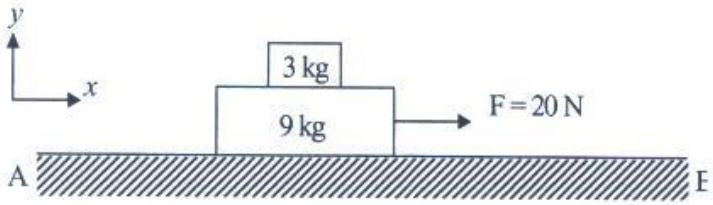
**Phys 101 – Sec # 1** Key **Quiz # 4 (Ch. 5 & 6)**

**Name:** **ID #**

1- A 3.0 kg block is placed on top of a 9.0 kg block as shown in the figure. A horizontal force **F** = 20 **i** N is applied to the 9.0 kg block, which slides on the frictionless surface AB. Assuming that the 3.0 kg block does not slip, find the **frictional force** exerted by the 9.0 kg block on the 3.0 kg block. (Find magnitude & direction).

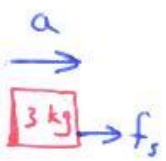



for the system of two blocks

$F_{net} = ma$

$F = (3+9)\,a$

$a = \frac{20}{12} = \frac{5}{3}\ m/s^2$.




Then, focus on top block

$\vec{f}_s = ma = 3\left(\frac{5}{3}\right) = 5\ N\ (\hat{i})$

directed to the right.

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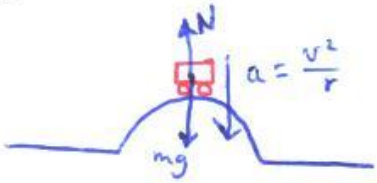
2- A roller-coaster car has a mass of 1200 kg when fully loaded. As the car passes over the top of a circular hill of radius 18 m, its speed is constant and equal to 11 m/s. What are the magnitude and direction of the **force** exerted by the track on the car?




apply Newton's 2nd law along the vertical axis.

$F_{net} = ma$

$N - mg = -m\frac{v^2}{r}$

$N = m\left(g - \frac{v^2}{r}\right) = 1200\left(9.8 - \frac{11^2}{18}\right) = 3693\ N$