8th

WS-2 friction

T task

(2)

we know that $f \propto N$

$$\Rightarrow f = \mu N$$

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

As Normal reaction (N) double, friction (f) also doubled

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

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

$$\Rightarrow \mu' = \mu$$

coefficient of friction remains unchanged

(3)

If R' be the resistance

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

$$\Rightarrow ma = mg - R$$

Acceleration $\Rightarrow a = \frac{mg-R}{m} = g - \frac{R}{m}$

clearly when 'm' increases 'a' also increases

Now $t_d = \sqrt{\frac{2h}{a}}$: Velocity of reaching $v = \sqrt{2ah}$.

Clearly $m_1 > m_2$ so m_1 has more acceleration and velocity It will reach first

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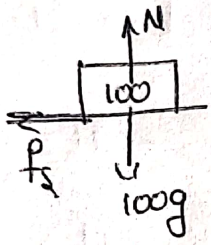
(5)

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

(6)

Given force $f = 98$ N. ; $m = 100$ kg.



$N = mg$

$\Rightarrow N = 100 \times 9.8$

$\Rightarrow N = 980$N.

Acc to law of static friction

$f_s = \mu_s N$

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

$\Rightarrow \mu_s = 0.1$

(7)

mass of each can $= 350$ gm $= 350 \times 10^{-3}$ kg

coefficient of friction $\mu_s = \frac{3}{4}$; $g = 10$ m/s^2 (or) 9.8 m/s^2

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

$= \mu_s mg$

$= \frac{3}{4} \times 350 \times 10^{-3} \times 9.8$

$= \frac{105}{4} \times 10^{-2} \times 9.8$

$= 25.65 \times 10^{-1} = 2.565$ N

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(8)

Given mass $m = 6\,kg$

Force $F = 12N$. ; $g = 10\,m/s^2$.

Given that the body is in uniform motion, that is

Velocity = constant ⇒ acceleration = 0

∴ The force of friction = Applied force

$f = 12N$.

(9)

Given Force $f = 4N$

Mass $m = 4\,kg$.; coefficient of friction

$\mu = 0.2$.

when the body is placed on a surface, first let us calculate static frictional force

$f_s = \mu_s N$

$= \mu_s mg$

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

∴ $f_s >$ Applied force [4N]. so the body remains at rest (ie) Acceleration = 0.

(11)

~~work done by the frictional force for a closed Path is not equal to zero. so frictional force is a non conservative force and also contact force, self~~

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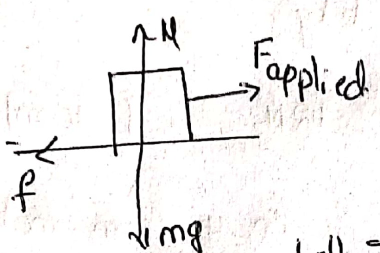
(11)

friction is a self adjusting



Applied force = frictional force

i.e $F_{applied} = f$

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 ~~not~~ will not come into action

L Task Main level

(2)

In cycling, the rear wheel moves by the force communicated to it by pedalling while front wheel moves by itself. so while Pedalling, the force exerted by rear wheel on ground makes force of friction act on it in the forward direction. Front wheel moving by itself experience a force of friction in backward direction. However if Pedalling is stopped both wheels move by themselves and experience Force of Friction in backward direction.

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(4)

If external (or) applied force = frictional force

Then F_{net} force = 0

∴ There is no relative motion between the bodies

∴ the body is at rest.

⇒ static frictional force comes into play

(5)

Rolling resistance is the energy that is lost when the tire is rolling. The main reason for the loss of energy is the constant deformation of the tire.

lower pressure in tyres results in more flexing of sidewalls which increase the deformation and damping thus produces higher rolling resistance

∴ A high pressure tire rolls more easily than low pressure tire

(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. [this is from $f = \mu N$]

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

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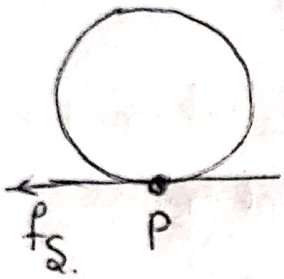
(7)

we know that static friction > kinetic friction



As the wheel is rotating, the lowest Point 'p' of the wheel is at rest There static friction developed

in order to stop the car in a shortest distance maximum possibe frictional force by applying breaker is needed. [i.e static frictional force]

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

WS-3, sound 8th integrated

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