**Work, Power & Energy problems**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_Period: \_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- |
| **Work**  W=Fd  W=ΔK= KF-Ki  W=ΔU= UF-Ui | **Power** | **Kinetic Energy** | **Potential Energy**  U=mgh |
| **Total Mechanical Energy** TE= K + U | | |
| **Conservation of Energy**  TEi= TEf | | |

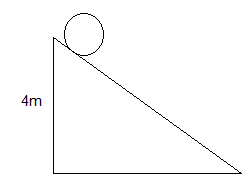
**WORK**

\_\_\_\_\_\_\_\_1. A student holds a 15kg bowling ball 1.5m above the ground for 15s. How much work is done on the ball?

\_\_\_\_\_\_\_\_\_2. A block of wood is pushed at a constant velocity with a force of 25N. How far did it travel if 100J of work are done into it?

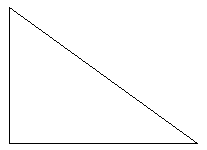
\_\_\_\_\_\_\_\_\_\_3. A 2kg textbook is picked up off the floor and placed on a 0.95m high desk. How much work is done on the book?

\_\_\_\_\_\_\_\_\_\_4. A 5kg ball rolls down a ramp that is 4m tall. How much work is done on the ball?



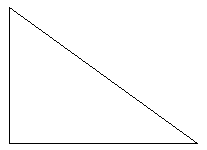
4m

\_\_\_\_\_\_\_\_\_\_5. A 5kg block of wood is pushed up a ramp as shown. If a force of 16N is needed to push it up the ramp at a constant speed. How much work is done in the block?



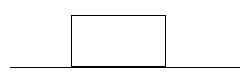
12m

\_\_\_\_\_\_\_\_\_\_\_\_\_6. A 5kg block of wood is pushed up a frictionless ramp as shown. How much work is done on the block?



8m

\_\_\_\_\_\_\_\_\_\_\_\_\_7. A box is pulled along a horizontal surface at a constant velocity. The tension in the rope is 150N and the rope makes an angle of 35° with the floor. How much work is done on the box if it is dragged 18m?



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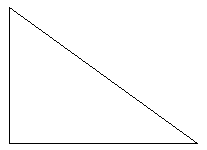
\_\_\_\_\_\_\_\_\_\_\_\_\_8. A 1200kg car traveling at 60km/h hits the brakes and comes to a stop in 32m. How much work is done on the car?

**POTENTIAL ENERGY**

\_\_\_\_\_\_\_\_\_\_\_\_\_9. How much potential energy does a 12kg bowling ball have if it is sitting on a 0.50m high chair?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_10. A 7.5kg bowling ball sits on a 1.10m desk. If a student lifts the ball 0.90m above the desk, how much potential energy does it have with respect to the desk?

\_\_\_\_\_\_\_\_\_\_\_\_\_11. A 5kg block is pushed up a ramp as shown. How much potential energy does it have when it reaches the top?



6.5m

13m

\_\_\_\_\_\_\_\_\_\_\_\_12. If the ramp in question #11 is frictionless, how much force is required to push the block up the ramp?

**KINETIC ENERGY**

\_\_\_\_\_\_\_\_\_\_13. How much kinetic energy does a 50g bullet traveling at 365m/s have?

\_\_\_\_\_\_\_\_\_\_14. If a 78kg cheetah is running at a speed of 120km/h, how much kinetic energy does it have?

\_\_\_\_\_\_\_\_\_\_\_15. A 3.91N baseball has 775J of kinetic energy. How fast is it moving?

\_\_\_\_\_\_\_\_\_\_\_16. A 0.425kg water balloon is dropped from the top of a school gymnasium onto some unsuspecting physics students. If the gym is 8.50m high, how much kinetic energy does it have just before it hits the ground?

**POWER**

\_\_\_\_\_\_\_\_\_\_\_17. A 12kg block is pushed up an 8m ramp at a constant speed of 2.5m/s with a force of 28N. How much power does it require?

\_\_\_\_\_\_\_\_\_\_\_18. A 25kg crate is lifted on to a 2m ledge by a worker that exerts 325W of power. How long does it take to reach the ledge?

\_\_\_\_\_\_\_\_\_\_\_\_19. A 0.390kg hockey puck is accelerated across a frictionless sheet of ice from rest to a speed of 15m/s in 1.5sec. How much power is exerted on the puck?

\_\_\_\_\_\_\_\_\_\_\_20. A 5kg box is sliding across the floor at 2m/s when it is accelerated to 8m/s in 1.80s. If the coefficient of friction is 0.220, How much power is required to accelerate the box?

