Answer on Question #54819-Physics-Mechanics-Kinematics-Dynamics

Two blocks of masses 1kg and 2kg are in contact liying on a horizontal smooth surface. The blocks are pushed by the force of 6N. IF THE BLOCKS ARE ALWAYS IN CONTACT, WHAT IS THE FORCE AT THEIR COMMON CONTACT {IF FORCE APPLIED AT 1KG BLOCK}?

Solution

Let us consider object 1. There are two forces acting on this object. The external force, and the contact force due to object 2, opposing the external force.

Let F be the external force applied to object 1 and let $F_{contact}$ be the force on 1 due to 2, opposing the externally applied force. Therefore, net force acting on object 1 is:

$$F_{net1} = m_1 a = F - F_{contact}$$

Therefore,

$$a = \frac{F - F_{contact}}{m_1}$$

Now let us consider object 2. There is one force acting on this object, that is the contact force between 1 and 2. Because of Newton's third law, this is the same as the contact force A applies to B, that is, $F_{contact}$. Therefore the net force acting on 2 is:

$$F_{net2} = m_2 a = F_{contact}$$

Therefore,

$$a = \frac{F_{contact}}{m_2}$$

Thus,

$$F_{contact} = F \frac{m_2}{m_1 + m_2} = 6 \frac{2}{1 + 2} = 4 \, N.$$

Answer: $4 \, N$.