UNIT 8 SELF ASSESSMENT QUESTIONS

Q1: Write down the names of any three units of work

ANS:

There are three units of work are:

The S.I unit of work is Joule (J)

$$1J = 1\ Nm$$

The CGS system unit of work is erg

$$1\ erg = 1\ dyne\ cm$$

The FPS system unit of work is erg

Q2: According to the definition of work in physics, Urwa did not perform any work if she made and assignment on her laptop in three hours. Why?

ANS:

In physics, work is done only when a **force causes displacement** in the direction of the force:

$$W=F\ d$$

While Urwa made an assignment on her laptop, there was **no significant displacement of the laptop or her body in the direction of an applied force** . So, according to the physics definition, **no mechanical work was done** , even though she used mental effort and time

Q3: At what angle between force and displacement the work done by a body will be maximum?

ANS:

Work done is:

$$\mathbf{W = F\ d\ \cos\theta}$$

For maximum work, cosθ must be maximum. The maximum value of cosθ is **1** , which occurs when:

$$\theta=0^\circ$$

$$\mathbf{W = F\ d\ \cos 0^\circ}$$

$$\mathbf{W = F\ d\ (1)}$$

$$\mathbf{W_{max} = F\ d}$$

So, work done is maximum when the force and displacement are in the **same direction**

Q4: A car of mass 50kg moving with velocity 10m/s in the direction of force. Calculate its Kinetic energy.

DATA

m = 50 kg

$v = 10\ m/s$

$K.E = ?$

$$K.E = \frac{1}{2} m v^2$$

$$K.E = \frac{1}{2} (50) (10)^2 = (0.5)(50)(100)$$

$$K.E = 2500 J$$

Q5: A body of mass 10kg is dropped from a height of 20m on the ground. What will be its potential energy, if g=9.8 m/s^2?

ANS:

DATA

m = 10 kg

h = 20 m

g = 9.8 m/s^2

SOLUTIONS

$$P.E = mgh$$

$$P.E = (10)(9.8)(20)$$

$$P.E = 1960 m$$

Q6: Give the energy changes when a ball is dropped from a height of 7m to the ground.

ANS:

When a ball is dropped from a height of 7 m:

- At the top, the ball has **maximum gravitational potential energy** and almost **zero kinetic energy** .
- As it falls, its **potential energy decreases** and changes into **kinetic energy** .
- Just before hitting the ground, it whole potential energy is converted into **kinetic energy**
- On hitting the ground, some kinetic energy changes into **sound energy** , **heat energy** , and energy used in **deforming the ball**.

Q7: What is biomass?

ANS:

Biomass is organic material that comes from **plants and animals** and can be used as a source of energy.

Examples include:

Wood, crop waste, animal dung, dead plants, and food waste

Biomass contains stored chemical energy from the Sun, and it can be burned or converted into fuels like biogas

Q8: Write down the name of fossil fuel?

ANS:

Names of fossil fuels include:

1 **Coal**

2 **Petroleum (oil)**

3 **Natural gas**

Q9: Which type of energy is stored deep in the Earth?

ANS:

The type of energy stored deep inside the Earth is called **geothermal energy** .
Geothermal energy is the heat energy present inside the Earth. The inside of the Earth is very hot because of:
heat left from the formation of the Earth,
decay of radioactive materials inside rocks,
hot molten material called magma.
This heat warms underground rocks and water. Sometimes hot water or steam comes out naturally as **hot springs** or **geysers**

Q10: Write down the names of any three renewable energy sources?

ANS

Three renewable energy sources are:

1. **Solar energy**
2. **Wind energy**
3. **Hydropower (water energy)**

Q11: Write down the names of any three nonrenewable energy sources.

ANS:

Three nonrenewable energy sources are:

1. **Coal**
2. **Petroleum (oil)**
3. **Natural gas**

Q12: What is the difference between renewable and non-renewable energy sources?

ANS:

RENEWABLE ENERGY SOURCES	NON-RENEWABLE ENERGY SOURCES
These sources can be replaced naturally in a short time.	These sources cannot be replaced quickly once used.
They do not finish easily.	They can be exhausted or finished.
They are usually cleaner and cause less pollution.	They usually cause more pollution.
Examples: solar energy, wind energy, hydropower.	Examples: coal, petroleum, natural gas.
They are better for the environment.	They are harmful to the environment because they release gases and smoke

Q13: A man pushes a car 18m with a force of 2N in 4second. Calculate the power of the man.

DATA

d = 18 m

F = 2 N

t = 4 s

P = ?

SOLUTIONS

$$W = F\,d$$

$$W = (2)\,(18)$$

$$W = 36\,J$$

$$P = \frac{W}{t}$$

$$P = \frac{36}{4}$$

$$P = 9\,Watt$$

Q14: Why power is a scalar quantity?

ANS

Power is a scalar quantity because it has magnitude only and no direction .

Power is the rate of doing work:

$$P = \frac{W}{t}$$

Here, work is a scalar quantity and time is also scalar, so power also has no direction.

Therefore, power is a scalar quantity.

Q15: Name the physical quantity which gives the rate of doing work.

ANS

The physical quantity which gives the **rate of doing work** is **power** .

$$P = \frac{W}{t}$$

So, the answer is: ***Power*** .