

CBSE Class 9 Work Energy and Power Solved test paper-04

- When a body falls freely towards the earth, then its total energy
 - increases
 - decreases
 - remains constant
 - first increases and then decreases
- A car is accelerated on a leveled road and attains a velocity 4 times of its initial velocity. In this process the potential energy of the car
 - does not change
 - becomes twice to that of initial
 - becomes 4 times that of initial
 - becomes 16 times that of initial
- In case of negative work the angle between the force and displacement is
 - 0°
 - 45°
 - 90°
 - 180°
- An iron sphere of mass 10 kg has the same diameter as an aluminum sphere of mass is 3.5 kg. Both spheres are dropped simultaneously from a tower. When they are 10 m above the ground, they have the same
 - acceleration
 - momenta
 - potential energy
 - kinetic energy
- A girl is carrying a school bag of 3 kg mass on her back and moves 200 m on a levelled road. The work done against the gravitational force will be ($g = 10 \text{ m/s}^2$)
 - $6 \times 10^3 \text{ J}$
 - 6 J
 - 0.6 J
 - zero
- Which one of the following is not the unit of energy?

- (a) joule (b) newton metre
(c) kilowatt (d) kilowatt hour
7. The work done on an object does not depend upon the
(a) displacement (b) force applied
(c) angle between force and displacement (d) initial velocity of the object
8. Water stored in a dam possesses
(a) No energy (b) Electrical energy
(c) kinetic energy (d) Potential energy
9. A body is falling from a height h . After it has fallen a height $\frac{h}{2}$, it will possess
(a) only potential energy (b) only kinetic energy
(c) half potential and half kinetic energy (d) more kinetic and less potential energy
10. How are Joule (J) and ergs (erg) related?
(a) $1\text{J} = 10^7 \text{ erg}$ (b) $1\text{erg} = 10^{-7} \text{ J}$
(c) $1\text{J} = 10^{-7} \text{ erg}$ (d) None

Solution:

1. (c) 2. (a) 3. (d) 4. (a) 5. (d) 6. (c) 7. (d) 8. (d) 9. (c) 10.(b)

11. A rocket is moving up with a velocity v . If the velocity of this rocket is suddenly tripled, what will be the ratio of two kinetic energies?

Ans: Initial velocity = u , then $v = 3u$ Initial kinetic energy = $\frac{1}{2} mu^2$

Final kinetic energy (K.E.) = $\frac{1}{2}mv^2 = \frac{1}{2} m (3u)^2 = 9 \times (\frac{1}{2} mu^2)$

(K.E) initial : (K.E) final = 1:9

12. Avinash can run with a speed of 8 m s^{-1} against the frictional force of 10 N , and Kapil can move with a speed of 3 ms^{-1} against the frictional force of 25 N . Who is more powerful and why?

Ans: Power of Avinash $P_A = F_A \times v_A = 10 \times 8 = 80 \text{ W}$

The power of Kapil $P_k = F_k \times v_k = 25 \times 3 = 75 \text{ W}$

So, Avinash is more powerful than Kapil.

13. Can any object have mechanical energy even if its momentum is zero? Explain.

Ans: Yes, mechanical energy comprises both potential energy and kinetic energy.

Momentum is zero which means velocity is zero. Hence, there is no kinetic energy but the object may possess potential energy.

14. Can any object have momentum even if its mechanical energy is zero? Explain.

Ans: No. Since mechanical energy is zero, there is no potential energy and no kinetic energy. Kinetic energy being zero, velocity is zero. Hence, there will be no momentum.

15. The power of a motor pump is 2 kW . How much water per minute the pump can raise to a height of 10 m ? (Given $g = 10 \text{ m s}^{-2}$)

Ans: $p = w/t = mgh/ t = [(m \times 10 \times 10)/60] \text{ m} = 1200 \text{ kg}$

15. A boy is moving on a straight road against a frictional force of 5 N . After travelling a distance of 1.5 km he forgot the correct path at a round about of radius 100 m . However, he moves on the circular path for one and half cycle and then he moves forward upto 2.0 km . Calculate the work done by him.

Ans: $F = 5 \text{ N}$ then, $W = F.S = 5 \times [1500 + 200 + 2000] = 18500 \text{ J}$.