Unit 4: Practice Test (Skills 28-32)
2 Pt Questions

109. A bulldog on a skate board rides down a hill. As this happens the total mechanical energy of the system

A) Increases
B) Decreases
C) Remains the same

110. The work done to accelerate a hovercraft down a hallway becomes.... [assume frictionless]

A) potential energy (gravitational)
B) elastic potential energy
C) internal energy
D) kinetic energy causes change in v

111. A force "F_s" is used to stretch a spring distance "x". Which equation should be used to determine the work done on the spring?

A) $\frac{x}{F_s}$ B) $\frac{F_s}{x}$ C) $F_s x$ D) $\frac{F_s}{2}x$

$W = \frac{F_s}{2}x$

112. A monkey drops a banana off a cliff. At what point in the fall are the kinetic and potential energy equal?

A) At the top
B) At the bottom
C) One quarter of the way down
D) Half way down

113. As Superman flies upward at a **constant speed** of 30m/s his

height ↑ v →

A) Kinetic energy remains the same and the potential energy increases
B) Kinetic energy decreases and the potential energy increases
C) Both potential and kinetic energy remains the same
D) Both potential and kinetic energy decrease

114. Ski lift A carries a group of snowboarders with a collective mass of 250kg to an elevation of 500m in a time of 4 minutes. Ski lift B carries a mass of 500kg in skiers to an elevation of 250m in a time of 2 minutes. Compared to Ski lift A, Ski lift B

A) Does the same work, but consumes twice the power
B) Does the same work, but consumes half the power
C) Does more work and consumes the same power
D) Does more work and consumes half the power

	A	B
m	250kg	500kg
(2h)	500m	250m
(2t)	4m	2m
	$W = 2mgh$	$W = 2mgh$
	$P = \frac{2mgh}{2t} = \frac{mgh}{t}$	$P = \frac{2mgh}{t}$

2m Same work
Small t Big P

115. The rate at which energy is consumed is measured in

A) joules
B) joules/second
C) seconds
D) meters/second

116. Energy and work are classified as

A) Vector quantities
B) Scalar quantities
C) Energy is scalar and work is a vector

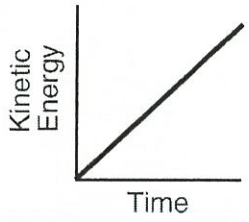
117. Which of the following is an appropriate unit for measuring potential energy?

A) J/s B) $kg\frac{m}{s^2}$ C) Nm D) N/m

mgh

118. An object falls freely near Earth's surface. Which graph best represents the relationship between the object's kinetic energy and its time of fall

A)



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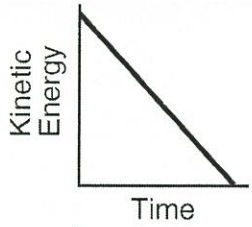

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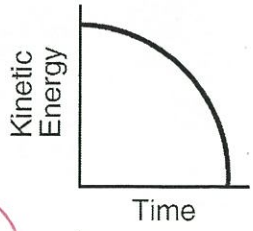

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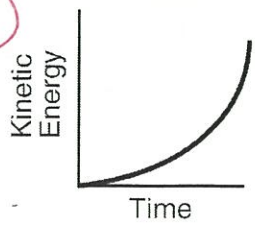


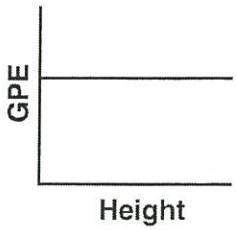
$v_f = at$

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

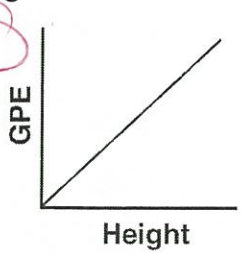
$KE = \frac{1}{2}m(v_f)^2$

119. Which graph represents the relationship between the gravitational potential energy *(GPE)* of an object near the surface of Earth and its height above the surface of Earth?

