

USEFUL RESOURCES

The updates, homework assignments, and useful links for APC can be found on SchoolNova's web page:

https://schoolnova.org/nova/classinfo?class_id=adv_phy_club&sem_id=ay2020

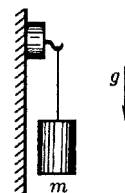
The practical information about the club and contacts can be found on the same web page.

TODAY'S MEETING

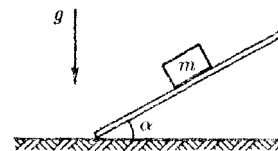
Today we discuss friction force. This homework is divided in two parts again.

HOMEWORK PART 1

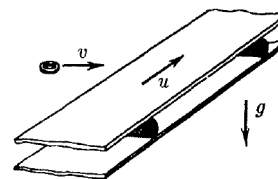
1. On an icy road friction coefficient between wheels of a car and the road is 9 times smaller than on a normal road. For what speed on an icy road the braking distance is the same as for 30 miles per hour on a normal road ?
2. A light magnet with a hook on a vertical steel wall stays at rest when a mass hanged on the hook is less than m_0 . What is magnetic force if friction coefficient between the wall and the magnet is μ ? What will acceleration of the magnet be if a mass $m > m_0$ is hung from the hook?



3. A body of mass m on a horizontal plane is acted upon with a force F directed at an angle α to the horizon. Friction coefficient is μ . Find acceleration of the body if it is not lifted above the plane.
4. A body of mass m lies freely on a horizontal plane with friction coefficient μ . The plane is slowly inclined all the way up to 90° . Find how the friction force between the body and the plane depends on the angle α which the plane makes with the horizon.



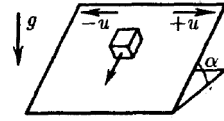
5. A horizontal conveyor belt is moving with speed u . A puck flies on the belt with initial velocity v perpendicular to the belt. Find the maximal width of the belt at which the puck will still reach the opposite side of the belt if friction coefficient between the puck and the belt is μ .



- *6. Two pucks are hit in such a way that their centers have the same initial velocity, but in addition one of them is rotating around its' center. Which of them will move farther on a horizontal surface with friction?

HOMework PART 2

- *7. An inclined plane is going back and forth along itself horizontally, quickly and often changing its' velocity between u and $-u$ (you may neglect time it takes to change the velocity and assume that it could only have these two values), as shown on a figure. A body is moving on this plane with constant velocity downwards. Find this velocity if coefficient of friction is μ and inclination angle of the plane is α and $\mu < \tan \alpha$.



- *8. A coin lies on a very long inclined plane with angle α . Friction coefficient is $\mu = \tan \alpha$. The coin is hit and it starts to move with horizontal velocity v along the plane. Find velocity of the coin after a very long time.

FOR THE NEXT MEETING

IMPORTANT: The next club's meeting is at 3:00pm, via Zoom, on Sunday, **December 20**.