Work, Energy and Power

1. A man pushes a car with a force of 250 N for 100m. What is the work he does on the car?

ANSWER: _____

2. A man lifts a heavy box 2 m from the ground vertically. If he does 200 J of work, what force does he exert on the box?

ANSWER: _____

3. A ball of mass 0.5 kg has 100 J of kinetic energy. What is the velocity of the ball?

ANSWER: _____

4. An 8 kg mass moves at 30 ms^{-1}. What is its kinetic energy?

ANSWER: _____

5. A horse pulls a sled across the snow with a force of 180 N. He pulls the sled 500 m in 5 minutes.
    a. What is the power at which the horse pulls?
    b. If 1 hp = 746 Js^{-1}, is the horse lazy? Why?

ANSWER: a) _____ b)_____

6. A boy of mass 50kg climbs a 3 m wall and then jumps to the ground.
    a. What is his weight?
    b. How much work is done climbing the wall?
    c. What kind of energy and how much of it does he have before he jumps off the wall?
    d. What is his velocity just before he hits the ground?

ANSWER: a) _____

b) _____

c) _____

d) _____

7.

Solutions

1. 25000 J
2. 100 N
3. 20 ms^{-1}
4. 3600 J
5. .
    a. 300 Js^{-1} or 300 W
    b. Yes (horse is pulling at 300 W but 1 hp is 746 W)
6. .
    a. 490 N
    b. 1470 J
    c. Potential energy, 1470 J
    d. 7.7 ms^{-1}