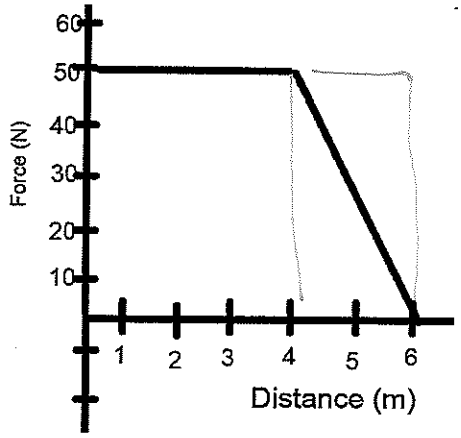
Name: _____ Class: _____ Date: _____ ID: A

## Work quiz Version B

**Multiple Choice**
*Identify the choice that best completes the statement or answers the question.*

____ 1.




(#3-3) A car is pushed across a level road. How much work was done on the car?
a. 0J
b. 250J
c. 300J
d. 550.1J

____ 2. (#3) A painter raises a 5kg bucket of paint up to a 10m platform at constant velocity. How much work has the painter done on the bucket?
a. 0N
b. 5N
c. 50N
d. 500N

____ 3. (#3-3) A student holds a 10kg mirror 6ft high on a wall for 20 seconds. What is the power generated during the time frame? (approximately)
a. 0 watts
b. 200 watts
c. 2000 watts
d. 100 watts

____ 4. (#3-3) A 70kg student generates a 210Watts of power while biking at a constant velocity of 7m/s. What is the average force needed to maintain this speed?
a. 490N
b. 30N
c. 3.0N
d. 0N

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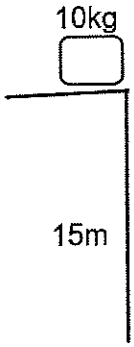
____ 5.




$PE = mhg = 10 \cdot 15 \cdot 10 = 1500J$ Before $= KE + air$

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

$\frac{1}{2}(15)(11.8)^2$

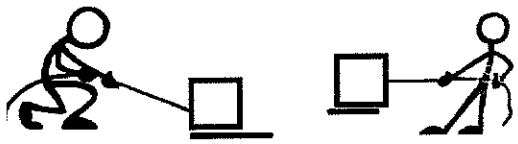
1044J

455J

(#3) A 10 kg block falls off a 15m ledge, If the velocity of the block is 11.8m/s how much work was done by wind resistance?

a. 10J
b. ~~100J~~
c. ~~1400J~~ 450J
d. 1500J

____ 6.



A box is dragged by two stick men the same distance, which guy did more work on the box. The left side stick man pulled at an angle, and the right hand side pulled with no angle.

a. equal work
b. Left side
c. right side
d. depends on the angle.

← more energy, Just same work.

**Short Answer**

7. A 5N force is applied to a 12kg bowling ball over a distance of 1.2m. $F \cdot d =$ Energy

a. How fast is the ball moving at the release of the ball?

$F \cdot d = \frac{1}{2}mv^2$ $5 \cdot 1.2 = 6J = \frac{1}{2}mv^2 = \frac{1}{2}(12)v^2$ $v = 1 m/s$

b. If the ball were to roll up hill, How high could the ball roll up? (no friction)

$6J = mgh$ $12 \cdot 10 \cdot h$ $h = 0.05 m$

c. If the lane has a coefficient of friction of 0.01, how far could the ball roll before stopping?

$TE = mg\mu_k \cdot d$ $6J = 12 \cdot 9.8 \cdot (.01)(x)$ $x = 5.1m$

d. If the ball hit a spring, with a 0.001Nm spring constant, what is the maximum distance the ball could compress the spring?

$6 = \frac{1}{2}kx^2$

$= \frac{1}{2}(.001)x^2$

$x = 109m$ Really small Spring Constant

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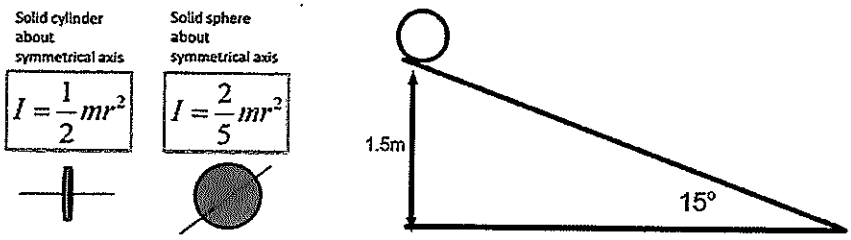
8.




A 10kg solid sphere is rolling down a slope, as seen above.

15cm Radius

a. Calculate the rotational inertial of the solid sphere. $I = \frac{2}{5}(10)(.15)^2 = 0.09\ kgm^2$

b. If a disk of equal mass and radius, is rolled down the incline, which reaches the bottom first?

$\frac{1}{2}$ vs. $\frac{2}{5}$ - Solid Sphere, less energy need to get moving, more $K_T$

c. If both are rolled off the edge of table at the same time, which hits the ground first?

Same = $a = -9.8$ or $g$

d. Calculate the velocity of the ball at the bottom of the incline.

$V_T = \omega r$

$\frac{V_T}{r} = \omega$ sub

$mgh = K_r + K_T$

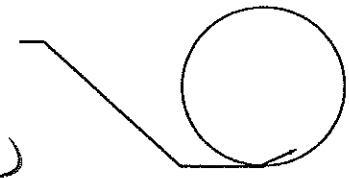
9. $mgh = \frac{1}{2}I\omega^2 + \frac{1}{2}mv^2$

$\frac{mgh}{10 \cdot 10 \cdot 1.5} = \frac{1}{2}\frac{I}{1}\frac{V_T^2}{r^2} + \frac{1}{2}mv^2$

$150 = .0002V_T^2 + 5V_T$

$V_T = 29.9$ m/s

Less $K_R$ ↓ // $K_T$ ↑



A ball is sitting on a 15m hill and given a 5m/s push as it proceeds down a frictionless surface.

a. Calculate the velocity of the ball at the bottom of the hill.

$PE + KE = KE$

$mgh + \frac{1}{2}mv^2 = \frac{1}{2}mv^2$

$9.8 \cdot 15 + \frac{1}{2}(5)^2 = \frac{1}{2}V^2$ $\quad V = 17.8$ m/s

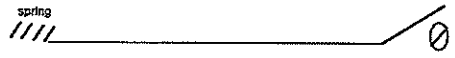
b. Using only formulas involving, m,v,h create a formula solving for the maximum height of a loop the ball can complete a loop.

$mg = \frac{mv^2}{r}$ $\quad v = \sqrt{g \cdot r}$ $\quad mgh = \frac{1}{2}mv^2$

$PE = KE$ $\quad$ sub in $h = \frac{\frac{1}{2}v^2}{g}$ $\quad h = \frac{\frac{1}{2}(\sqrt{g \cdot r})^2}{g}$

$h = \frac{1}{2}gr^2$

10.




A steel ball of mass M is pushed against the a spring with a spring constant of k, a distance of d. If the ball slides on a frictionless surface, write a formula for the

a. maximum time in the air as it is launched off ramp.

SKIP

b. Maximum height in the air as it is launched into the air.

$\frac{1}{2}kx^2 = mhg$

$\frac{\frac{1}{2}kx^2}{mg} = h$