A)

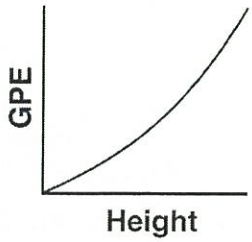


B)

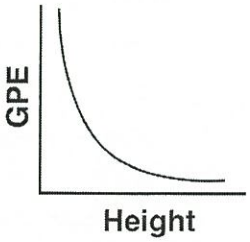


PE=mgh

C)



D)

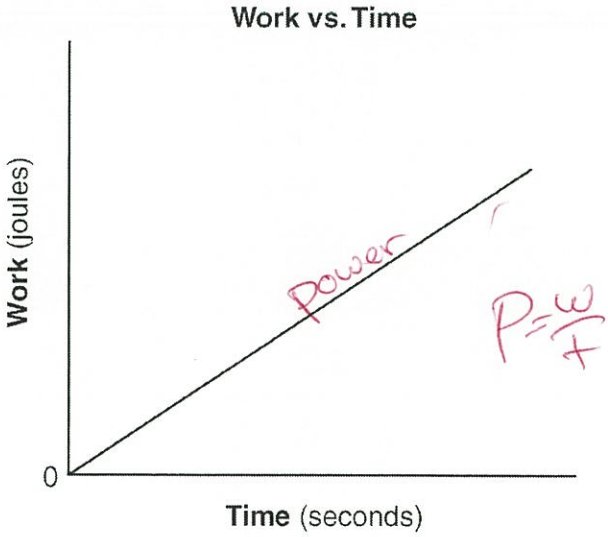


120. When a force moves an object over a rough, horizontal surface at a constant velocity, the work done against friction produces an increase in the object's

A) weight B) momentum
C) potential energy D) internal energy

121. The graph below represents the relationship between the work done by a student running up a flight of stairs and the time of ascent.

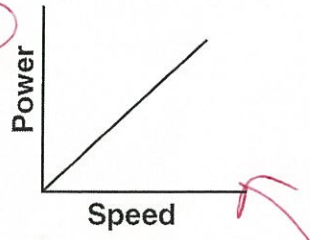
What does the slope of this graph represent?

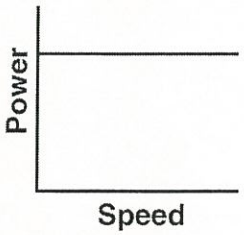


A) impulse B) momentum
C) speed D) power

Unit 4: Practice Test (Skills 28-32)

122. Which graph best represents the relationship between the power required to raise an elevator and the speed at which the elevator rises?

A)


B)


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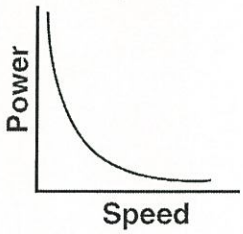
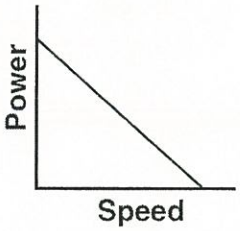
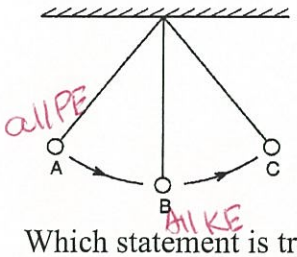


D)


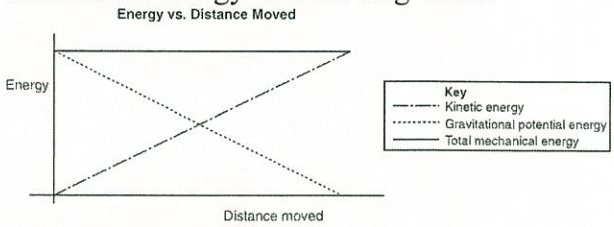
123. The diagram below shows three positions, *A*, *B* , and *C*, in the swing of a pendulum, released from rest at point *A*. [Neglect friction.]



Which statement is true about this swinging pendulum?

A) The potential energy at A equals the kinetic energy at *C*.
B) The speed of the pendulum at A equals the speed of the pendulum at *B*.
C) The potential energy at *B* equals the potential energy at *C*.
D) The potential energy at *A* equals the kinetic energy at *B*.

124. The graph below represents the kinetic energy, gravitational potential energy, and total mechanical energy of a moving block.



Which best describes the motion of the block?

A) accelerating on a flat horizontal surface
B) sliding up a frictionless incline
C) falling freely
D) being lifted at constant velocity

125. The force of attraction between a cow with mass m_c and a "moon" with mass m_m is 900N when separated by a distance of "r". If the distance were changed to 3r, what would be the new force between the cow and the moon?

