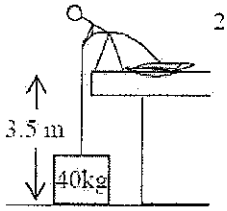
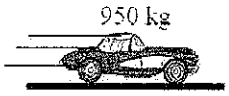
1. Potential Energy (PE), Kinetic Energy (KE), Potential Elastic Energy (PE_{el}), or Work (W)?

A. KE A car is moving 22 m/s.
B. PE_{el} When a spring is compressed.
C. PE When an object is sitting on a desk.
D. 0 After a falling object hits the ground.
E. -W The ground stopping a falling object.
F. PE, KE While a rock is flying thru the air.
G. W When a force pushes on and moves an object.
H. PE Decreases as an object goes downhill.
I. KE What is gained as an object goes downhill.
J. -W Friction acting on a sliding object.
K. 0 A box on the ground at rest.
L. KE Decreases as an object slows down.
M. W Provided by the engine of car.
N. W Pushing an object up a ramp.
O. PE + KE For a dropped object, as it is falling.
P. PE_{el} Decreases as a spring is released.



2. Slim Jim lifts a 40 kg object up 3.5m.
A. How much energy does it have before it is lifted? 0 J
B. What kind of energy will it gain? PE
C. Where does this energy come from? Work
D. Calculate the box's energy after it is lifted.

$PE = mgh = 40kg\ 10m/s^2\ 3.5m = 1400J$



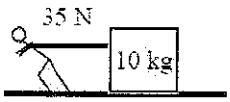
3. If the car has 30,400 J of kinetic energy, how fast is it moving?

$KE = \frac{1}{2}mv^2$

$30,400J = \frac{1}{2} \cdot 950kg\ v^2$

$30,400 = 475\ v^2$

$\sqrt{64} = \sqrt{v^2}$ $v = 8m/s$



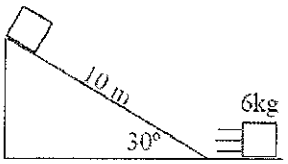
4. Slim Jim pulls on a box for 6.5m.
A. How much work did Jim do?

$W = Fd\cos\theta$

$= 35N \cdot 6.5m \cos 1$

227.5 J

B. What kind of energy does the box gain? KE
C. If there is no friction, how much energy does the box gain? 227.5 J



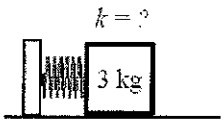
5. A 6 kg object is slides down a frictionless 10 m ramp.
A. What kind of energy does it have at the top? PE
B. "h" must always be vertical. Calculate "h" at the top of the ramp.

$h = 10m \sin 30° = 5m$

C. Calculate the energy at the top.

$PE = mgh$ $6kg \cdot 10m/s^2 \cdot 5m = 300J$

D. What is this energy transforming into as it slides down the ramp? kinetic



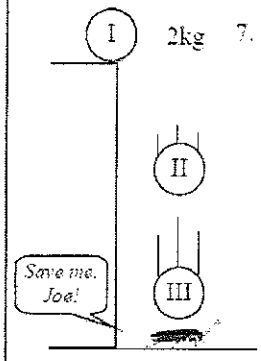
6. A 3 kg object compresses a spring 0.6m, giving it 8.1 J of energy.
A. What kind of energy does it have? PE_{el}
B. Calculate the spring constant for this spring.

$PE_{el} = \frac{1}{2}kx^2$

$8.1 = \frac{1}{2}k(0.6m)^2 = 16.2 = k \cdot 0.36$

$k = 45\ N/m$

C. What kind of energy will the object have when the spring is released? Kinetic



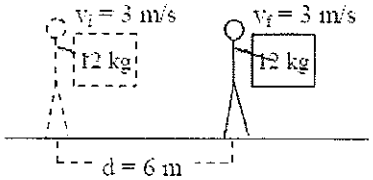
7. A. If the ball has 120J of energy at position I, calculate the height at I.

$PE = mgh$

$120J = 2kg \cdot 10m/s^2\ h$

$h = 6m$

B. What kind of energy does it have at II? PE + KE
C. Where does the energy go at III? into work -W

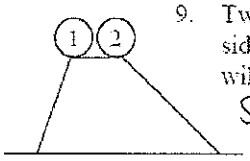


8. Slim Jim carries a box for 6m at constant speed.
A. How much energy does the box have?

$KE = \frac{1}{2}mv^2 = \frac{1}{2}12kg \cdot 3m/s^2 = 54J$

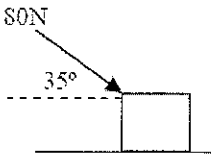
B. How much work does Jim do?

0 J No change in E = no work done



9. Two identical balls roll down opposite sides of a frictionless platform, which one will be going faster at the bottom?

Same speed = PE means = KE at bottom



10. If the box moves 12m to the right, calculate the work done on the box.

$W = F \cdot d\cos\theta$

$80N \cdot 12m \cdot \cos 35° = 786J$