Question #72941, Physics / Other

A printing press weighing 9500 newtons was pulled up an incline 1.00 m long and 2.00 m high in 2.00 minutes. The force used to overcome friction was 250 N. Calculare:

(a) Total work input.

(b) Total work output

(c) Potencial energy added

(d) Efficiency

(e) Power generated (bases on work input)

Solution

(a) $W_{in} = \Delta E_{gp} + W_f = mg\Delta h + f\sqrt{d^2 + h^2}$;

$W_{in} = 9500 \times 2.0 + 250\sqrt{1^2 + 2^2} = 19559\,\text{J}$

(b) $W_{out} = \Delta E_{gp} = mg\Delta h$;

$W_{out} = 9500 \times 2.0 = 19000\,\text{J}$

(c) 19000 J

(d) $k = \frac{W_{out}}{W_{in}} = \frac{19000}{19559} = 0.97$

(e) $P = \frac{W_{in}}{\Delta t} = \frac{19559}{120} = 163\,\text{W}$