

Physics (New Book) - 9th Class Physics Chapter 6 Long Question Preparation

Q1. Define work. when a force do work? explain

Ans 1: Work: work is said to be done when a force acts on a body and moves it in the direction of the force.
 Recognition of work: the question raised how much work is done? naturally, greater is the force acting on a body longer is the distance moved by it, larger would be work done
 " work is done when a force acting on a body displaces it in the direction of force".

Ans 2: Quantity: work is scaler quantity

Ans 3: Dependence; it depends on the force acting on the body, displacement of the body and angle between them.

Ans 4: unit: its unit is joule(J)

Ans 5: Definition: if one newton force act on the body it covers one meter distance in the direction of force, then its work will be one joule
 $1J = 1N \cdot 1m$

Q2. Define power and explain its units

Ans 1: Power is defined as the rate of doing work.
 Mathematically:
 Power = $P = \frac{\text{work done}}{\text{time taken}}$
 $P = \frac{W}{t}$

Ans 2: Quantity: work is a scaler quantity. Therefore , power is also a scaler quantity.

Ans 3: Unit: SI unit of power is watt(W)

Ans 4: Watt: the power of a body is one watt if it does work at the rate of 1 joule per second (1 Js^{-1})
 Formula:
 $1W = 1j / 1s$

Ans 5: Bigger units : bigger units of power are kilowatt , megawatt etc
 $1KW = 1000W = 10^3W$
 $1MW = 1000000W = 10^6W$
 $1hp = 746W$

Q3. Write a note on energy and environment

Ans 1: Sources; environmental problems such as pollution that consist of noise , air pollution and water pollution may arise by using different sources of energy such as:

- Fossil fuels
- Nuclear energy

Ans 2: Pollution: pollution is the change in quality of environment that can be harmful and unpleasant for living things.

Thermal pollution: a temperature rise into the environment that disturbs life is called thermal pollution.

Effects:

- Thermal pollution upsets the balance of life.
- It endangers the survival of many species

Ans 3: Air pollutants: Air pollutants are unwanted and harmful. Natural processes such as volcanic eruptions, forest fires and dust storm add pollutant to the air. These pollutants rarely build up to harmful levels. On the other hand the burning fuel and solid wastes in homes, automobiles and factories release harmful amount of air pollutants

Ans 4: Pollution from fission plants: all power plants produce waste heat, but fission plants produce the most. The heat released into a lake, a river, or an ocean upsets the balance of life in them. Unlike other power plants, nuclear power plants don't produce carbon dioxide. But they do produce dangerous radioactive wastes.

Ans 5: Laws; in many countries government have passed laws to control air pollution. Some of these limit the amount of pollution that power plants, factories and automobiles are allowed to give off. To meet this condition for automobiles, new cars have catalytic converters. These devices convert some polluting gases. The use of lead free petrol has greatly reduced the amount of lead in the air. Engineers are working to improve new kinds of car engines that use electricity or energy sources other than diesel and petrol. Many individual communities have laws which protect their areas from pollution. Individuals can help to control air pollution simply by reducing the use of cars and other machines that burn fuel. Sharing rides and using public transportation are the way to reduce the number of automobiles in use.

Q4. Write note on solar house heating and solar cells

Ans 1: The use of solar energy is not new. However, its use in houses and offices as well as the commercial industrial processes is quite recent. Complete solar house heating systems are successfully used in areas with a minimum amount of sunshine in winter.

Parts: a heating system consists of

1. A collector
2. A storage device
3. A distribution system

Ans 2: Structure and working: solar house heating system consists of solar collector made of glass's panel over black metal plates. The plates absorb the sun's energy which heats a liquid flowing in the pipes at the back of the collector. The hot water can be used for cooking, washing and heating the buildings

Uses: solar energy is used in solar cookers, solar distillation plants, solar power plants etc

Ans 3: Solar cells: solar energy can also be converted directly into electricity by solar cells. A solar cell also called photo cell is made from silicon wafer. When sunlight falls on a solar cell, it converts the directly into electrical energy

Uses: solar cells are used in calculators, toys and watches

Ans 4: Solar panels: large number of solar cells are wired together to form solar panels.

Uses: solar panels can provide power to telephone booths, light house and scientific research centers. Solar panels can also be used to power satellites

Q5. How is energy converted from one form to another? Give some examples

Ans 1: Interconversion of energy: the conversion of one form of energy into another form is called interconversion of energy.

