# Important Q & A - Chapter 11: Work and Energy (Class 9 CBSE Science)

### Q1. When is work said to be done?

A: Work is said to be done when a force is applied on an object and the object moves in the direction of the applied force.

#### Q2. What is the SI unit of work?

A: The SI unit of work is Joule (J).

#### Q3. Define 1 Joule of work.

A: 1 Joule is the work done when a force of 1 Newton displaces an object by 1 meter in the direction of the force.

## Q4. What is the work done when a body moves in a circular path? Explain.

A: In a circular path, the force (centripetal) is perpendicular to displacement at every point.

So, Work =  $F \times d \times \cos(90^\circ) = 0$ 

Hence, no work is done.

### Q5. Write the expression for kinetic energy and define each term.

A:  $KE = \frac{1}{2}mv^2$ , where:

- KE = Kinetic Energy

- m = mass of object

-v = velocity of object

### **Q6.** Derive the expression for kinetic energy.

A: Using  $v^2 = u^2 + 2as$  and u = 0, we get  $v^2 = 2as$ .

Work done W = F × s = ma × s = m × a ×  $v^2/(2a) = \frac{1}{2}mv^2$ .

Thus, Work Done = Kinetic Energy.

### Q7. A body of mass 5 kg is moving with a velocity of 4 m/s. Calculate its kinetic energy.

A: KE =  $\frac{1}{2} \times 5 \times 4^2 = \frac{1}{2} \times 5 \times 16 = 40$  J.

## Q8. State and explain the law of conservation of energy.

A: Energy can neither be created nor destroyed, it can only change from one form to another.

Total energy remains constant before and after transformation.

## Q9. A man carries a load on a level road. Is he doing work? Why/Why not?

A: No, because the direction of force is vertical, while displacement is horizontal. Angle =  $90^{\circ}$ , so work = 0.

# Q10. Why is the work done by gravity negative when a body is thrown upward?

A: Because force of gravity is downward and displacement is upward.

So, angle =  $180^\circ$ , and  $\cos(180^\circ) = -1$ . Therefore, work done is negative.