Answer on Question #49449-Physics-Mechanics-Kinematics-Dynamics

The car has $m = 1t = 1000\ kg$ measure. Over the long motion friction force acts as gravity $\mu = 0.1$.What will be the withdrawal of his forces if he moves: a) uniformly rectilinearly, b) rectilinear so hastily rushed evenly to $a = 2\frac{m}{s^2}$, c)ascends the slope $h = 1m$ in every street $l = 25m$ is that haste. , d) descends in the same slope with the same haste

Solution

a) If the car moves uniformly rectilinearly, the withdrawal of his forces is zero:

$$F = ma = 0.$$

b) If the car moves rectilinear so hastily rushed evenly to $a = 2\frac{m}{s^2}$, the withdrawal of his forces is zero:

$$F = ma = 1000\ kg \cdot 2\frac{m}{s^2} = 2000\ N = 2\ kN.$$

c) If the car ascends the slope 1m in every street 25m, then

$$\sin\alpha = \frac{h}{l} = \frac{1}{25}.$$

The withdrawal of his forces is

$$F = ma = m(-g\sin\alpha - \mu g\cos\alpha) = -mg(\sin\alpha + \mu\cos\alpha)$$
$$= -1000\ kg \cdot 9.8\ \frac{m}{s^2}\left(\frac{1}{25} + 0.1\sqrt{1 - \left(\frac{1}{25}\right)^2}\right) = -1.37\ kN.$$

The negative value means that the force is directed opposite motion.

d) If the car descends in the same slope with the same haste, then the withdrawal of his forces is

$$F = ma = m(g\sin\alpha - \mu g\cos\alpha) = mg(\sin\alpha - \mu\cos\alpha) = 1000\ kg \cdot 9.8\ \frac{m}{s^2}\left(\frac{1}{25} - 0.1\sqrt{1 - \left(\frac{1}{25}\right)^2}\right)$$
$$= -0.59\ kN.$$