Prob-Chap04-PHYS-109

4.3. A 5.0 kg block is suspended by three taut strings as shown in Fig. 4.62. Find the tension in the strings.

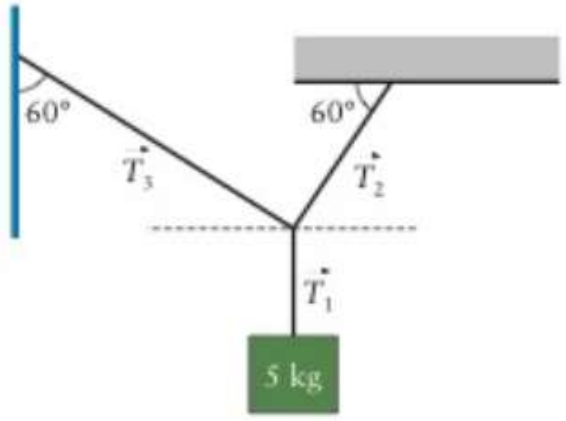

Figure 4.62

4.7. Two horizontal forces, $\overrightarrow{F_1}$ and $\overrightarrow{F_2}$, are pulling an object mass m = 1.5 kg from two opposite sides. $\overrightarrow{F_1}$ pulls to the right and $\overrightarrow{F_2}$ pulls to the left. The magnitude of $\overrightarrow{F_1}$ is 25 N. The object moves strictly along the horizontal x-axis, which we choose as positive to the right. Find the magnitude of $\overrightarrow{F_2}$ if the object's horizontal acceleration is (a) a=10m/s ;(b) a=0m/s ; and (c) a = –10 m/s^2.

4.10. Fig. 4.64 shows two blocks of masses M and m. The horizontal surface allows for frictionless motion. The string tied to the two blocks is massless and passes over a massless pulley that rotates without friction. (a) What resulting motion of the two blocks do you predict? If M = 3.0 kg and m = 2 kg, (b) find the magnitude of the acceleration of the sliding block, (c) find the magnitude of the acceleration of the hanging block, and (d) find the magnitude of the tension in the massless string.

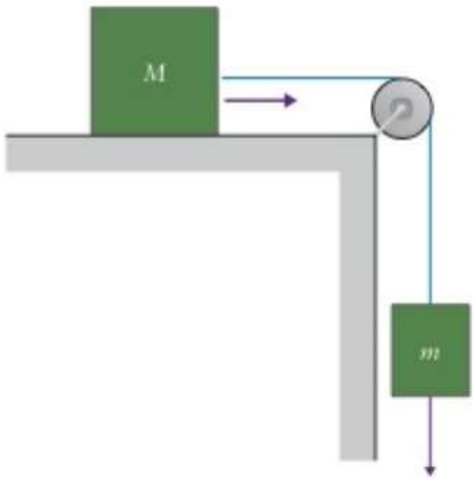

Figure 4.64

4.11. Fig. 4.65 shows two objects that are connected by a massless string. They are pulled along a frictionless surface by a horizontal external force. Using F_{ext} = 50 N, m_1 = 10 kg, and m_2 = 20 kg, calculate (a) the magnitude of the acceleration of the two objects, and (b) the magnitude of the tension ST in the string.

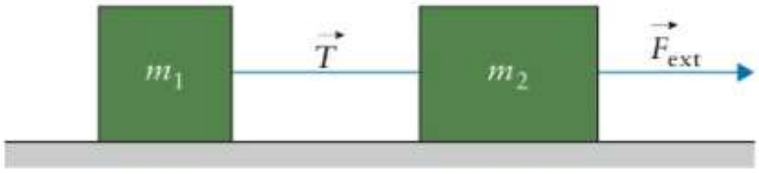

Figure 4.65

4.12. A block of mass m_1 = 14 kg, on a frictionless inclined plane with an angle of $\theta = 35°$ with the horizontal, is connected to another block of mass m_2 = 6 kg by a massless string that passes over a pulley as shown in Fig. 4.66. Take the pulley as an ideal pulley. Calculate the acceleration of the blocks and the tension in the string.

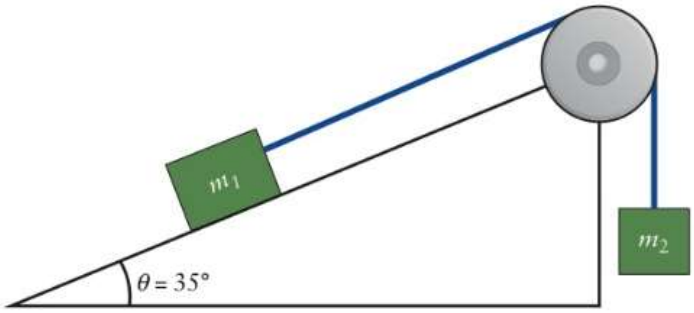

Figure 4.66