Explanation: energy cannot be destroyed however it can be converted into some other forms. For example, rub your hands together

quickly. You will feel them warm. You have used your muscular energy in rubbing hands as a result heat is produced. In the process of rubbing mechanical energy is converted into heat energy. Processes in nature are the results of energy changes. For examples, some of the heat from the sun is taken up by water in the oceans. This increases thermal energy. Thermal energy causes water to evaporate from the surface to form water vapors. These vapors rise up and form clouds. As they cool down, they form water drops and fall down as rain. Potential energy changes to kinetic energy as the rain falls . This rain water may reach a lake or a dam. As the rain water flows down, its kinetic energy changes into thermal energy while parts of kinetic energy of flowing water is used to wash away soil particles of rocks known as soil erosion. During the interconversion of energy from one form to other forms, the total energy at any time remains constant .

Q6. What are nuclear fuels? explain it

Ans 1: nuclear fuels: the materials through which we can obtain nuclear energy are called nuclear fuels e.eg uranium element. In nuclear power plants we get energy as a result of fission reactions.

Ans 2: Nuclear fission reaction: the process in which heavy nucleus breaks into two smaller nuclei releasing a lot of energy is called nuclear fission reaction. During fission reaction, heavy atoms splits into two smaller parts releasing large amount of energy.

Ans 3: Example: fission reaction of uranium element

Ans 4: Uses: nuclear power plants give out a lot of nuclear radiations and a vast amount of heat. A part of this heat is used to run power plants while a lot of heat goes waste into environment

Q7. What is efficiency? explain working of an ideal system.

Ans 1: Efficiency: efficiency of a system is the ration of required form of energy obtained from a system as output to the total energy given to it as input.

Ans 2: Ideal system: an ideal system is that which gives an output equal to the total energy used by it. In other words, its efficiency is 100%. People have tried to design a working system that would be 100% efficient. But practically such a system does not exist. Every system meet energy losses due to friction that causes heat, noise etc. There are not the useful forms of energy and go waster . This means we cannot utilize all the energy given to working system . The energy in the required form obtained from a working system is always less than energy given to it as input.

Q8. Explain the mass-energy equation

Ans 1: Einstein predicted the interconversion of matter and energy. According to him, a loss in the mass of a body provides a lot of energy. This happen in the nuclear reaction. The relation between mass m and energy E is given by Einstein's mas-energy equation

$$E=mc^2$$

Where c is the speed of light($3 \times 10^8 \text{ ms}^{-1}$)

Ans 2: Significance; the above equation shows that tremendous amount of energy can be obtained from sample quaintly of matter. It happens that matter is highly concentrated form of energy

Ans 3: Uses: the process of getting the energy from our nuclear power plants is based on the above equation. The process is taking place on the sun and stars for the last millions of yeas. Only a very small fraction of the suns energy reaches the earth. This very small fraction of the suns energy is responsible for life on the earth.

Q9. Q no:(B) Calculate the power of a pump which can lift 200 kg of water through a height of 6 meters in 10 seconds.

Ans 1: $M = 200\text{kg}$

$h = 6\text{ m}$

$t = 10\text{ s}$

power of the pump = $p = ?$

Since

$F = w$

$= mg$

200×10

$= 2000\text{ n}$

As we know that

$p = w/t = F \times s/t$

But putting the values, we have

$p = 2000 \times 6/10$

$p = 12000/10$

$P = 1200\text{ W}$ Ans

Q10. What are fossil fuels? explain

Ans 1: Fossil fuels: natural fuel such as coal, oil and gas are called fossil fuels because they are produced by dead bodies of living things.

Uses; we use fossil fuels such as coal, gas to heat our houses and run industry. They are usually hydrocarbons.

Ans 2: Hydrocarbons: hydrocarbons means compound of carbon and hydrogen. When they burnt they combine with oxygen from the air.

Ans 3: Non renewable sources: fossil fuels took million of years for their formation they are known as non renewable resources. We are using fossil fuels at very fast rate. Their use is increasing day by day. If we continue to use them. They will soon exhausted. Once their supply is exhausted world would face serious problems. Therefore, we should use them wisely at same time develop new sources for future survival

Ans 4: Harmful waste : moreover fossil fuels release harmful waste as carbon monoxide and other harmful gases which pollute environment

Ans 5: Diseases: This may cause serious health problems such as headache, tension, nausea, allergy, irritation of eyes, nose, throat and may cause lungs cancer, asthma, heart diseases, damage of brain, nerves and other organs of our body.
