

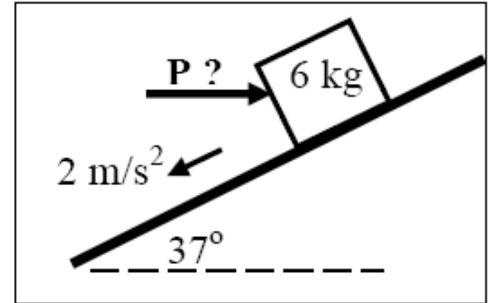
Practical Discussion Problems (4)

Dynamics (Newton's Laws of Motion)

Q1:

A 6-kg block is on a frictionless inclined plane that makes an angle of 37° with the horizontal. Note $\sin(37^\circ) = 3/5$ and $\cos(37^\circ) = 4/5$. What horizontal pushing force is needed in order for the block to accelerate down the plane at 2 m/s^2 ?

- A) 30 N B) 40 N C) 45 N D) 60 N



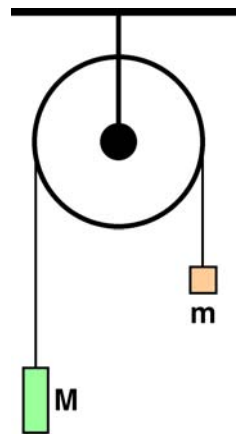
Q2: In the figure shown, the two masses are connected by a string over a pulley.

(i) Suppose first that $M = m = 0.8 \text{ kg}$ and that the masses are moving at a constant speed. Which of the following statements about the tension in the left string is true? (Use $g = 10 \text{ N/kg}$.)

- (A) The tension is smaller than 8 N. (B) The tension is 8 N.
(C) The tension is larger than 8 N but smaller than 16 N. (D) The tension is 16 N.
(E) None of the above.

(ii) Now suppose that $M = 0.8 \text{ kg}$ and $m = 0.4 \text{ kg}$, and the system is released from rest. The tension in the left string is CLOSEST to:

- (A) 12 N (B) 10 N (C) 8 N
(D) 6 N (E) 4 N



Q3:

Two identical blocks are connected by a spring. The combination is suspended, at rest, from a string attached to the ceiling, as shown in the figure above. The string breaks suddenly.

Immediately after the string breaks, what is the downward acceleration of the upper block?

- (A) 0 (B) $g/2$ (C) g
(D) $2g$ (E) $2g$

