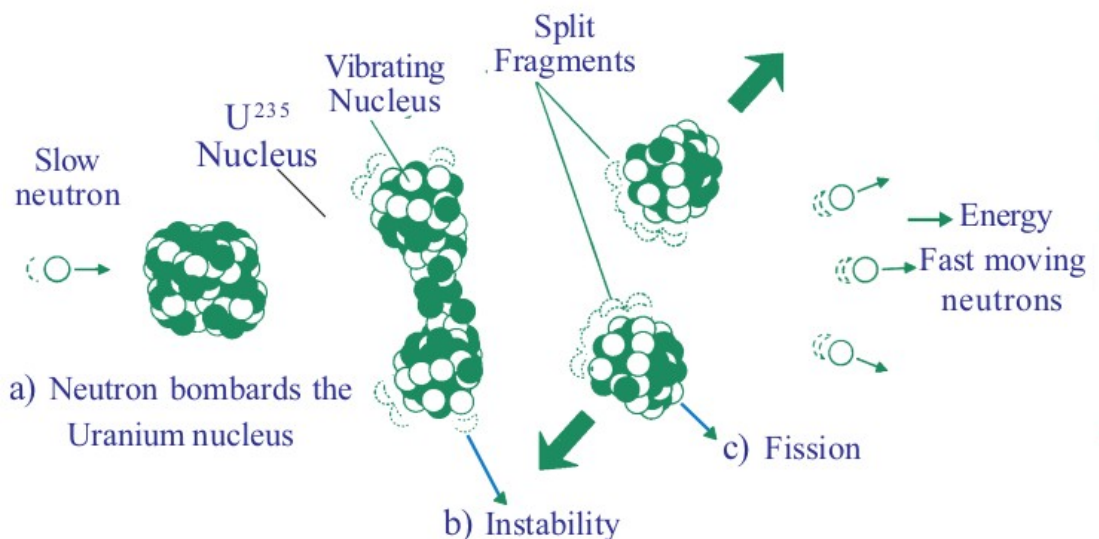


7 ENERGY MANAGEMENT

Nuclear energy

1. Nuclear fission

- * Nuclear fission is the process by which the nuclei of greater mass are split into lighter nuclei, using neutrons
- * The mass of small nuclei formed is less than that of parent nucleus. It means that there is loss of matter during such a splitting. The matter that is lost is converted into energy.
- * According to Einstein's equation $E = mc^2$, even if the matter converted is very small, the energy produced will be very large.
- * Uncontrolled fission will end in a huge explosion. This is the process that takes place in an atom bomb.



2. Nuclear fusion

- * Nuclear fusion is the process in which lighter nuclei are combined to form heavier ones.
- * In this process the matter lost is converted into energy.
- * You know that energy is produced in the stars and the Sun in this way.
- * This is the principle used for making a hydrogen bomb.
- * The scientific world has not yet been able to produce energy commercially by controlled nuclear fusion

1. What are the different methods by which energy is produced from the nucleus?

* Nuclear Fission and Nuclear Fusion

2. Even if the matter converted is very small, the energy produced is very large. What is the reason?

* According to Einstein's equation $E = mc^2$, even if the matter converted is very small, the energy produced will be very large.

3. What is the reason for uncontrolled fission reaction ending in an explosion?

* Nuclear fission is the process by which the nuclei of greater mass are split into lighter nuclei, using neutrons. The mass of nucleus produced in such process is less than of its parent nuclei. Thus there will be loss of matter in fission process. The mass lost during fusion convert in to energy. The two or three neutrons produced during the process, bombards with other nucleus and fission process continues rapidly and end in big explosion.

Nuclear reactor

* Nuclear reactor is a system that converts nuclear energy into electrical energy

* There are power stations to control fission reaction and produce electricity.

Nuclear power station

- Using nuclear energy water is converted to steam at a high temperature and pressure.
- The force of steam is used to turn the turbines to generate electrical energy.
- Such power stations are established at Tarapur, Kalpakkam, Kota, and Koodamkulam.
- Energy change taking place here is : Nuclear energy \rightarrow Heat energy \rightarrow Mechanical energy \rightarrow Electrical energy



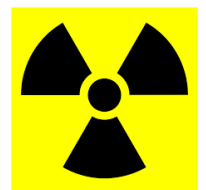
Fig 7.16

Nuclear Pollution

* The pollution caused by the presence of radioactive substances and radiations in water, air and environment is known as nuclear pollution.

* Precautions to face nuclear hazards

1. Shift out to safe places (Concrete buildings, buildings constructed using bricks etc)
2. Strictly follow the directions from the concerned authorities
3. Observe the symbols showing the nuclear radiations and behave accordingly.
4. Reduce the density of population in places likely to experience nuclear hazards.
5. If necessary, consume potassium iodide tablets or take food rich in iodine



Renewable Sources of energy

- * Those which replenish energy as it is being used up are the renewable sources of energy.
- * The natural sources of energy obtained from sunlight, wind, rain, high tide etc can be replenished. Hence these are examples for renewable sources of energy.
- * They do not pollute the environment.

Non renewable Sources of energy

- * Petroleum, coal, natural gases, nuclear energy etc., are non renewable sources.
- * They are harmful to the environment as well.

Green Energy / Clean energy

- * Green energy is the energy produced from natural sources that does not cause environmental pollution.
- * All the energy produced from renewable sources belong to this category.
- * The renewable sources like solar energy, wind energy, energy from waves and energy from biomass are considered as green energy.
- * This is also referred to as clean energy.

Green Energy

- * The energy produced from non renewable sources such as petroleum and coal, and the nuclear energy are named brown energy.
- * These are sources which cause environmental problems including global warming.
- * Classify the energy sources as green energy and brown energy:

Green Energy	Brown Energy
<ul style="list-style-type: none">* Solar cells* Tidal energy* Hydro electric power* Windmills	<ul style="list-style-type: none">* Atomic reactors* Diesel engines* Thermal power stations.

- * What must be done to ensure maximum utilization of green energy while constructing a house?
 1. Sufficient sunlight should be available in the rooms during day time.
 2. Comfortable warmth, coolness and air circulation must be available without the help of electricity.

Energy Crisis

* 'Energy crisis is the consequence of increasing demand but decreasing availability'

* What can be done for reducing energy crisis as far as possible?

1. Judicious utilisation of energy.
2. Maximum utilisation of solar energy.
3. Minimising the wastage of water.
4. Making use of public transportation as far as possible.
5. Construction and beautifying of houses and roads in a scientific manner.
6. Controlling of the street lamps with LDR (Light Dependent Resistor).
7. Timely maintenance of machines.
8. Limiting the size of newly constructed buildings.
9. Ensuring of maximum efficiency of the machines used.

* List down the devices that can be used at home to reduce energy consumption.

1. Hot box
2. Pressure cooker
3. Energy efficient oven

