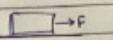


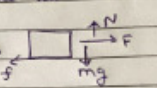
QUES 03:-

A block placed on a rough horizontal surface is pulled by a horizontal force F . Let f be the force applied by the rough surface on the block. Plot a graph of f versus F .

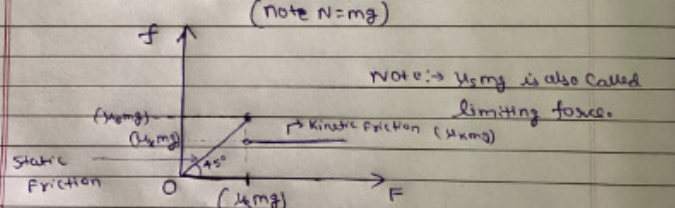
Soln: \rightarrow

Solution: \rightarrow 
 Rough surface (Coefficient = μ_s, μ_k)

\rightarrow Let's Analyse the motion:
 When we apply the force F , the rough surface will exert a opposing friction force f .

Force analysis: \rightarrow  $\Rightarrow N = mg$

\Rightarrow Static friction force range is from 0 to $\mu_s N$.
 So As we know the work of friction is to oppose the relative motion between between the surface.
 So let's check the effect of f as value of F changes. (Note $N = mg$)



Graphical analysis: \rightarrow See as the F increases from 0, f will change $f = 0$ and take value equal to F .
 So ($\text{net} = F - f$) stays 0; But as the F reaches $\mu_s mg$, slipping will start and now friction will obtain a constant value of $\mu_k mg$.
 [Note: $\mu_k < \mu_s$... in real situation]