

## CLASS 8

# FRICTION

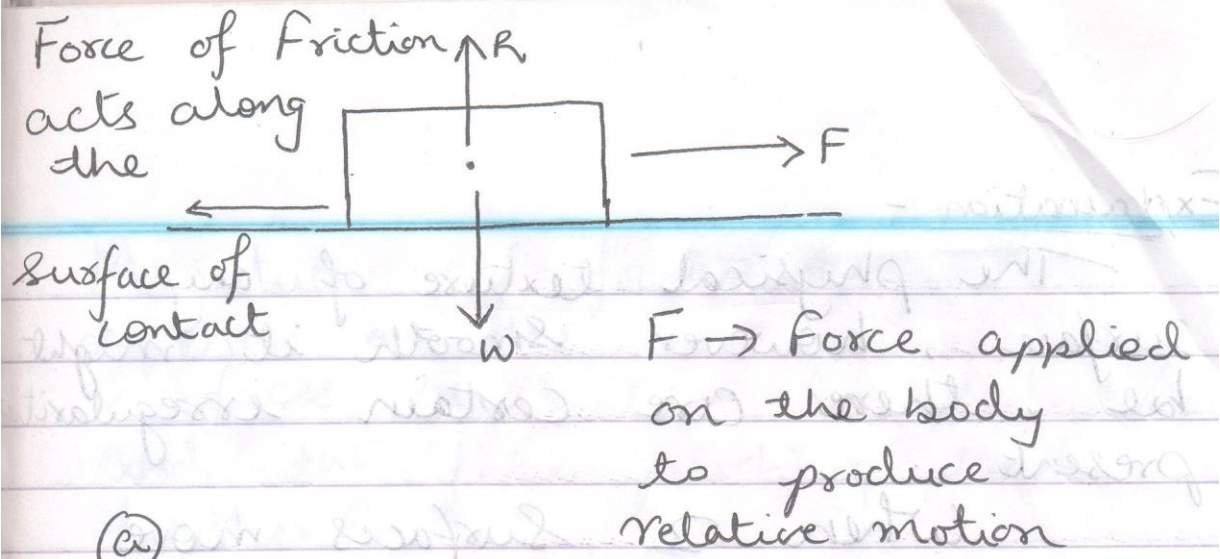
Friction is a natural force resisting the relative motion of two surfaces in contact. It is always exerted in a direction that opposes motion.

### Other Definitions -

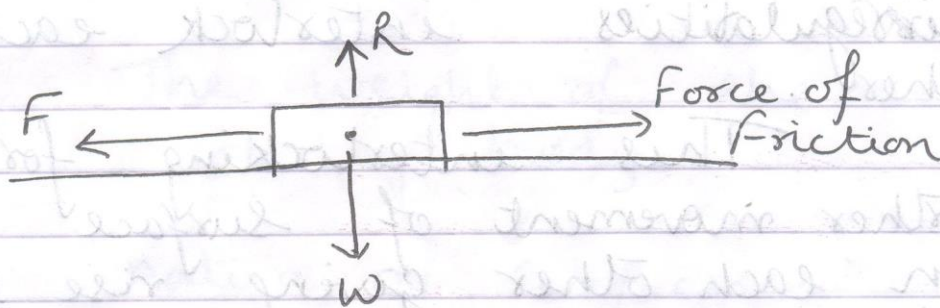
\* Friction is the force that resists the motion of an object when it is in contact with another object or surface.

\* Friction is the resistance to motion experienced when 2 surfaces in contact move with respect to each other.

Friction is possible only when two surfaces are in physical contact with each other.



(a)



when a block is pulled towards right, force of friction acts towards left and vice versa.

## CAUSE of FRICTION

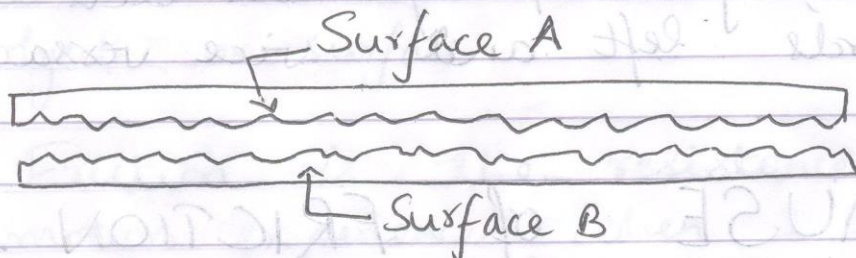
- (i) Due to roughness of the two surfaces in contact.

## Explanation -

The physical texture of any surface, however smooth it might be, there are certain irregularities present.

When 2 surfaces move against each other, their irregularities interlock each other.

This interlocking forbids further movement of surface on each other giving rise to friction.



