

QUESTION:

How much work is done by a person if he pulls a crate with a force of 250 N at an angle of 60 and crate moves 20 m if the same amount of force is applied horizontally, how much work is done if the crate still move the same distance ?

ANSWER

The work done by a constant force of magnitude F on a crate that moves a distance d in the direction of the force is:

$$W = Fd \cos \alpha$$

α is the angle between \vec{F} and \vec{d} .

Hence in the first case the work done is

$$W = Fd \cos(60^\circ)$$

$$W = 250 \cdot 20 \cdot 0.5 = 2500 \text{ J}$$

And in the second case work is

$$W = 250 \cdot 20 \cdot \cos(0^\circ) = 250 \cdot 20 \cdot 1 = 5000 \text{ J}$$

ANSWER

2500 J and 5000 J