

1. Define power
 - Work done / time taken
2. A force F takes time t to move an object through a displacement x at constant velocity v in the direction of the force. The work done by the force is W . Use the definition of power to show that the power P transferred by the force is given by $P = Fv$.

$$W = Fx \text{ or } E = Fx$$

$$(P =) Fx / t = Fv \text{ or } P = Fvt / t = Fv$$

3.

A block is pulled up a slope by a wire attached to a motor, as shown in Fig. 3.1.

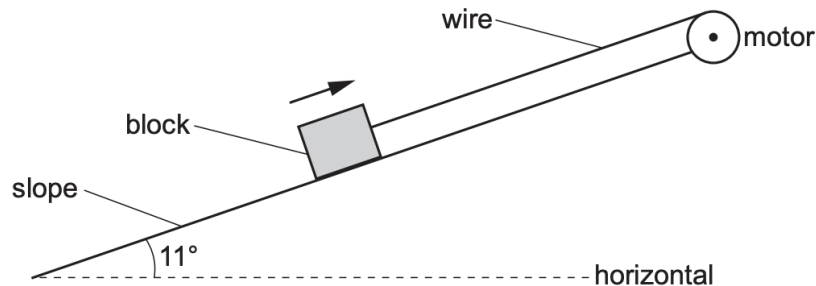


Fig. 3.1 (not to scale)

The useful power output of the motor is 56 W. The block has a weight of 430 N and travels with constant velocity along the slope at an angle of 11° to the horizontal.

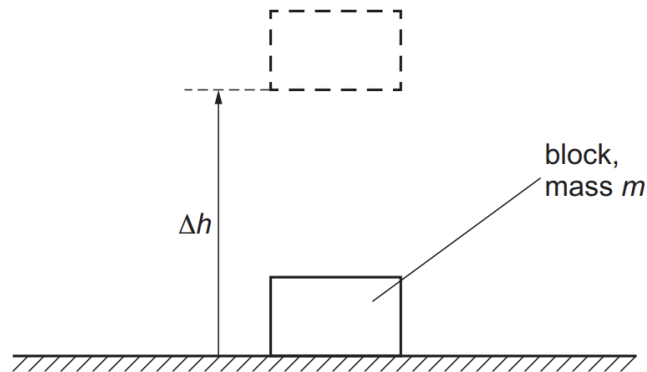
Assume that there are no resistive forces opposing the motion of the block.

The rate of increase of gravitational potential energy of the block is equal to the useful power output of the motor. One of the reasons for this is that there is no work done against resistive forces. By considering the motion of the block, state another reason for this.

- No change in kinetic energy of the block (as velocity is constant)
4. State what is meant by the work done by a force.
 - Product of force and displacement in the direction of force

5.

A block of mass m is raised vertically at constant speed. The vertical height gained by the block is Δh , as shown in Fig. 3.1.



weight/force = mg , and g identified as acceleration of free fall

ΔE_P identified as work (done by lifting force/weight), and so = $mg \times \Delta h$

When asked to determine efficiency, give answer as a fraction.
Eg 0.67 instead of 67%