

Cambridge International AS & A Level

Mathematics

9709/42

Paper 4 Mechanics

May/June 2025

Question No (1)

<https://kingcambridgesolutions.com>

WhatsApp 03454231525

Rs:300/Paper

Question No (1)

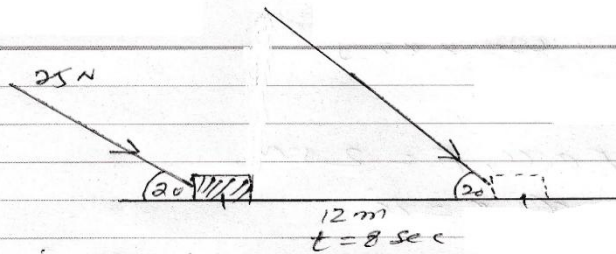
A crate is being pushed in a straight line along a horizontal surface by a force of magnitude 25 N inclined at 20° above the horizontal. The crate moves a distance of 12 m in 8 seconds with constant speed.

- Find the constant speed of the crate.
- Find the work done by the 25 N force.
- Find the power at which the 25 N force is working.

Solution:

DATE :-

(a)



given data,

$$\text{Force, } F = 25 \text{ N}$$

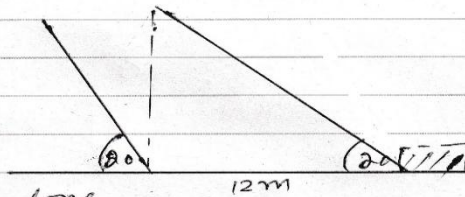
angle above horizontal, $\theta = 20^\circ$ distance, $s = 12 \text{ m}$ time, $t = 8 \text{ sec}$

$$\text{constant speed, } v = \frac{\text{distance}}{\text{time}}$$

$$= \frac{12}{8}$$

$$v = 1.5 \text{ m s}^{-1}$$

(b)



work done,

$$W = FS \cos \theta$$

$$= 25 \times 12 \cos 20^\circ$$

$$= 25 \times 12 \times 0.9397$$

(As the block is moving along horizontal, so $\cos \theta$)

$$W = 281.9 \text{ J}$$

$$W = 282 \text{ J}$$

©

Given data,

$$\text{Force, } F = 25 \text{ N}$$

$$\text{angle, } \theta = 20^\circ$$

$$\text{speed, } v = 1.5 \text{ m/s (part a)}$$

$$\text{power, } P = F v \cos \theta$$

(As the block is moving along horizontal)

$$\begin{aligned} P &= 25 \times 1.5 \times \cos 20^\circ \\ &= 25 \times 1.5 \times 0.9397 \end{aligned}$$

$$P = 35.2 \text{ W}$$