Module 05 - Lesson 4

Tension, Strings, and Pulleys

Question 1: A 5.0-kg bucket of water is raised from a well by a rope, giving the bucket an upward acceleration of 3.0 m/s². Find the force exerted by the rope on the bucket.

Question 2: Two boxes-connected by a string are placed on the frictionless slope shown in Fig. 1. Calculate the ratio of the masses (m_1/m_2) for the system to remain in equilibrium.
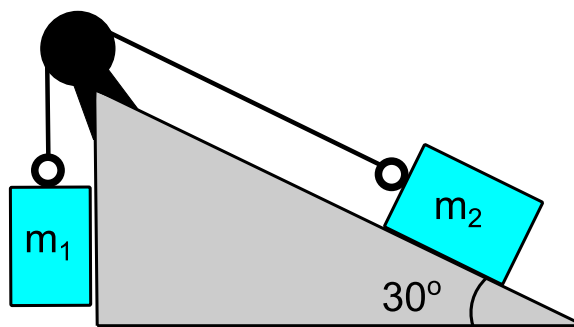

FIG. 1: Boxes on frictionless slope

Problem: An warehouse worker is pulling two boxes (of mass $m_1 = 5$ kg and $m_2 = 20$ kg) across a frictionless horizontal floor, by exerting a 40-N horizontal force. The boxes are connected with a massless rope. Find the acceleration of each box and the tension in the rope.
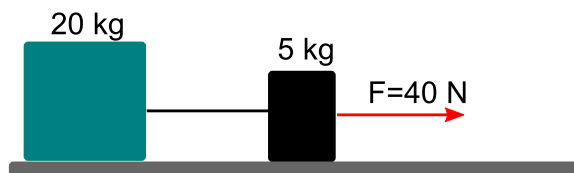

FIG. 2: Pulling two-boxes across a frictionless surface