TALLER DE TRABAJO , ENERGÍA Y POTENCIA

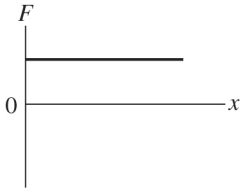
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) A truck has four times the mass of a car and is moving with twice the speed of the car. If K_t and K_c refer to the kinetic energies of truck and car respectively, it is correct to say that 1) _____

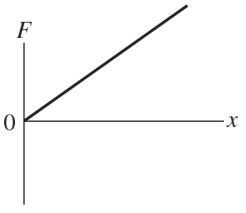
A) $K_t = K_c$. B) $K_t = 16K_c$. C) $K_t = 2K_c$. D) $K_t = 4K_c$. E) $K_t = \frac{1}{2}K_c$.

2) The graphs shown show the magnitude F of the force exerted by a spring as a function of the distance x the spring has been stretched. For which one of the graphs does the spring obey Hooke's law? 2) _____

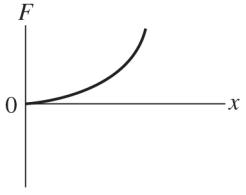
a)



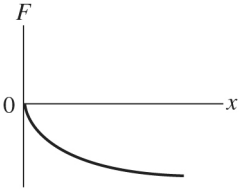
b)



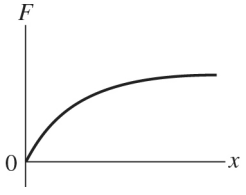
c)



d)



e)



A) Graph a B) Graph b C) Graph c D) Graph d E) Graph e

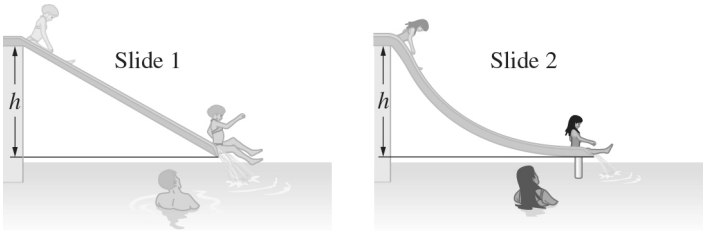
3) When you throw a pebble straight up with initial speed V, it reaches a maximum height H with no air resistance. At what speed should you throw it up vertically so it will go twice as high? 3) _____

A) $2V$ B) $\sqrt{2}V$ C) $8V$ D) $16V$ E) $4V$

4) When you drop a pebble from height H, it reaches the ground with speed V if there is no air resistance. From what height should you drop it so it will reach the ground with twice speed? 4) _____

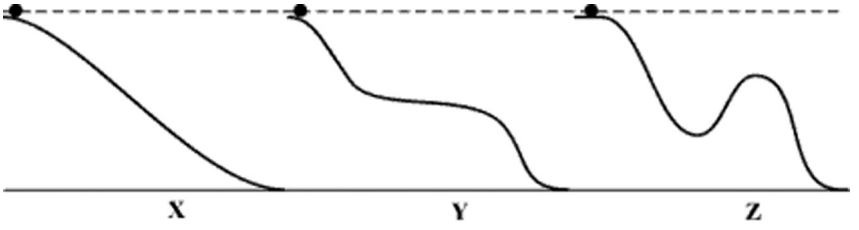
A) $2H$ B) $16H$ C) $4H$ D) $8H$ E) $\sqrt{2}H$

5) Swimmers at a water park have a choice of two frictionless water slides, as shown in the figure. Although both slides drop over the same height h, slide 1 is straight while slide 2 is curved, dropping quickly at first and then leveling out. How does the speed v_1 of a swimmer reaching the bottom of slide 1 compare with v_2, the speed of a swimmer reaching the end of slide 2? 5) _____



A) $v_1 < v_2$
B) $v_1 = v_2$
C) $v_1 > v_2$
D) The heavier swimmer will have a greater speed than the lighter swimmer, no matter which slide he uses.
E) No simple relationship exists between v_1 and v_2.

6) A stone can slide down one of four different frictionless ramps, as shown in the figure. For which ramp will the speed of the ball be the greatest at the bottom? 6) _____



A) Ramp X
B) Ramp Y
C) Ramp Z
D) The speed of the ball will be the same for all ramps.

