Physics Practice

5.50×10^3 J 1.

91.7 watts 2.

$p = mv$

A go-cart has a mass of 250.0 kg. A constant force acts on it for 60.0 s. The go-cart's initial velocity is 6.00 m/s and its final velocity is 28.0 m/s?

a) What is its change in momentum?
b) What is the magnitude of the force that acts upon it?

$p = (250)(28-6)$ $\quad = 5500$

$p = \frac{(250)(28-6)}{60\ s} = 91.6\ldots$

4/30. kg·m/s 3.

$Ft = m\Delta v$

A force of 43.0 N acts on a 13.00 kg object for 10.0 s. Find the object's impulse.

$(43\ N)(10\ s)$

3.78×10^3 m/s 4.

A bullet with a mass of 100.0 g strikes a wooden block with a mass of 15.0 kg and becomes embedded in the block. The block and the bullet then fly off at 25.0 m/s. Find the initial velocity of the bullet.

.100 kg

$m_b v_b + m_B v_B = (m_b + m_B) v_{bB}$ $\quad (.100) v_b + (15)(0) = (15.1)(25)$

$v_b = \frac{(15.1)(25)}{.100}$

3.48×10^3 J 5.

290 watts 6.

A constant force of 120 N was applied at an angle of 15.0° to the horizontal to move a 150.0 kg block a distance of 30.0 meters in 12.0 seconds.

120 N

150 kg

a) Find the amount of work.
b) Determine the average power consumption.

$W = (120 \cos 15)(30)$ $\quad = 3477$ J

$p = \frac{120 \cos(15) * 36}{12}$

14.4 m/s 7.

−11.0 J 8.

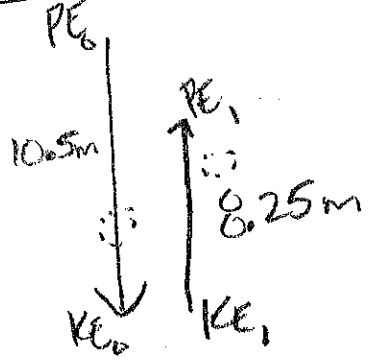
A 500.0 gram ball was released from a height of 10.5 m. The ball hit the ground and rebounded to a height of 8.25 m.

.5 kg

a) Find the vertical velocity of the ball just before it hits.

SOUND, CONTACT, RESISTANCE 9. b) Calculate the energy change. $KE_1 - KE_0 = \Delta KE$

c) How was the energy lost?



$PE_0 = (.5)(9.81)(10.5)$ $\quad = 51.5$ J

$KE_0 = 51.5$ J

$PE_1 = (.5)(9.81)(8.25)$ $\quad = 40.5$ J

$KE_1 = 40.5$ J

$\sqrt{\frac{2(51.5)}{.5\ kg}} = v$

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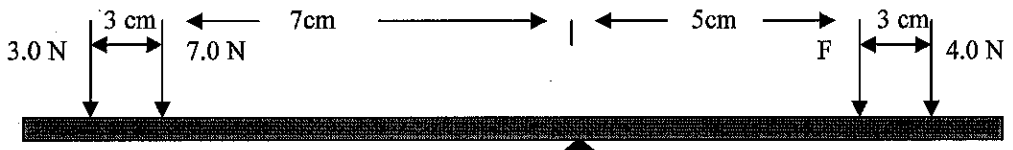
F = 9.4 N

10. Forces of 3, 7, 4, and F N are applied to a weightless board that rests a fulcrum. The board is in equilibrium (does not rotate). Find the magnitude of F.



$\frac{.47}{.05} = F$

$(3)(.10)+(7)(.07)=(F)(.05)+(4)(.08)$

$.30+.49=.05F+.32$

$.79-.32=.05F$

10m/s

30.8 s^{-1}

11. A bicycle wheel of radius 0.325 meters rotates at a speed of 10.0 m/s.

a. If a person is riding the bike, how fast are they traveling?

b. What is the angular velocity of the bicycle's wheel?

$\omega = \frac{10\ m/s}{.325\ m} =$

$a_c = 47\ m/s^2$

12. A 10.0 kg dog is chasing his tail. The radius of the circle that dog makes is 0.62 meters. The dog runs in a circle 10 times in 7.2 seconds.

a) What is the centripetal acceleration?

b) What is the tension (force) in the string?

$m = 10.0\ kg$

$r = .62\ m$

$\omega = \frac{10\ rev}{7.2\ s} \cdot \frac{2\pi}{1\ rev} = 8.7\ s^{-1}$

$a_c = \omega^2 r$

$= 47\ m/s^2$

Directions: Explain to a friend how to prepare a presentation properly.

VARIES FROM STUDENT TO STUDENT

"Don't water your weeds." -- Harvey Mackay

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