Friction :- It is a property of two surfaces in contact by virtue of which a resisting force is developed so as to oppose the sliding motion between two surfaces. This resisting force is called as "friction force".

- FF will act in opposite motion to the direction of motion
- Impending motion is the state of the body in which the body is on the verge of motion.
- This state of the body is called as Limiting Equibrium.
- Each surface exerts a force on other one. They form action-reaction pair.

Types of friction- 1) Dry friction - between two dry surfaces - Coulomb's friction. exists because of irregulators of surfaces.

2) Fluid friction:- between particles or layers of fluids (liquids or gases) It exists because of cohesive force or inter molecular attraction

Types of dry friction- 1) static friction

↓

It is experienced when the body is at rest or in Eqm.

2) Kinetic friction

- while sliding over other surface
- while Rolling over other surface

Limiting Friction:- (F_L):- It is the maximum friction force that can be developed between two surfaces in contact under the given situation before the motion starts.

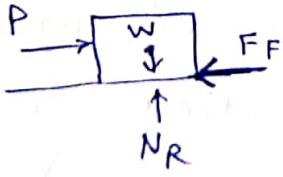
Impending motion:- It is the state of a body when the body is on the verge of motion. This condition is called as limiting equilibrium.

→ Friction Force will be maximum when the body is in impending motion. i.e. limiting $\equiv$ m.

Forces on the block (body) are -

1) weight of the body $= mg = W$
2) Normal reaction from the surface.

both of them will not cause a motion.

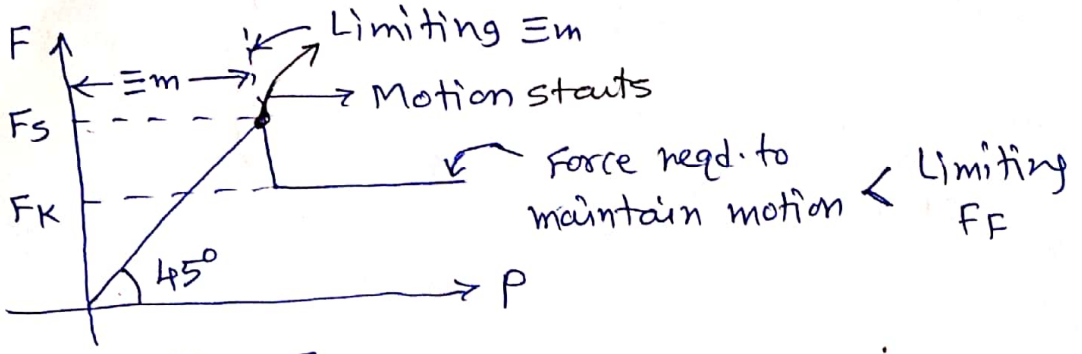


- If we apply a small horizontal force, the block will not move as $F_F > P$
- If P is ↑, then F_F will also ↑.
- But there is a limitation of F_F to increase
- ∴ when $P > F_F$ body will go in impending motion & then start moving. The F_F will drop down.
- ∴ F_F is maximum when body is in impending motion OR limiting $\equiv$ m.

→ The force required to maintain motion with uniform velocity is ~~considerably~~ less than the limiting F_F.

Graph between F & P

F = Friction force & P = applied force



$F_S = F_{max.}$

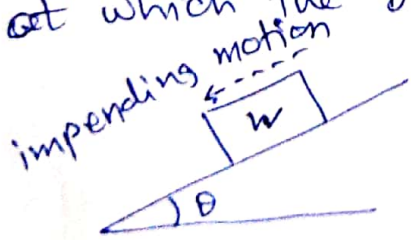
4 cases:- 1) P not present, body in Ξm, no motion, all forces & reactions are in Ξm

2) P applied but not large enough to set the body in motion.

3) P applied is just enough to stat the motion of the body

4) P applied overcomes all opposing forces and sets the body in motion.

Angle of repose:- It is the minimum angle between the inclined plane and the horizontal at which the body tends to slide down the slope under its own weight without application of any external force.



Factors on which friction depends:-

1) Nature of the surfaces in contact
2) Normal reaction (N_R) bet^n the surfaces in contact

Normal Reaction N_R :- If a body is resting on a surface and is not moving, there exists a force exerted by the surface on the body in contact with it which prevents the body from passing through the surface. This is N_R which is $\perp^{ar}$ to the surface. N_R exists even though Friction force is not existing.