Mechanical Work: Notes SPH4C

The mechanical work on an object is the amount	of mechanical
to that object by a:	
W =	_
Whereas the mechanical energy of an object is to change by mechanical work (definition by the De	
Energy is a concept so fundamental in physics tha more fundamental. It is easier just to understand expotential energies.	
Kinetic energy is the energy of	and potential energy is the energy to,
potentially,	<u>_</u> .
Thermal energy, the energy of the particles of a spotential energy: The kinetic energy is in the kinetic energy of	
The potential energy is stored in the atomic	during this motion.
The SI derived unit of work is the Joule: 1 J =	
But there exist other metric units, e.g. kilowatt-ho	ours: 1 kWh =
calories: 1	cal =
Amount %Daily Value	of necessary to raise the y 1°C (at standard atmospheric pressure). kilocalories (or Calories with a capital C).

 $1 \, Calorie = 1000 \, cal = 4184 \, J = 4.184 \, kJ$

In the simplest case of an object move	ving in one direction	and a constant force applied parallel						
to that direction: W =	to that direction: W =, where F is the magnitude of the applied force and Δd is							
the distance the object travels. (Note that work is a quantity.)								
Example 1: Ms. Rosebery applies a horizontal force of magnitude 40.0 N to push a 10.0 kg box 15.0 m across a frictionless surface. Find the work done on the box.								
Example 2: Ms. Rosebery applies a vertical force of magnitude 40.0 N on a 10.0 kg box as it slides 15.0 m across a frictionless surface. Find the work done on the box.								
Answer:: Ms. Rosebery i	of the box and							
thus its mechanical energy. Forces a	applied at	to the motion don't count.						
If there is a frictional force, it will do work on the object, i.e								
its total mechanical energy.								
Example 3: Ms. Rosebery applies a horizontal force of magnitude 40.0 N to push a 10.0 kg box 15.0 m across a surface. The frictional force is 10.0 N. Find the work done <i>by friction</i> on the box.								
The total change in energy of the box		•						
		$\Delta E = \underline{\qquad}$ $\Delta E = \underline{\qquad}$						
The work done by friction would have gone into creating heat and sound energy.								
Power is the rate at which work is done or energy is transferred:								
	P =							
It has units of or	P =	_						

More Practice

Match	Match each term on the left with the most appropriate description on the right.								
	kinetic energy		A. energy pos	A. energy possessed by the particles of a substance					
	mechanical work		B. when a force is applied to an object to change its energy						
	potential energy		C. rate of doing work						
	power		D. energy possessed by moving objects						
	thermal energy		E. energy an object possesses because of its position						
1.	Energy is measured in:								
	A. calories	B. Jou	lles	C. kilowatt-hours	D. all of the above				
2.	1 Joule is equivalent to:								
	A. $1\frac{m}{s^2}$	B. 1	$\frac{kg \cdot m}{s^2}$	C. $1\frac{kg \cdot m}{s}$	D. $1 \frac{kg \cdot m^2}{s^2}$				
3.	If a force is applied to an object that is opposite its direction of motion, the total mechanical energy of the object will be:								
	A. the same	B. inci	reased	C. decreased	D. It cannot be determined.				
4.	A student uses a force of 20 N to push a book 1.0 m along a table. A frictional force of 20 N opposes the motion of the book. The work done by the student is:								
	A. 0 J	B. 20	J	C. 40 J	D. It cannot be determined.				
5.	A shopper pushes a shopping cart across a horizontal surface with a horizontal applied force 41 N for 11 m. The cart experiences a frictional force of 35 N.								
	(a) Calculate the wor	k done	by the shoppe	r on the shopping cart					
	(b) Calculate the work done by friction on the shopping cart.(c) Calculate the total mechanical work done on the shopping cart.								