A) 300N
B) 8100N
C) 100N
D) 2700N

Review

r×3 $F_g \div 9$

126. Tyrannosaurus Flex uses his tail to launch watermelons across a ravine into a pile of sand. As the speed of the launched watermelons doubles, the distance required to stop the watermelons if the force is held constant will be

A) doubled
B) one-half
C) quadrupled
D) one-fourth

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

$d = \frac{\frac{1}{2}mv^2}{F}$

Unit 4: Practice Test (Skills 28-32)
3 Pt Questions

127. Groot lifts Rocket Raccoon's mass of 20kg to a height of 10m on Planet X giving Rocket a total gravitational potential energy of 1500J. What is the gravitational field strength on Planet X?

A) 9.8 N/kg B) 5 N/kg
C) 1000 N/kg D) 7.5 N/kg

$PE = mgh$
$1500J = (20kg)(g)(10m)$
$g = 7.5 N/kg$

128. A 4kg sloth climbs slowly from a 2m high limb to a 5m high limb over a period of 12 hours. How much potential energy was gained by the sloth?

A) 1.8×10^{-3} J B) 8 J
C) 118 J D) 78.4 J

$PE = mgh \quad (4kg)(9.8 m/s^2)(3m) = 117.6J$

129. Captain America jumps on a spring with a spring constant of 240 newtons per meter, the spring is compressed 5 meter. How much energy is stored in the spring?

A) 7.5×10^3 J B) 3×10^3 J
C) 1.2×10^2 J D) 1.5×10^3 J

$k = 240 N/m$
$x = 5m$
$PE_s = ?$

$PE_s = \frac{1}{2}kx^2$
$PE_s = 3000J$

130. A monkey named Abu drops a 3kg shiny trinket from a height of 20m. What are the approximate kinetic and potential energy of the trinket after it has fallen 15m?

A) PE = 441J ; KE = 147J
B) PE = 588J ; KE = 0 J
C) PE = 588J ; KE = 441J
D) PE = 147J ; KE = 441J

	$E_T = PE + KE$
20m	588J | 588J + 0
15m	
5m	588J | 147J + 441J

131. A horizontal force of 40 Newtons pushes a block along a level table at a constant speed of 2 meters per second. How much work is done on the block in 3 seconds?

A) 80 J B) 120 J
C) 480 J D) 240 J

$F = 40N$
$V = 2 m/s$
$t = 3s$

$W = Fd = Fvt$
$= (40N)(2 m/s)(3s)$

132. A 0.2 kg mouse runs up a clock to a height of 2 m and slides down a piece of wood back to the base. The mouse has 1J of kinetic energy when he reaches the base. How much work was done against friction during the slide?

A) 3 J B) 1 J
C) 2 J D) 0.3 J

$Q = PE_{Top} - KE_{Bottom}$
$3.9J - 1J = 2.9J$

133. If Optimus Prime does 2×10^5J of work in 2 seconds to launch Bumblebee into the air, the power developed is

A) 2×10^5 watts B) 4×10^5 watts
C) 1×10^5 watts D) 1 watt

$P = \frac{W}{t} = \frac{2 \times 10^5 J}{2s}$

134. Raphael the ninja turtle swings his 80kg mass on a rope like a pendulum. Raphael's maximum velocity at the bottom of the swing is 20 m/s. What is the maximum height of the pendulum's swing?

A) 80 m
B) 392 m
C) 20 m
D) 4m

$PE_{TOP} = KE_{Bottom}$
$mgh = \frac{1}{2}mv^2$
$(9.81 m/s^2)h = \frac{1}{2}(20 m/s)^2$
$h = 20 m$

135. A 25-gram frog falls from the ledge of a stream bank 0.90 meter above a creek. If the frog has 0.20 joule of kinetic energy when it hits the water, what is the total amount of energy converted into internal (thermal) energy during the frog's fall?

A) 0.02 J
B) 0.22 J
C) 2.2 J
D) 220 J

136. How much work is done by a 500kg Orca whale as it speeds up from 10m/s to 12m/s?

A) 1800J
B) 11000J
C) 19800J
D) 3600J

$W = \Delta KE$
$= \frac{1}{2}m(v_f^2 - v_i^2)$
$= \frac{1}{2}(500kg)[(12 m/s)^2 - (10 m/s)^2]$