

**WORKSHEET 2**  
**WORK AND ENERGY**

1. Define work. Is it scalar or vector quantity?
2. What is the condition for a force to do work on a body?
3. A man is rowing a boat upstream, but his boat remains at rest with respect to the shore. Is he doing any work?
4. Give an example where the displacement of a particle is in the direction opposite to force acting on this particle.
5. What happens to the work done when the displacement of a body is at right angles to the direction of force acting on it? Explain your answer.
6. A ball of mass 1 kg thrown upwards, reaches a maximum height of 5 m. Calculate the work done by the force of gravity during this vertical displacement.
7. A person pulls a body on a horizontal surface by applying a force of 5 N at an angle of  $30^\circ$  with the horizontal. Find the work done by this force in displacing the body through 2 m. ( $\cos 30^\circ = \sqrt{3}/2$ )
8. A horizontal force of 50 N displaces an object of mass 100 kg. Calculate the distance moved and work done by the force in 8 seconds.
9. A car of mass 2500 kg travelling at a speed of 40 m/s stops after covering a distance of 50 m when brakes are applied. Calculate (a) the force exerted on it by the brakes (b) work done by brakes.
10. Differentiate between work, power and energy. Also state their S.I. units.
11. Define kinetic energy. Give one example also.
12. By what factor does the kinetic energy of a particle of mass  $m$  increase if the speed is increased by a factor of 3?
13. Does the kinetic energy of a body depend on its direction of motion?
14. By how much will the kinetic energy of a body increase if  
i) Speed is doubled ii) Speed is halved.
15. Deduce the formula of kinetic energy of a body moving with velocity,  $v$
16. A ball of mass 0.5 kg slows down from a speed of 5 m/s to that of 3 m/s. Calculate change in kinetic energy of the ball.
17. A block is thrown upwards with a K.E. of 2J. If it goes up to a maximum height of 2m, find the mass of the block.
18. The mass of a ball A is double the mass of Ball B. The ball A moves at half the speed of ball B. Calculate the ratio of K.E. of A to K. E. of B.
19. A body A of mass 3 kg and body B of mass 2 kg are dropped simultaneously from a height of 14.9 m. Calculate a) Their momenta b) their kinetic energies When they are 5 m above the ground
20. Differentiate between work, power and energy. Also state their SI units.
21. Define potential energy. Give one example.
22. Write ten examples of potential energy?
23. State the principle of conservation of energy.
24. A ball is dropped from a height  $H$ . When it reached the ground, its velocity is 50 m/s. Find height  $H$ .
25. A body of mass 100 kg is lifted up by 10 m. Find  
i) Amount of work done  
ii) Potential energy of the body at that height (value of  $g = 10 \text{ m/s}^2$ )
26. A boy weighing 40 kg carries a box weighing 20 kg to the top of building 15 m high in 25 sec. Calculate the power. ( $g = 10 \text{ m/s}^2$ )
27. Two persons do the same amount of work in 10s and 20 s respectively. What is the ratio of the power used by first person to that by second person?
28. Calculate the power developed by a 110 kg mass climbing up a vertical staircase at the rate of 2 m/s. ( $g = 9.8 \text{ m/s}^2$ )