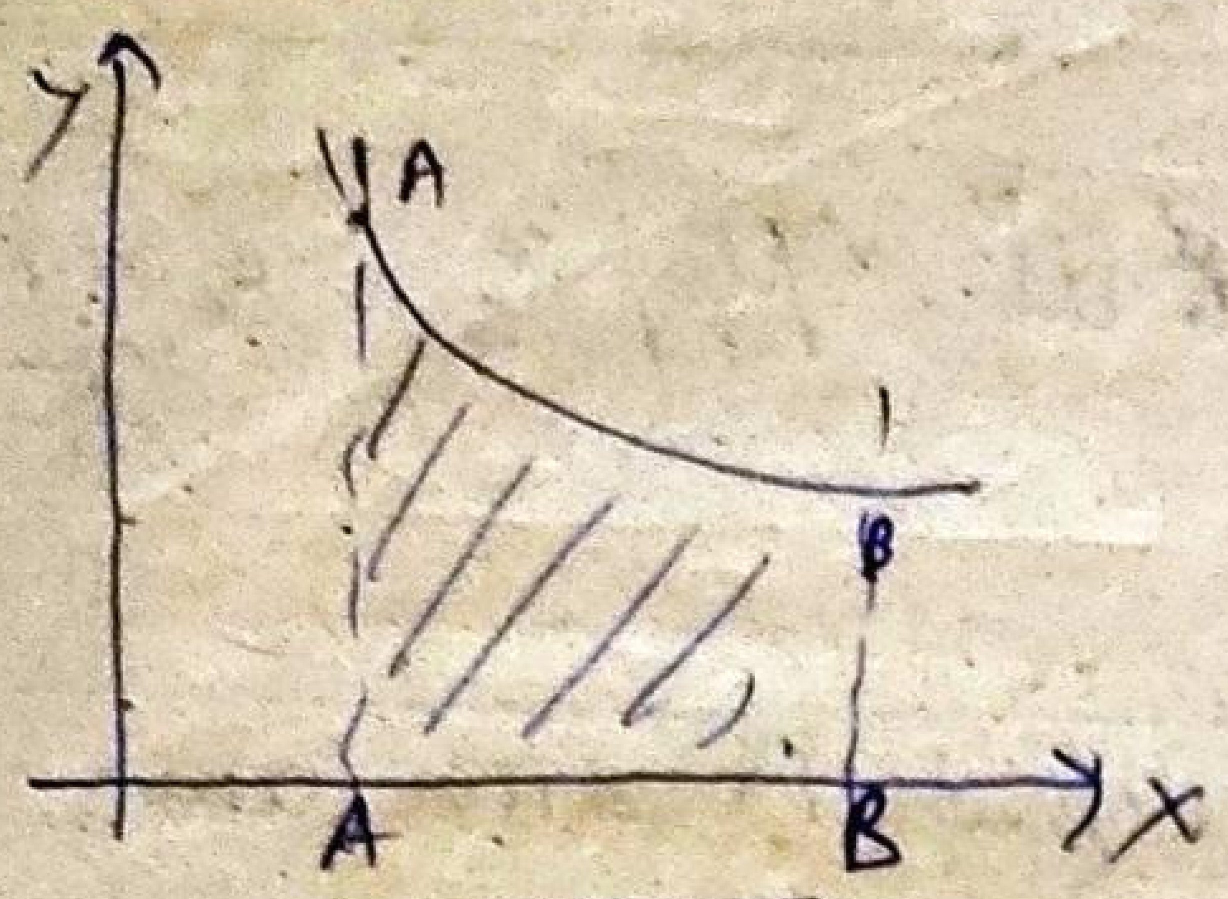
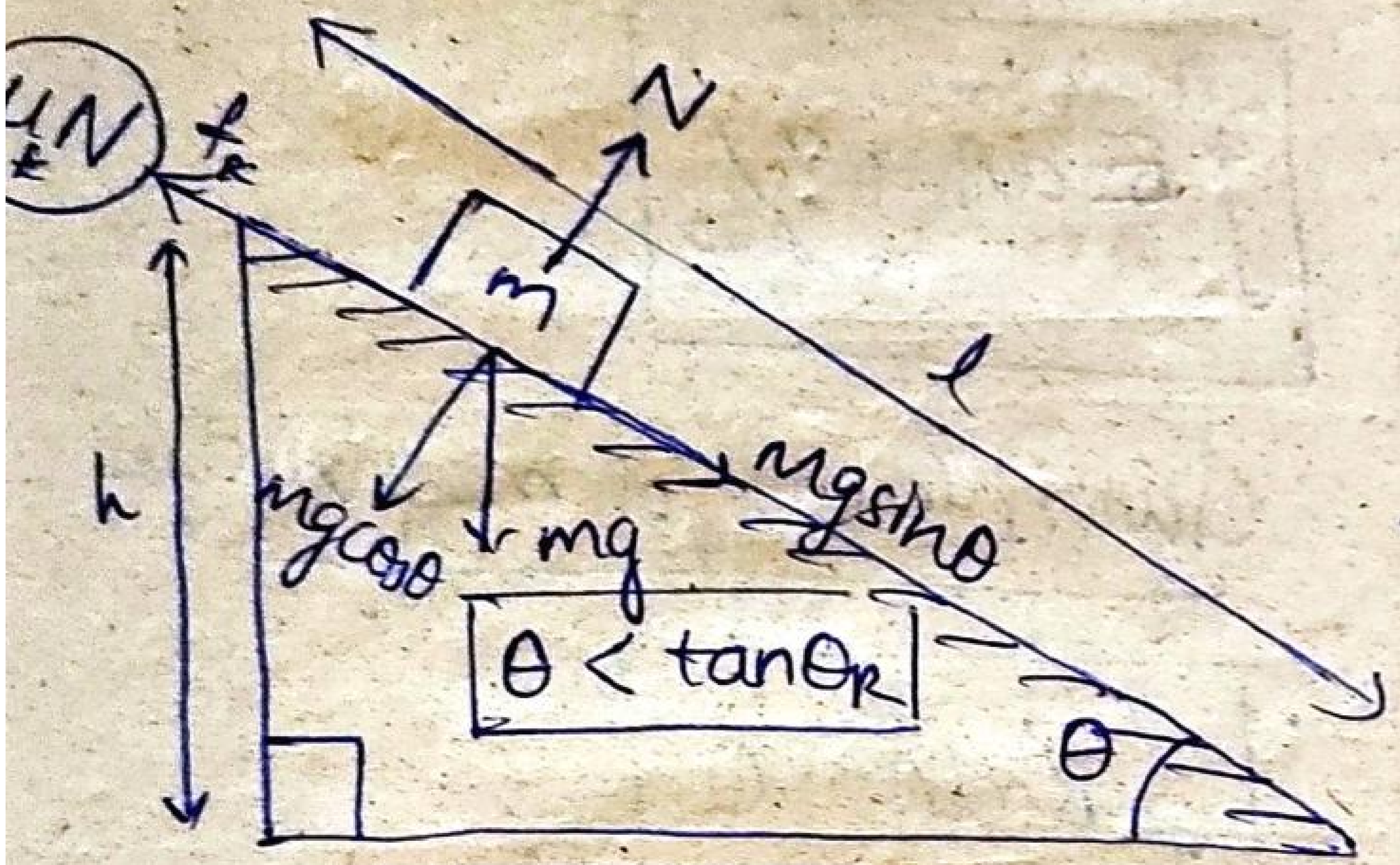
Area Under Force-displacement Graph



$\boxed{W = F.dx}$ Area



$\boxed{h = l\sin\theta}$

→ Work done due to normal force; ⇒ 0J

⇒ due to gravity, [mgh]

$$\boxed{W = +mg\,l\sin\theta\ J}$$

⇒ due to friction [$\mu_k N$]

$W = f_k \cdot s$

$W = -\mu_k N(l)$

$W = -\mu_k mg\cos\theta(l)$

$$\boxed{W = -\mu_k mg\,l\cos\theta}$$

Work done by a Spring

Force

spring const

$$\boxed{W_s = \frac{-k}{2}\left(x_f^2 - x_i^2\right)}$$

final disp. initial disp.

[If initial displacement is natural length] **

$\boxed{x_i = 0}$

$$\boxed{W_s = -\frac{1}{2}kx^2}$$

$\boxed{W = P(\Delta V)}$ *

$\boxed{K.E = \frac{1}{2}I\omega^2}$ *

If ω is given in r.p.m

$$\boxed{\omega_{r/s} = \frac{2\pi\omega_{rpm}}{60}}$$ *

$\boxed{\text{Force} \times \text{time} = \Delta p}$

$= p_f - p_i$

$$\boxed{P.E = \frac{1}{2}kx^2}$$