

CHAPTER-5 | Work, Energy and Power

QUIZ
PART-02

1. Work is defined as:

- A. Product of force and velocity
- B. Product of force and displacement
- C. Product of mass and acceleration
- D. Product of energy and time (B)

Explanation: Work is the product of force applied on a body and the displacement in the direction of the force: $W = F \cdot d$.

2. Energy is a:

- A. Vector quantity
- B. Scalar quantity
- C. Tensor quantity
- D. Dimensionless quantity (B)

Explanation: Energy has magnitude but no direction, so it is scalar.

3. The SI unit of energy is:

- A. Erg
- B. Calorie
- C. Joule
- D. Electron volt (C)

Explanation: The standard SI unit of energy is the Joule (J), defined as $1 \text{ J} = 1 \text{ Nm}$.

4. Kinetic energy of a body of mass m moving with velocity v is:

- A. mv^2
- B. $\frac{1}{2} mv^2$
- C. $\frac{v^2}{2m}$
- D. $\frac{p^2}{2}$ (B)

Explanation: By definition, kinetic energy is $KE = \frac{1}{2} mv^2$.

5. Relation between kinetic energy K and momentum p is:

- A. $K = \frac{p^2}{2m}$
- B. $K = \frac{p}{2m}$
- C. $K = \frac{2p}{m}$
- D. $K = \frac{mp}{2}$ (A)

Explanation: Since $p = mv$ and $KE = \frac{1}{2} mv^2$, substituting gives $KE = \frac{p^2}{2m}$.

6. The work-energy theorem states:

- A. Work done on a body equals change in momentum
- B. Work done on a body equals change in potential energy
- C. Work done on a body equals change in kinetic energy
- D. Work done is independent of energy change (C)

Explanation: The theorem states that net work done by forces on a body equals the change in its kinetic energy.

7. Potential energy of a body of mass m at a height h near Earth's surface is:

- A. mgh
- B. $\frac{1}{2} mv^2$
- C. $\frac{1}{2} kx^2$
- D. $\frac{q_1 q_2}{r}$ (A)

Explanation: Gravitational potential energy is given by $U = mgh$.

8. Which of the following is a non-conservative force?

- A. Gravitational force
- B. Electrostatic force
- C. Elastic spring force
- D. Friction (D)

Explanation: Friction depends on the path taken and dissipates energy as heat, so it is non-conservative.

9. Mechanical energy of a body is:

- A. Rate of doing work
- B. Energy absorbed in motion
- C. Sum of kinetic and potential energies
- D. Energy released in mechanical work (C)

Explanation: Mechanical energy is defined as the sum of kinetic and potential energy of the body.

10. Work-energy theorem is valid:

- A. Only in presence of external force
- B. Only for conservative forces
- C. Only for internal forces
- D. For all types of forces (D)

Explanation: The theorem applies universally, regardless of whether forces are conservative or non-conservative.