(One surface sliding over another)

Roughness can be seen as presence of hills and valleys.

- \* The 2 surfaces tend to interlock the hills and valleys and oppose the motion.

Magnitude of frictional force depends on the nature of the surfaces that are in contact and the force pushing them together.

It depends on -

(i) The weight of the sliding body.

(ii) nature of surfaces in contact.

→ More the weight, more is frictional force.

→ Eg:

## FRICTION

A ball rolls on a glass surface farthest.  
It rolls shortest distance on a Carpet.

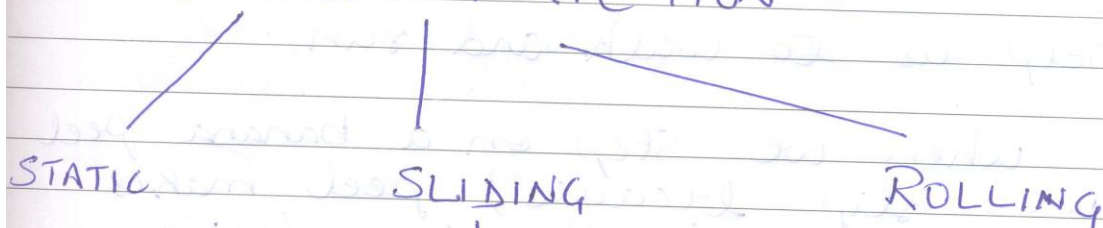
The glass surface is smooth hence cause less friction, thus, ball moves farthest.

The carpet is rough and causes more friction, thus, ball moves slow.

\* Smoother the surface, lesser is the friction.

Eg:- It is easier to push or pull a suitcase on wheels.  
Because, Rolling friction is less than sliding friction.

### TYPES OF FRICTION



STATIC

SLIDING

ROLLING

↓  
When sliding an object the contact pt. do not get enough time to interlock

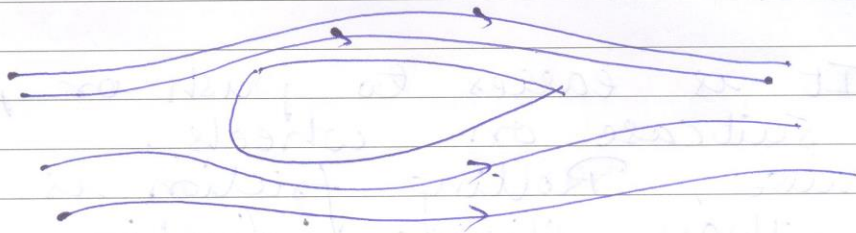
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\* SLIDING is smaller than  
STATIC friction

A streamlined shape of an object moving through a fluid reduces friction.

eg: Birds, an aeroplane, a boat or a fish they all have streamline shape.

Their streamline shape helps them to move through fluid easily.



### ADVANTAGES -

1) Help us to walk and run.

eg: when we step on a banana peel we slip because, peel makes the surface smooth so, friction between your feet and ground decreases.

Friction b/w shoes and ground allows us to walk by pushing off ground without slipping and falling down.

Friction allows car tyres to grip and roll along road without skidding.

2) Brakes of vehicles use friction.

When we apply brake, a brake increases friction between tyre and road and vehicle stops.

On a frictionless surface body keep on moving, it will not stop.

3) Friction produces heat -

4) A match stick lights up due to friction.

5) Nails and screws can be held together because of friction.

6) Friction between board and chalk and paper and pencil helps us to write.

### DISADVANTAGES -

1) Friction causes wear and tear.

2) Friction reduces the speed of a moving object.

- 3) Large amount of fuel is wasted while running machines.
- 4) Frictional heat generated can reduce engine's efficiency.

### Methods to Reduce Friction

- 1) Use of Lubricants  
eg: we use powder on carrom board to make its surface smooth, hence friction reduces and striker moves easily.
- 2) By using ball bearings
- 3) By streamlining

### To Increase Friction

1) Friction is a necessary evil.

We are able to walk because of friction.

On a wet marble floor it's difficult to walk because friction is less on smooth surface.



To increase friction surface is made rough. Therefore, our shoe soles are grooved, hence provides greater grip to shoes on the surface. Thus, can walk safely without slipping.

Football shoes have spikes to increase friction and give better grip while playing.

If car tyres are smooth it skids, hence they are treaded to increase friction.

Nail files are rough hence to increase friction between nails and file.

## Important Questions

- 1) Why do fishes have streamlined body?
- 2) Cars have streamline shape to give better mileage. why?
- 3) While servicing cars, we use grease on its moving parts. why?
- 4) While going to Himalaya's we use special snow shoes. why?
- 5) While using new leather shoes we have to be very careful while walking on marble floor. Give reason.
- 6) One must drive carefully on wet roads. why?