7) A force produces power P by doing work W in a time T. What power will be produced by a force that does six times as much work in half as much time? 7) _____

A) $\frac{1}{12}P$ B) $6P$ C) $\frac{1}{6}P$ D) P E) $12P$

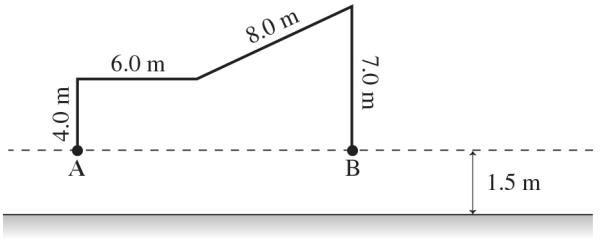
8) A force of 30 N stretches a very light ideal spring 0.73 m from equilibrium. What is the force constant (spring constant) of the spring? 8) _____

A) 34 N/m B) 41 N/m C) 46 N/m D) 22 N/m

9) A 30- N box is pulled upward 6.0 m along the surface of a ramp that rises at 37° above the horizontal. How much work does gravity do on the box during this process? 9) _____

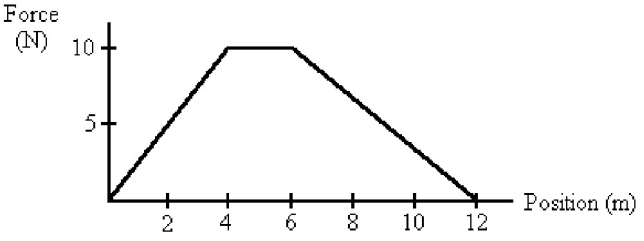
A) -1100 J B) 120 J C) -180 J D) -140 J E) -110 J

10) A person carries a 25.0-N rock through the path shown in the figure, starting at point A and ending at point B. The total time from A to B is 1.50 min. How much work did gravity do on the rock between A and B? 10) _____



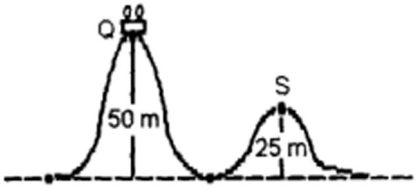
A) 0 J B) 275 J C) 625 J D) 20.0 J E) 75 J

11) A force acts on an object, causing it to move parallel to the force. The graph in the figure shows this force as a function of the position of the object. How much work does the force do as the object moves from 0 m to 4 m? 11) _____



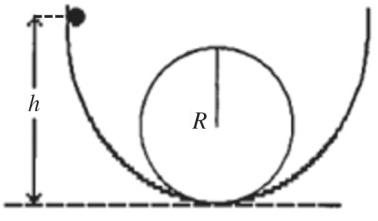
A) 30 J B) 20 J C) 0 J D) 70 J E) 40 J

12) The figure shows a famous roller coaster ride. You can ignore friction. If the roller coaster leaves point Q from rest, what is its speed at the top of the 25-m peak (point S)? 12) _____



A) 44 m/s B) 10 m/s C) 120 m/s D) 22 m/s E) 62 m/s

13) A roller coaster starts from rest at a height *h* at the left side of a loop-the-loop, as shown in the figure. It is not attached to the track in anyway, and there is no friction from the track or from air resistance. If the radius of the loop is R = 6.0 m, what is the minimum height *h* for which the roller coaster will not fall off the track at the top of the loop? 13) _____

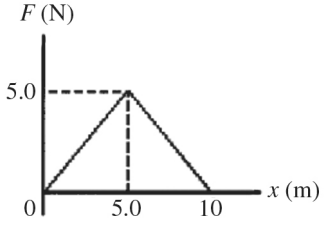


A) 18 m B) 15 m C) 8.5 m D) 21 m E) 12 m

14) At what minimum rate is a 60.0-kg boy using energy when, in 8.00 s, he runs up a flight of stairs that is 10.0-m high? 14) _____

A) 4.80 kW B) 48.0 W C) 735 W D) 75.0 W

15) The net force that an animal exerts on a large fruit it has found is observed over a 10-s interval and is shown in the graph in the figure. What was the average power delivered to the fruit by the animal over this time interval? 15) _____



A) 1.3 W B) 2.5 W C) 2.2 W D) 0.00 W E) 5.0 W