WS-2 · Task

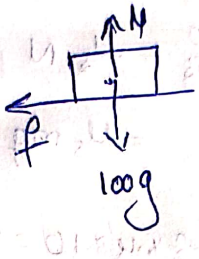
(2)

As the coefficient of friction does not depend on area of surface, both of the breakes will be equally effective.

WS-2 Thank 8th integrated plus

(3)

Given force $F = 98\ N$; $m = 100\ kg$



$N = mg$

$\Rightarrow N = 100 \times 9.8$

$= 980\ N$

Acc to law of friction

$f_s = \mu_s N$

$\Rightarrow \mu_s = \frac{f_s}{N} = \frac{98}{980}$

$\Rightarrow \mu_s = 0.1$

(4)

Mass of each coin $= 350\ gm = 350 \times 10^{-3}\ kg$

$\mu_s = \frac{3}{4}$; $g = 10\ m/s^2$

$\therefore$ The friction force $f = \mu_s N$

$\Rightarrow f = \frac{3}{4} \times 350 \times 10^{-3} \times g$

$= 2.565\ N$

(5)

Given $m = 6\ kg$; $F = 12\ N$; $g = 10\ m/s^2$

Given that the body is in uniform motion

$V =$ constant $\therefore$ acceleration $= 0$

$\therefore$ The force of friction = Force applied

$= 12\ N$

⑥

Given force $f = 4\ N$.

mass $m = 4\ kg$; $\mu = 0.2$

When the body is placed on a surface, let us calculate static friction $f_s = \mu_s N$

$= \mu_s mg$

$\Rightarrow f_s = 0.2 \times 4 \times 10 = 8\ N.$

Clearly $f_s > F[4N]$. So the body remains at rest $\therefore$ Acceleration $= 0$

⑨

We know that $f \propto N$.

$\Rightarrow f = \mu N.$

$\Rightarrow \mu = \frac{f}{N}$

As Normal reaction is doubled, friction (f) also doubled.

$\therefore \mu' = \frac{2f}{2N} = \frac{f}{N}$

$\therefore \mu' = \mu$:

Coefficient of friction remains constant.

(10)

If R' be the resistance

Then net force acting on the body as it is falling down is $F_{net} = F_g - R$

$\Rightarrow Ma = mg - R$

$\therefore$ acceleration $= a = \frac{mg-R}{M} = g - \frac{R}{m}$

clearly when 'm' increases, 'a' also increases

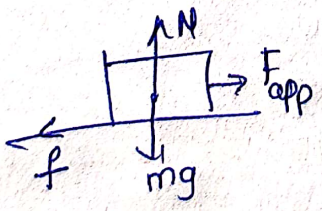
Now $t_d = \sqrt{\frac{2h}{a}}$: Velocity on reaching ground

$v = \sqrt{2ah}$

clearly $m_1 > m_2$, so m_1 has more acceleration and velocity. It will reach first

(11)

friction is a self adjusting force.



Applied force = frictional force

$F_{app} = f$

Till there is no relative motion between the bodies

Friction is a non conservative force because the amount of work done by the friction depends on the path and friction is also an EM force.

(12)

If contact force = Normal force

For the body to remain in equilibrium the net force acting on the body must be 0.

The bodies may be rough but they don't slip each other, because force of friction will not come into action.

L TASK

(2)

when a bicycle is in motion, the force of friction exerted by the ground on the two wheels is such that it acts in the backward direction on the front wheel and in the forward direction on the rear wheel

For the rear wheel, the wheel pushes backward on the ground, so the ground pushes the wheel Forward its friction is in forward direction.

For the front wheel, it experiences friction in the backward direction as it resists the forward motion

(3)

Aeroplanes are streamlined because streamlining reduces the resistance offered by the air (fluid) as the aeroplane moves through it

(4)

If external force = frictional force

$\therefore F_{net} = 0$.

$\therefore$ There is no relative motion between the bodies. Then the body is at rest

$\Rightarrow$ static frictional force comes into play

⑤

A high pressure tyre has a smaller contact area with the ground.

while the total Normal force remains the same, the smaller contact area means less deformation of the tyre and road, which generally leads to less rolling ~~rest~~ resistance

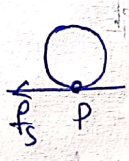
⑥

Smaller steps gives us larger magnitude of the normal force, and extra normal force leads to a large friction force. But larger steps provides less normal force, and it will affect in small frictional force.

So as soon as we walk on a slippery floor like ice, we must take small steps to avoid slipping

⑦

we know that static friction > kinetic frict



As wheel rotating, the lowest point P of the wheel is at rest, then static friction develo in order to stop the car in a shortest distance maximum possible frictional force by applying breakes is needed.

This maximum force can only be achieved whe the surfaces in contact are just on the verge of slipping but not slip. so apply the breakes hard enough to prevent slipping